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# User's Manual

## ROTAMASS Total Insight Coriolis Mass Flow and Density Meter Software Instruction Manual Modbus



IM 01U10S03-00EN-R

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# 1 Introduction

## 1.1 Scope of application

These instructions apply to the following Rotamass Total Insight product families:

- Rotamass Nano
- Rotamass Supreme
- Rotamass Giga
- Rotamass Prime
- Rotamass Intense
- Rotamass Hygienic
- Rotamass Total Insight transmitter in combination with any Rotamass Total Insight sensor.

## 1.2 Contact information

For more information or questions, contact your local Yokogawa sales organization.

Additional information available at <http://www.yokogawa.com> or on the last page of this document.

## 1.3 Starting conditions

### Installation

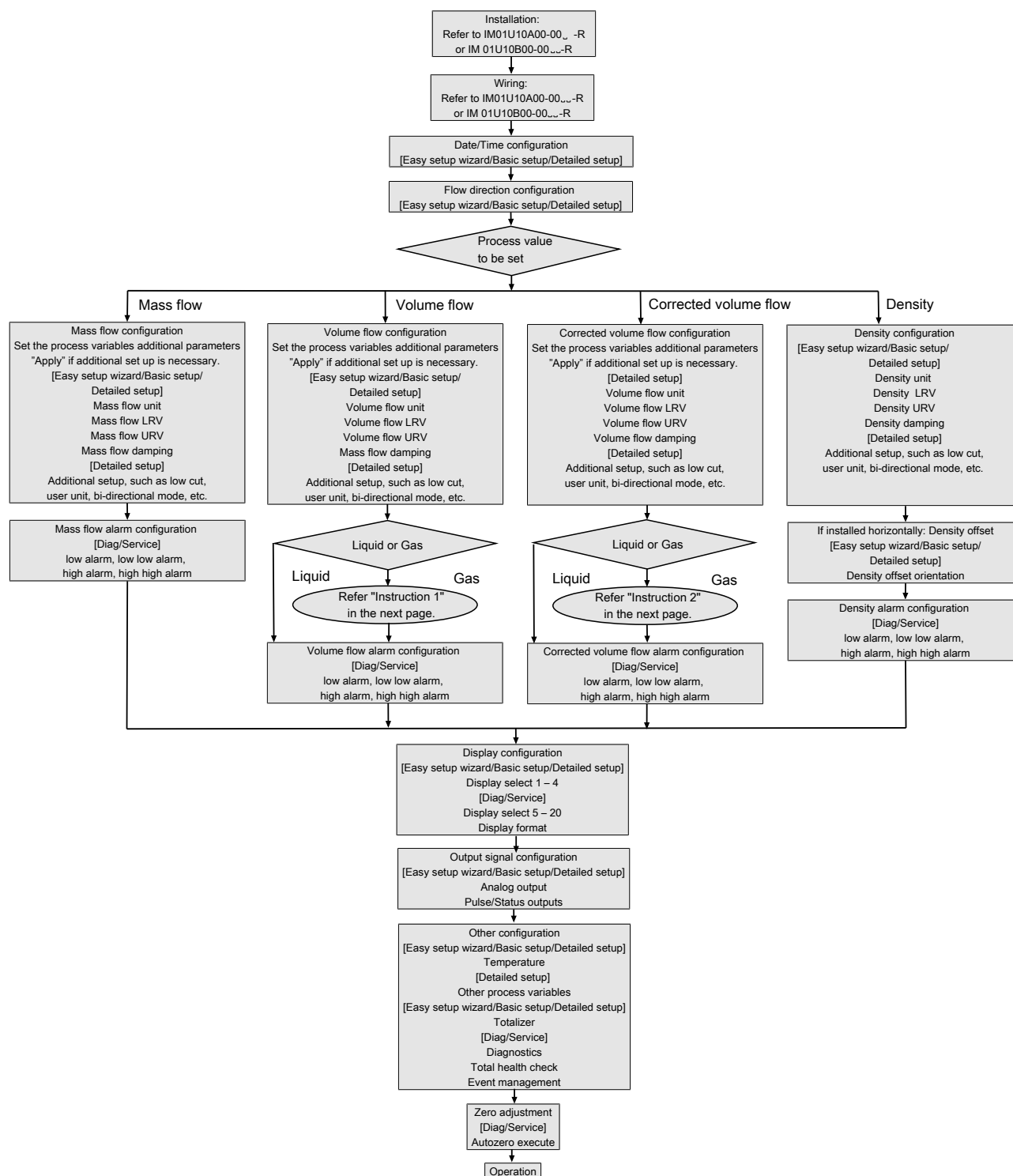
Before starting to use the device, it has to be installed appropriately and all other configurations, such as wiring, have to be configured appropriately.  
For more information about general recommendations for installations and configurations refer to the instruction manual.

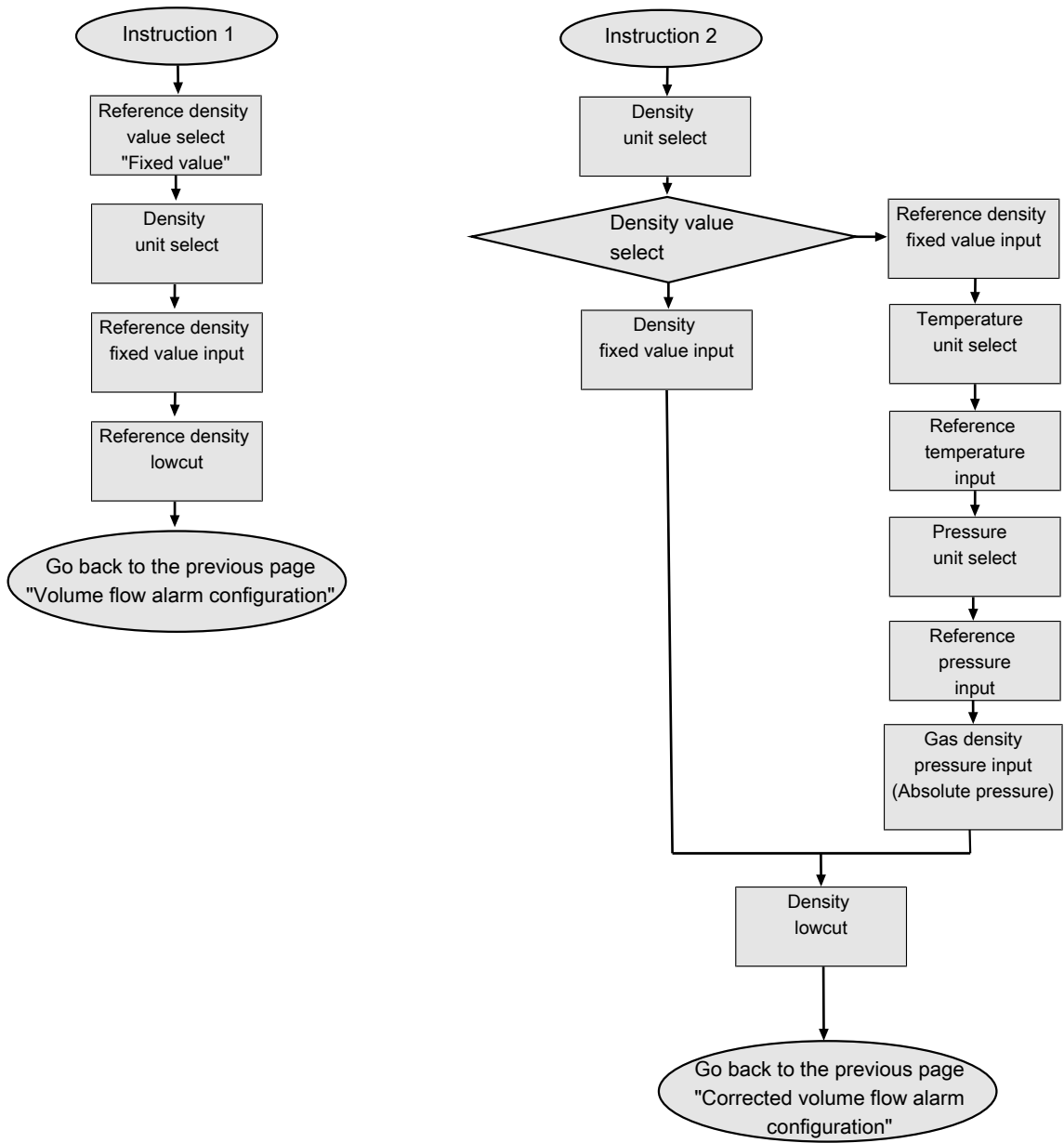
### Operation level for operation and configuration

To operate or configure the device, the appropriate Operation level has to be set when the device is started. To configure the device or change the configuration, Maintenance or Specialist has to be selected and set as the Operation level. For more information on confirming the Operation level and possible operations see *Operation level* [▶ 20].

### Example of configuration procedure

The following flow chart is an example for configuring the device and starting to use it. For more detailed information refer to the description of each function and parameters. To configure or change parameter, the Operation level has to be set to Maintenance or Specialist.





## 2 Functions of transmitter and configuration example

### 2.1 Functions of transmitter

#### 2.1.1 Measuring function

This device can measure mass flow, density and temperature of fluids. Also, volume flow, velocity, calorific value, concentration and net flow can be obtained by calculation. For details of the measuring function see *Measuring function* [▶ 21].

#### 2.1.2 Display function

Measured or calculated process variables, current or total values, are displayed on the LCD display of the Indicator. On the display, status information is also displayed. For more detailed information see *Display* [▶ 14].

#### 2.1.3 Signal IO function

To output the value of process variables, the device has an Analog output to output current signal (4 – 20 mA), a Pulse/Frequency output to output a pulse or frequency signal; the status output can be used to output a specific status or information, such as an alarm. The number of available Analog or Pulse/Frequency outputs depends on the each device configuration. Analog input may be enabled to input a process value to the device. For details of available configuration of IOs, refer to in the instruction manual.

The following table shows the available output/input signals with their corresponding explanation and parameter.

| Output/Input signal           | Overview                             | Parameter                   |
|-------------------------------|--------------------------------------|-----------------------------|
| Analog output                 | Current signal output [▶ 28]         | Analog output [▶ 470]       |
| Pulse/Frequency/Status output | Pulse/Frequency signal output [▶ 30] | Pulse/Status output [▶ 474] |
| Analog input                  | Analog input [▶ 34]                  | Analog input [▶ 500]        |

#### 2.1.4 Totalizer

A maximum of six totalizers can be used on the device to total flow process variables. For more detailed information see *Totalizer* [▶ 502].



### 2.1.5 Event management

Event management is a function for managing how events, such as alarm, warning in terms of categorization, indication, status of output signal, action and behavior, are handled. The user can define the following actions and behavior of the device when an event occurs. For more detailed information see *Event management* [▶ 55].



Do not use this function for critical or important events.

|                         | Configurable options                                                                                                                                                                                               |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Action and Behavior     | <ul style="list-style-type: none"> <li>▪ Ignore it</li> <li>▪ Request that user acknowledge it</li> <li>▪ Record it as an event</li> <li>▪ Change status of output signal</li> <li>▪ Start data logging</li> </ul> |
| Status of output signal | <ul style="list-style-type: none"> <li>▪ Continue</li> <li>▪ Change to alarm status</li> <li>▪ Burnout</li> </ul>                                                                                                  |

### 2.1.6 Backup and restore

The user configuration can be stored in the device memory or on a microSD card on the Indicator. Stored user configuration can be restored to the same or another device by attaching the Indicator or microSD to the target device. For more detailed information see *Backup and restore* [▶ 76].

### 2.1.7 Diagnosis

The device has the following diagnostic functions to perform diagnoses of the device. When any diagnosis detects an abnormal status, an alarm is activated. For more detailed information see *Diagnosis* [▶ 90].

| Detection            | Description                                                                                                                                                                                                                                                            |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Slug detection       | Detection of bubble flow. If a bubble or slug occurs in the fluid, the accuracy or ability to measure process variables is negatively affected. When slug is detected by this function, alarm No.201 is generated. This function is not available for gas measurement. |
| Empty pipe detection | Detection of empty pipe. When an empty pipe is detected by this function, alarm No.202 is generated. This function is not available for gas measurement.                                                                                                               |
| Corrosion detection  | Detection of corrosion in pipe. When corrosion in the pipe is detected by this function, alarm No.203 is generated. This function is not available for gas measurement.                                                                                                |
| Tube health check    | Health check of measuring tube by detecting a change in the spring constant of the measuring tubes. When the value reaches a user-defined criteria, alarm No.203 is generated.                                                                                         |

3 Operating options

The Rotamass Total Insight can be operated in different ways:

- IR switches on the display
- Digital communication (e.g. Modbus)

The section below describes how to operate the system using the IR switches on the display.



The display is a device option and therefore not always available.

3.1 Display

All of the functions described here are also available via digital communication. Numeric values entered using the display are limited to six digits.

The controls on the display are IR switches. They respond as soon as an object, such as a finger, is in close proximity. It is not necessary to apply pressure to the display surface.

Observe the following instructions to ensure that the IR switches are functional:

- ▶ Keep the display glass clean.
- ▶ Avoid exposure to direct sunlight.
- ▶ To increase the reflectivity of fingers (e.g., if they are very dirty), place some white tape on the fingertip.
- ▶ If the IR switches do not work properly, remove the finger from the display and try to push the switch again.

IR switch functions

| IR switch | Display | Function                                                                                                                                                  |
|-----------|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| [SET]     | [SET]   | <ul style="list-style-type: none"><li>▪ Apply setting</li><li>▪ Enter data</li><li>▪ Apply parameter</li></ul>                                            |
| [SHIFT]   | [SFT]   | <ul style="list-style-type: none"><li>▪ Move cursor right or to the next position</li><li>▪ Change function and display of [SET] and [▼]</li></ul>        |
| [▼]       | [INC]   | <ul style="list-style-type: none"><li>▪ Increment parameter or value</li><li>▪ Change position of decimal point</li><li>▪ Select next menu item</li></ul> |

The IR switch function changes as follows when used with the [SHIFT] key:

| Key combina-<br>tions | Display | Function                                                                                                            |
|-----------------------|---------|---------------------------------------------------------------------------------------------------------------------|
| [SHIFT] + [SET]       | [ESC]   | <ul style="list-style-type: none"><li>▪ Cancel and switch to previous menu</li></ul>                                |
| [SHIFT] + ▼           | [DEC]   | <ul style="list-style-type: none"><li>▪ Decrement parameter or number</li><li>▪ Select previous menu item</li></ul> |

Status icons

| Status icon                                                                         | Description                                                                                   | Status icon                                                                          | Description                                                                                 |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
|    | System alarm tripped                                                                          |    | Process alarm tripped                                                                       |
|    | Settings alarm tripped                                                                        |    | Warning tripped                                                                             |
|    | Write protection disabled                                                                     |    | Write protection enabled                                                                    |
|    | Device error (no write access)                                                                |    | Device busy (no write access)                                                               |
|    | microSD card ready                                                                            |    | Access to microSD card                                                                      |
|    | Error accessing microSD card                                                                  |    | Process variable has bad status                                                             |
|    | Upload parameter enabled                                                                      |    | Download parameter enabled                                                                  |
|  | Total health result: good<br>(only indicated when display total health result is active)      |  | Total health result: warning<br>(only indicated when display total health result is active) |
|  | Total health result: bad state<br>(only indicated when display total health result is active) |  | Tube Health Check with result: OK                                                           |
|  | Tube Health Check with result: warning                                                        |  | Tube Health Check with result: error                                                        |
|  | Stop batch                                                                                    |  | Resume batch                                                                                |
|  | Batch running                                                                                 |                                                                                      |                                                                                             |

Measured quantities and identifications

List of measured quantity abbreviations and identification on the display:

Tab. 1: Regular display

| Abbreviation | Measured quantity     |
|--------------|-----------------------|
| MFL          | Mass flow             |
| DNS          | Density               |
| TMP          | Temperature           |
| VFL          | Volume flow           |
| RFD          | Reference density     |
| RLD          | Relative density      |
| CVF          | Corrected volume flow |

| Abbreviation | Measured quantity                              |
|--------------|------------------------------------------------|
| PRS          | Pressure                                       |
| TT1 – TT6    | Totalizer 1 – 6                                |
| TAG          | Customer-specific identification               |
| LTG          | Customer-specific identification, long version |
| VEL          | Velocity                                       |
| CNC          | Concentration                                  |
| NM1 – NM2    | Net mass flow rate 1 – 2                       |
| NV1 – NV2    | Net volume flow rate 1 – 2                     |
| NCV          | Corrected net volume flow rate                 |
| DRC          | Driving current                                |
| HT1          | 24hours totalizer 1                            |
| HT2          | 24hours totalizer 2                            |
| HT3          | 24hours totalizer 3                            |
| GVF          | Gas void fraction                              |
| VSC          | Viscosity                                      |



Applies only to the trend display of logging data on the microSD card. Refer to *Data logging display* [▶ 258].

Tab. 2: Trend display

| Abbreviation | Measured quantity       |
|--------------|-------------------------|
| MFL          | Mass flow               |
| DNS          | Density                 |
| TMP          | Temperature             |
| VFL          | Volume flow             |
| PRS          | Pressure                |
| CNC          | Concentration           |
| NM1          | Net mass flow rate 1    |
| NV1          | Net volume flow rate 1  |
| PHS          | Phase shift             |
| FRQ          | Resonant frequency      |
| DRG          | Drive gain              |
| DRC          | Driving current         |
| MBT          | Transmitter temperature |



Applies only to the Batch control with option BT. Refer to *Display measurement mode* [▶ 263].

Tab. 3: Batch control display

| Abbreviation | Measured quantity     |
|--------------|-----------------------|
| QTY          | Batch quantity        |
| UPW          | Batch upwards value   |
| DNW          | Batch downwards value |
| TTQ          | Total batch quantity  |
| CNT          | Batch counter value   |
| SET          | Batch select          |

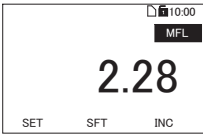
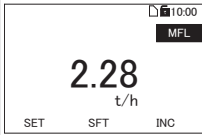
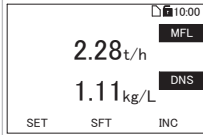
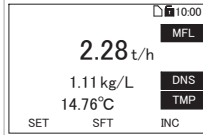
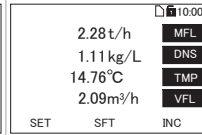
| Abbreviation | Measured quantity         |
|--------------|---------------------------|
| BPV          | Batch variable sel        |
| CMP          | Compensation value        |
| ICP          | Internal close point      |
| ICT          | Internal close time       |
| TIM          | Batch time                |
| MFL          | Mass flow                 |
| DNS          | Density                   |
| TMP          | Temperature               |
| VFL          | Volume flow               |
| RFD          | Reference density         |
| CVF          | Corrected volume flow     |
| PRS          | Pressure                  |
| TAG          | Tag                       |
| LTG          | Long tag                  |
| NM1          | Net mass flow 1           |
| NM2          | Net mass flow 2           |
| NV1          | Net volume flow 1         |
| NV2          | Net volume flow 2         |
| NCV          | Net corrected volume flow |

Display format LCD

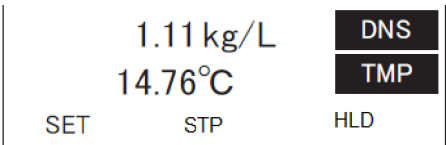
The display format on the LCD can be configured, such as the number of lines, contrast, process variables to be displayed, and display format of each process variable. For more detailed information see *Display* [▶ 514].

| Typical configuration parameter | Description                                 |
|---------------------------------|---------------------------------------------|
| Display select n                | Process variable to be displayed on line n  |
| Display format process variable | Decimal point position for process variable |
| Display contrast                | Contrast of LCD                             |
| Display line                    | Number of display lines on LCD              |

Example of display: configured by parameter *Display line* of *Display operation configuration* [▶ 539].

| 1line (big)                                                                         | 1line                                                                               | 2line                                                                                | 3line                                                                                 | 4line                                                                                 |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 1-line display with big fonts, without unit                                         | 1-line display of value with unit                                                   | 2-line display of value with unit                                                    | 3-line display of value with unit                                                     | 4-line display of value with unit                                                     |
|  |  |  |  |  |

When Batch control is active in Display measurement mode, the following buttons are shown on Indicator to operate batch function:

|                                                                                     |                                                                                      |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|  |  |
| Batch is stopped                                                                    | Batch is running                                                                     |

| IR switch | Display | Function                                                                                                           |
|-----------|---------|--------------------------------------------------------------------------------------------------------------------|
| [SET]     | [SET]   | <ul style="list-style-type: none"> <li>▪ Apply setting</li> <li>▪ Enter data</li> <li>▪ Apply parameter</li> </ul> |
| [SHIFT]   | [RUN]   | Batch is started                                                                                                   |
| [SHIFT]   | [STP]   | Batch is stopped                                                                                                   |
| [▼]       | [RST]   | Batch is resetted                                                                                                  |
| [▼]       | [HLD]   | Batch hold                                                                                                         |

## 3.2 Modbus communication

The Modbus interface is available at the *IoT4* output.

### 3.2.1 Connection of the Modbus configuration tool

The Modbus configuration tool is connected to the transmitter instead of Modbus host.

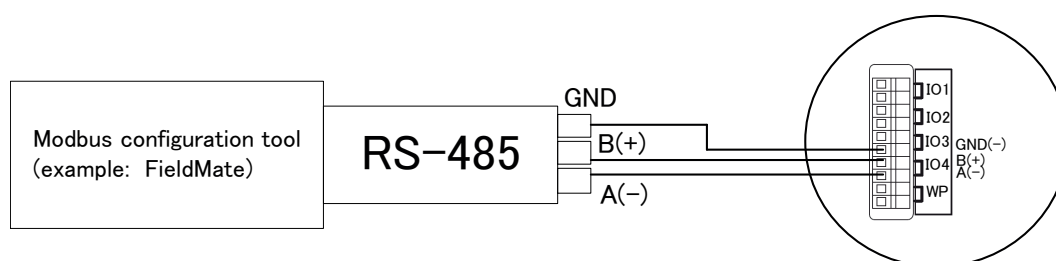


Fig. 1: Modbus configuration tool (example: FieldMate)

### 3.2.2 Modbus basic setting

Modbus setting both Rotamass Total Insight and Modbus configuration tool is necessary to match before Modbus communication. The following table shows the related communication parameters. To reflect the setting, Modbus init, device restart or Function Code8 (Sub Code 01) needs to be sent after setting. Refer to the following table for details of Modbus setting parameters:

| Items                          | Parameter settings                                                                 |
|--------------------------------|------------------------------------------------------------------------------------|
| Transmission media             | RS-485                                                                             |
| Baud rate (selectable)         | 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 [bps]<br>Default: 19200        |
| Transmission Mode (selectable) | RTU / ASCII<br>Default: RTU                                                        |
| Address                        | Hardware switch : 1 to 127<br>Software switch : 1 to 247<br>Default : 1 (Software) |
| Parity                         | Even, Odd, No parity<br>Default: Even                                              |
| Stop bit                       | 1 bit, 2 bit<br>Default: 1 bit                                                     |



Avoid writing setting parameters periodically via the MODBUS RS485 function codes 06 or 16, these parameters are saved in the EEPROM. The number of writes to the EEPROM is limited. If this limit is exceeded, it may cause data loss and memory failure.

### 3.3 microSD card

A dedicated microSD card is inserted into the device. The following data can be saved on the transmitter and on the microSD card:

- Data from the *Event history* [▶ 61]
- Data from the *Monitoring history* [▶ 61]
- *Data logging* [▶ 63]
- *Parameter Backup* [▶ 76]

The content of the microSD card can be read by removing it from the Indicator and reading the file on a computer equipped with a microSD card reader port. The locking screw may need to be loosened for this purpose.

#### CAUTION

**Do not unmount the microSD card until the value of Execute in the parameter of Unmount has been selected. If the unmounting procedure is not executed correctly, the data might become corrupted. A warning will be displayed in this case.**

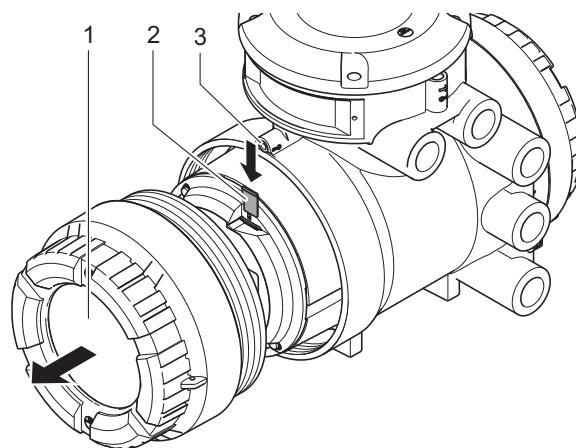


Fig. 2: microSD card on the device

- 1 Housing cover of display
- 2 microSD card
- 3 Locking screw

On the microSD card, the following files are stored:

| File type               | Extension                                                      |
|-------------------------|----------------------------------------------------------------|
| Event history file      | [* .EVT] (CSV file)                                            |
| Monitoring history file | [* .MON] (CSV file)                                            |
| Data logging file       | [* .TRD] (CSV file)                                            |
| Backup file             | [* .PAR] (binary file, for Rotamass Total Insight series only) |

The file format of the microSD card is compatible to Windows (MS-DOS).

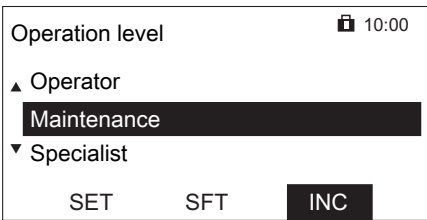
4 System configuration and operation

4.1 Operation level

To limit access to device setup and parameters for configuring the operation of the device, 3 operation levels can be defined. One of them has to be selected and set when a user enters the operation menu to configure the device:

Tab. 4: Operation levels and related user rights

| Operation level | User rights                                                                                                                                                                                           | Description                                                                                                                                              |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operator        | All parameters can be displayed.<br>The following parameter can be used: Language [▶ 107].                                                                                                            | No password is required.                                                                                                                                 |
| Maintenance     | All parameters can be displayed.<br>The following parameters can be used: <ul style="list-style-type: none"><li>▪ Language [▶ 107]</li><li>▪ Autozero [▶ 150]</li><li>▪ Basic setup [▶ 323]</li></ul> | <ul style="list-style-type: none"><li>▪ Password is required. Default value is 0000.</li><li>▪ Password can be changed, see Root menu [▶ 549].</li></ul> |
| Specialist      | All parameters can be displayed and all parameters can be used.                                                                                                                                       | <ul style="list-style-type: none"><li>▪ Password is required. Default value is 0000.</li><li>▪ Password can be changed, see Root menu [▶ 550].</li></ul> |



4.1.1 Select operation level

1. Press and hold [SET] for 2 seconds.
2. Press [SFT] + [INC] switches to enter [Setting Mode].  
⇒ Menu [No] is preselected.
3. Press [INC] switch and select [yes], then press [SET].
4. [yes] is blinking, then press [SET] switch to enter the menu [Operation level].
5. Press [INC] to select the desired operation level.
6. Press [SET] to confirm.  
⇒ If the operation level [operator] has been selected, the following steps are not necessary. Access to the operation menu will be granted.  
⇒ If the operation levels [Maintenance] or [Specialist] have been selected, a numeric password must be entered, see steps 7 – 11.
7. Press [INC] to choose the first number of the numeric password.
8. Press [SFT] to switch to the remaining numbers of the numeric password.
9. Press [INC] to choose the remaining numbers of the numeric password.
10. Press [SET] to confirm the entered numeric password.  
⇒ The entered password flashes.



11. Press [SET] to confirm.

⇒ If the password is correct, access to the operation menu will be granted.

⇒ If the password is incorrect, access to the operation menu will be denied and the menu [operation level] opens again.

## 4.2 Measuring function

This device can measure mass flow, density and temperature of fluids. Also, volume flow, velocity, calorific value, concentration and net flow can be obtained by calculation. The following chart shows an outline of measuring function.

| Process variable | Outline                                                                                                                                                                                          | Reference                                                                                                                                                                             |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Mass flow        | The device measures the mass flow with the help of the "Coriolis force" when medium flows inside measuring tubes that are vibrating.                                                             | <ul style="list-style-type: none"> <li>▪ Easy setup wizard [▶ 273]</li> <li>▪ Basic setup [▶ 326]</li> <li>▪ Detailed setup [▶ 381]</li> <li>▪ Additional function [▶ 383]</li> </ul> |
| Density          | Density is measured from the resonance frequency of measuring tubes with fluid. Density values of liquids can be reliable if no gas is included in the fluid. Density of gas cannot be measured. | <ul style="list-style-type: none"> <li>▪ Easy setup wizard [▶ 275]</li> <li>▪ Basic setup [▶ 328]</li> <li>▪ Detailed setup [▶ 387]</li> <li>▪ Additional function [▶ 389]</li> </ul> |
| Temperature      | Temperature of medium is measured by a temperature sensor (RTD) attached to the measuring tube.                                                                                                  | <ul style="list-style-type: none"> <li>▪ Easy setup wizard [▶ 278]</li> <li>▪ Basic setup [▶ 330]</li> <li>▪ Detailed setup [▶ 392]</li> <li>▪ Additional function [▶ 394]</li> </ul> |
| Volume flow      | Volume flow is calculated from mass flow and density. In a gas measurement, a fixed density value is used for the calculation.                                                                   | <ul style="list-style-type: none"> <li>▪ Easy setup wizard [▶ 280]</li> <li>▪ Basic setup [▶ 331]</li> <li>▪ Detailed setup [▶ 397]</li> <li>▪ Additional function [▶ 400]</li> </ul> |

| Process variable  | Outline                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Reference                                                                                                                                   |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Pressure          | <p>Pressure is obtained from a pressure sensor that is connected to the analog input, or a fixed value can be used. Analog input is necessary on the device and proper configuration is necessary to obtain the value from a pressure sensor.</p> <p>When an external pressure sensor is used, set the value of the parameter <b>[Func]</b> to Pressure. If it is not set to pressure related selections (Pressure compensation, Pressure compensation and NOC, or Pressure NOC), a fixed value that has been set in <b>[Fix val]</b> is used as the pressure value. When an external pressure sensor is used, the current measurement at the Analog input for measuring the signal from the pressure sensor should be set prior to the measurement appropriately. Parameters for configuring the input current signal on the Analog input for pressure sensor are as follows:</p> <ul style="list-style-type: none"> <li>Unit of pressure to be input at the Analog input: <b>[AI unit]</b></li> <li>LRV of pressure current signal: <b>[AI LRV]</b> (pressure value at 4mA)</li> <li>URV of pressure current signal: <b>[AI URV]</b> (pressure value at 20mA)</li> </ul> <p>After these parameters have been configured, pressure measurement conditions, such as the unit for pressure value (<b>[Unit]</b>), LRV (<b>[LRV]</b>), URV (<b>[URV]</b>), should be configured.</p> | <ul style="list-style-type: none"> <li>Detailed setup <a href="#">[ 402]</a></li> <li>Additional function <a href="#">[ 405]</a></li> </ul> |
| Reference density | <p>Density value at reference temperature, which is calculated by a quadratic polynomial with user-defined coefficients for the calculation.</p> <p>To use this function, reference temperature, 1<sup>st</sup> order and 2<sup>nd</sup> order temperature coefficients have to be set.</p> <p>Reference density is calculated by the following formula:</p> $\text{Reference density} = \rho / (1 + A (t - t_{ref}) + B (t - t_{ref})^2)$ <p><math>\rho</math>: measured density value (or specified fixed density)<br/> <math>t</math>: measured temperature<br/> <math>t_{ref}</math>: reference temperature (parameter: <b>[Ref temp]</b>)<br/> <math>A</math>: 1<sup>st</sup> order coefficient (parameter: <b>[Temp coeff A]</b>)<br/> <math>B</math>: 2<sup>nd</sup> order coefficient (parameter: <b>[Temp coeff B]</b>)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"> <li>Detailed setup <a href="#">[ 408]</a></li> <li>Additional function <a href="#">[ 410]</a></li> </ul> |

| Process variable       | Outline                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Reference                                                                                                         |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Relative density       | <p>Relative density is relative to a specified density reference, such as specific gravity, Baume degree or API degree.</p> <p>Specific gravity compared to water is measured based on the measured density or Relative density. API degree, Baume degree or Sake degree is measured based on Reference density. Which density value - measured density or Relative density - is used, is specified by the parameter, Relative density reference select. When Reference density is selected, the Reference density measurement has to be appropriately configured.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>▪ Detailed setup [▶ 412]</li> <li>▪ Additional function [▶ 415]</li> </ul> |
| Corrected volume flow  | <p>Volume flow based on mass flow and Reference density, instead of mass flow and measured density. The Reference density measurement has to be appropriately configured to use this function.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>▪ Detailed setup [▶ 416]</li> <li>▪ Additional function [▶ 419]</li> </ul> |
| Calorific value        | <p>Calorific value (energy) is a value obtained from an Analog input or a fixed value.</p> <p>When calorific value is obtained from Analog input, set the value of the parameter [Func] to Calorific value. If it is not set to Calorific value, a fixed value, which is set in [Fix val], is used as the value.</p> <p>When the calorific value is obtained from an Analog input, the current measurement on the Analog input for measuring the current signal should be set prior to the measurement. Parameters to configure the input current signal on the Analog input for calorific value are as follows.</p> <ul style="list-style-type: none"> <li>▪ Unit of calorific value: [AI unit]</li> <li>▪ LRV of calorific value: [AI LRV] (calorific value at 4mA)</li> <li>▪ URV of calorific value: [AI URV] (calorific value at 20mA)</li> </ul> <p>According to the configured calorific value and its unit, the value is multiplied by the mass flow or volume flow and totaled on Totalizer 1 – 6 [▶ 503] as Energy. When using Energy, the same unit as Calorific value has to be set on Energy.</p> | <ul style="list-style-type: none"> <li>▪ Detailed setup [▶ 421]</li> <li>▪ Additional function [▶ 422]</li> </ul> |
| Velocity               | <p>The Flow velocity of the medium is calculated from volume flow.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>▪ Detailed setup [▶ 424]</li> </ul>                                        |
| Concentration (option) | <p>Concentration is calculated from density and temperature.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"> <li>▪ Detailed setup [▶ 424]</li> </ul>                                        |

| Process variable                   | Outline                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Reference                                                                                                                                                                     |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Net mass flow (option)             | <p>Net mass flow of solute or solvent of solution, or suspended and emulsified substances in fluid, based on mass flow measurement and concentration. It is available if concentration measurement option CST, AC_ or C52 is enabled on the device.</p> <p>Net mass flow 1 is the net mass flow of the product/substance, Net mass flow 2 is the mass flow of the carrier. Net mass flow is only available if the optional Concentration function has been enabled on the device.</p>                                        | <ul style="list-style-type: none"> <li>Net mass flow 1 – 2 [▶ 450]</li> </ul>                                                                                                 |
| Net volume flow (option)           | <p>Net volume flow of solute or solvent of solution, or suspended and emulsified substances in fluid, based on mass flow measurement, density measurement and concentration. It is available if the Concentration measurement option CST, AC_ or C52 has been enabled on the device.</p> <p>Net volume flow 1 is the volume flow of the product/substance, Net volume flow 2 is the volume flow of the carrier. Net volume flow is only available if the optional Concentration function has been enabled on the device.</p> | <ul style="list-style-type: none"> <li>Net volume flow 1 – 2 [▶ 455]</li> </ul>                                                                                               |
| Net corrected volume flow (option) | <p>Net volume flow of solute or solvent of solution, or suspended and emulsified substances in fluid, at reference temperature, based on mass flow measurement, reference density and concentration. It is available if concentration measurement option CST, AC_ or C52 is enabled on the device. If the Advanced concentration function is enabled and used instead of the Standard concentration, this process variable is available but it always becomes 0.0.</p>                                                       | <ul style="list-style-type: none"> <li>Net corrected volume flow [▶ 461]</li> </ul>                                                                                           |
| Batch (option)                     | <p>Batching function is available to use 1 stage and 2 stage batch by controlling 1 or 2 valves. To use 2 stage batch, at least 2 Pulse/Status outputs have to be available by IO type of M3, M4 or M5.</p> <p>It is available if the Batching function option BT has been enabled on the device.</p>                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>Easy setup wizard [▶ 310]</li> <li>Basic setup [▶ 364]</li> <li>Detailed setup [▶ 550]</li> <li>Additional function [▶ 558]</li> </ul> |
| Viscosity (option)                 | <p>Viscosity calculates the value from delta pressure. To calculate it, delta pressure has to be received via Analog input by IO type of M2 or M7.</p> <p>It is available if the Viscosity option VM has been enabled on the device.</p>                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>Detailed setup [▶ 466]</li> <li>Additional function [▶ 467]</li> </ul>                                                                 |



### Flow Direction

For flow variables, which direction is forward is defined by the parameter Flow dir. If Forward is selected, the direction of the arrow marking on the sensor is set as the forward direction on the device. If Reverse is selected, the opposite direction is set as the forward direction on the device. The Parameter can be set in the following menus: Easy setup wizard, *Installation configuration* [▶ 271], Basic setup, *Installation configuration* [▶ 325] or Detailed setup, *Installation configuration* [▶ 379].

For each process variable, the following configurations can be defined by corresponding parameters.

| Configuration               | Description                                                                                                                                                                                                                                               | Example of parameter (Mass flow)      |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| Unit                        | Unit for the process variable.                                                                                                                                                                                                                            | [Unit]                                |
| LRV                         | Lower range value, 0 % for the scaling of the analog and frequency output.                                                                                                                                                                                | [LRV]                                 |
| URV                         | Upper range value, 100 % for the scaling of the analog and frequency output.                                                                                                                                                                              | [URV]                                 |
| Ftime (damping)             | Damping constant for the process variable, which is the time for the value to become 63.2 % of the total amount of change. It may be effective when the measurement value is fluctuating.                                                                 | [Damp]                                |
| Low cut                     | The value of a process variable for setting the value to zero below the value itself. It may be effective when the measurement value is close to zero but it is fluctuating slightly.                                                                     | [Lowcut]                              |
| User unit                   | If predefined units are not appropriate, a User unit can be defined and used for the process variable. A maximum of 8 characters can be used to define the unit. Effective when User unit is selected in the Unit configuration of each process variable. | Mass flow user unit                   |
| User unit conversion factor | Conversion factor by which the process variable is multiplied to match the defined user unit. Effective when User unit is selected in the Unit configuration.                                                                                             | Mass flow user unit conversion factor |

|                     |                                                                                                                                                                                                                                                                                                                                                          |                               |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| Bi-directional mode | Configuration of analog or frequency output when the measurement range of the process variable is both reverse and forward. When this mode is set to Active, the LRV of the measurement range has to be set to zero. Refer to the following figures for the behaviors of the current output signal. To output flow direction, Status output can be used. | Mass flow bi-directional mode |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|

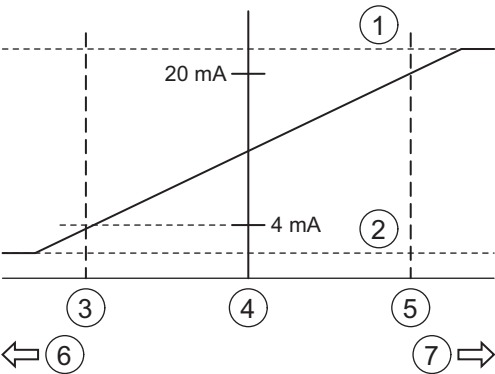


Fig. 3: Bi-directional mode: Not active

- 1

Analog High Limit
- 2

Analog Low Limit
- 3

LRV
- 4

Zero
- 5

URV
- 6

Reverse
- 7

Forward

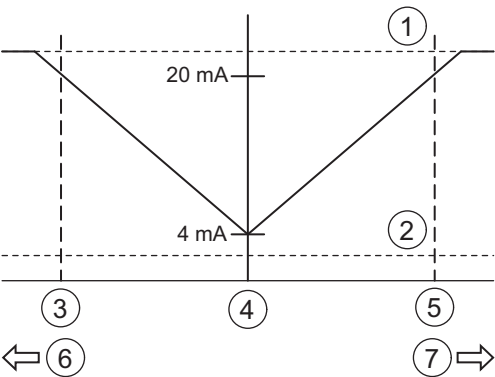


Fig. 4: Bi-directional mode: Active

- 1

Analog High Limit
- 2

Analog Low Limit
- 3

-URV
- 4

Zero (LRV)
- 5

URV
- 6

Reverse
- 7

Forward

| Configuration       | Description                                                                                                                                          | Example of parameter (Mass flow) |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| Damping pulse/total | Damping constant for the process variable in pulse output and total, which is the time for the value to become 63.2 % of the total amount of change. | [Damp pls/tt1]                   |

| Configuration | Description                                                                                                                                                                                                               | Example of parameter (Mass flow)       |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| Trim          | Trim for a process variable, which is defined by gain and offset. Trimmed value is effective if Enable is set in the Trim select configuration. Formula is as follows:<br>Trimmed value = gain * measured value + offset. | [Trim sel], [Trim offset], [Trim gain] |

Alarms can be defined for certain measured values of each process variable. There are 4 kinds of alarms: low low, low, high, high high. To prevent the alarms from activating/deactivating in rapid succession when the level is fluctuating around the alarm level, hysteresis can be defined for each alarm. For detailed information, see *High/Low alarm configuration* [ 159].



Bi-directional mode and URV/LRV setting

When the bi-directional mode of a process variable is set to Active, its URV and LRV have to be the same sign (both of them are + or -). The configuration to set URV and LRV with different signs causes a configuration error. Also, note that the behavior of the output signal may not be appropriate when LRV is not set to zero. For the behavior of the output signal when the LRV is not set to zero and such a configuration is used, refer to the following figure.

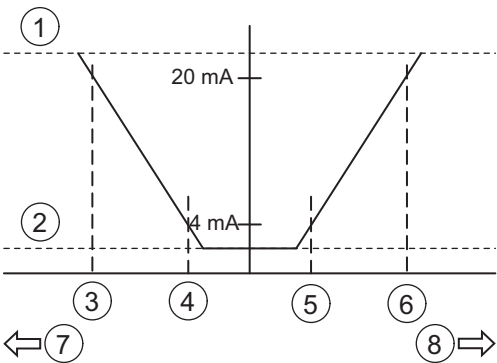


Fig. 5: Bi-directional mode: Active  
LRV > Zero flow

- |   |                   |   |         |
|---|-------------------|---|---------|
| 1 | Analog High Limit | 5 | LRV     |
| 2 | Analog Low Limit  | 6 | URV     |
| 3 | -URV              | 7 | Reverse |
| 4 | -LRV              | 8 | Forward |

### 4.3 Current signal output (applicable model only)

The process variables in the following table can be assigned to an analog output for outputting a current signal, 4 – 20 mA. For the current signal of an analog output, the characteristics of the signal, such as low/high limit of the current, current signal at an alarm state, can be configured. When NE43 is selected as the setting of the NE43 opt option, the low limit has to be 3.8 mA and the high limit has to be 20.5 mA. The NE43 opt setting does not automatically change the limits, but generates a configuration alarm if the limits are not set to 3.8 mA and 20.5 mA. For the relationship of the LRV/URV configuration of the process variables to the low/high limit of the current, refer to the following figure.

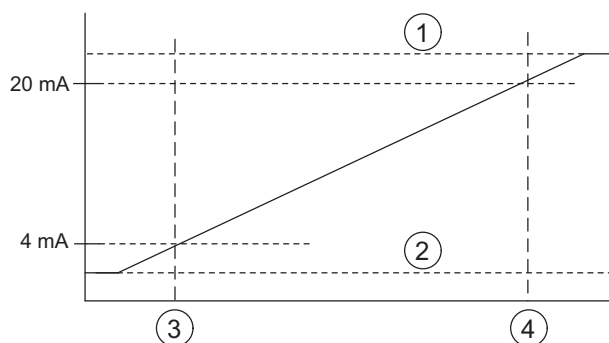


Fig. 6: Not Namur43

|   |                   |   |     |
|---|-------------------|---|-----|
| 1 | Analog High Limit | 3 | LRV |
| 2 | Analog Low Limit  | 4 | URV |

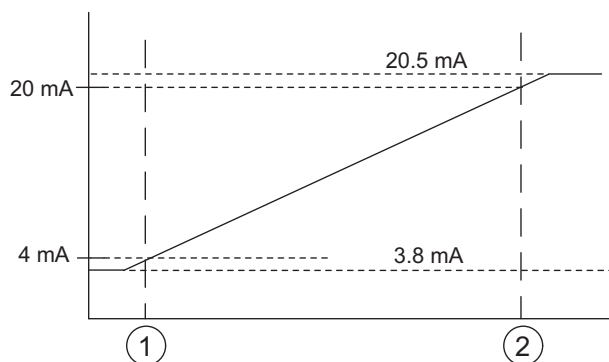


Fig. 7: Namur43

|   |     |   |     |
|---|-----|---|-----|
| 1 | LRV | 2 | URV |
|---|-----|---|-----|

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [ 282]
- *Basic setup* [ 334]
- *Detailed setup* [ 470]



|          | Process variable that can output a current signal to the analog output                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Standard | <ul style="list-style-type: none"> <li>▪ Mass flow</li> <li>▪ Density</li> <li>▪ Temperature</li> <li>▪ Volume flow</li> <li>▪ Reference density</li> <li>▪ Relative density</li> <li>▪ Corrected volume flow</li> <li>▪ Pressure: <ul style="list-style-type: none"> <li>– Measured value if analog input is available and pressure sensor is connected and configured.</li> <li>– Fixed value if analog input is not available.</li> </ul> </li> <li>▪ Drive current</li> </ul>                                                                                                        |
| Option   | <p>The following parameters are available if the concentration measurement option CST, AC_ or C52 has been enabled.</p> <ul style="list-style-type: none"> <li>▪ Concentration</li> <li>▪ Net mass flow</li> <li>▪ Net volume flow</li> <li>▪ Net corrected volume flow</li> </ul> <p>The following parameter is available if the Batch option BT has been enabled:</p> <ul style="list-style-type: none"> <li>▪ Batch</li> </ul> <p>The following parameter is available if the Viscosity option VM has been enabled:</p> <ul style="list-style-type: none"> <li>▪ Viscosity</li> </ul> |

If adjustment or correction of the output currents is necessary, the Analog output trim function can be used to correct the currents. For details, see *Analog output/input trim* [▶ 152]. Analog output is trimmed at the factory; therefore an adjustment will usually not be necessary.

#### 4.4 Pulse/Frequency signal output

The following process variables can be assigned to the Pulse/Frequency output to output a pulse/frequency signal.

|          | Process variable that can output a frequency signal to the Pulse/Frequency output                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Standard | <ul style="list-style-type: none"> <li>▪ Mass flow</li> <li>▪ Density</li> <li>▪ Temperature</li> <li>▪ Volume flow</li> <li>▪ Reference density</li> <li>▪ Relative density</li> <li>▪ Corrected volume flow</li> <li>▪ Pressure: <ul style="list-style-type: none"> <li>– Measured value if analog input is available and pressure sensor is connected and configured.</li> <li>– Fixed value if analog input is not available.</li> </ul> </li> <li>▪ Drive current</li> </ul> |
| Option   | <p>The following parameters are available if the concentration measurement option CST, AC_ or C52 has been enabled:</p> <ul style="list-style-type: none"> <li>▪ Concentration</li> <li>▪ Net mass flow</li> <li>▪ Net volume flow</li> <li>▪ Net corrected volume flow</li> </ul> <p>The following parameter is available if the Viscosity VM has been enabled:</p> <ul style="list-style-type: none"> <li>▪ Viscosity</li> </ul>                                                |

|          | Process variable that can output a pulse signal to the Pulse/Frequency output                                                                                                                                                                             |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Standard | <ul style="list-style-type: none"> <li>▪ Mass flow</li> <li>▪ Volume flow</li> <li>▪ Corrected volume flow</li> <li>▪ Energy</li> </ul>                                                                                                                   |
| Option   | <p>The following parameters are available if the concentration measurement option CST, AC_ or C52 has been enabled:</p> <ul style="list-style-type: none"> <li>▪ Net mass flow</li> <li>▪ Net volume flow</li> <li>▪ Net corrected volume flow</li> </ul> |

One of 4 output signal types - Fixed pulse output, Frequency output, Status output or Double pulse output - can be selected and used.

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [ 287]
- *Basic setup* [ 337]
- *Detailed setup* [ 474]

**Fixed Pulse**

Pulse signal with fixed pulse width, duty ratio changes according to the value of the assigned process variable. Characteristics of pulse output, such as pulse width, pulse rate, signal at alarm status, flow direction to output pulse and active mode [on] or [off act] of the pulse, can be configured. The pulse signal range that can be set for LRV or URV is 0.0001 – 10000 pps (pulses per second). The following chart shows pulse width selections and corresponding maximum pulse rates.

| Pulse width in ms | Max. pulse rate in pps |
|-------------------|------------------------|
| 0.05              | 10000                  |
| 0.1               | 5000                   |
| 0.5               | 1000                   |
| 1                 | 500                    |
| 5                 | 100                    |
| 10                | 50                     |
| 20                | 25                     |
| 33                | 15                     |
| 50                | 10                     |
| 100               | 5                      |
| 200               | 2.5                    |
| 330               | 1.5                    |
| 500               | 1.0                    |
| 1000              | 0.5                    |
| 2000              | 0.25                   |

Formula to calculate pulse rate from max flow rate (F) and flow per 1 pulse (P), or pulse per unit flow (N):

$$PPS = \frac{F}{T \times P}$$

$$PPS = \frac{F}{T} \times N$$

Tab. 5: Description of variables

| Variable | Meaning          | Description                                                 |
|----------|------------------|-------------------------------------------------------------|
| F        | Max flow rate    | Larger one of absolute value of LRV or URV                  |
| T        | Time in unit     | Time in unit in seconds, e.g., 3600 for kg/h, 60 for kg/min |
| P        | Flow par 1 pulse | Unit flow/pulse                                             |
| N        | Pulse par flow   | Pulse/unit flow                                             |
| PPS      | Pulse Per Second | Calculated pulse rate                                       |

Example 1: Max flow rate is 2580 kg/h, 0.1 kg/pulse

$$7.1666 = \frac{2580}{3600 \times 0.1}$$

Example 2 : Max flow rate is 2580 kg/h, 10 pulse/kg

$$7.1666 = \frac{2580}{3600} \times 10$$

When pulse width is set, the maximum pulse rate at the defined pulse width must be larger than the defined pulse rate PPS. In the example above,  $PPS = 7.1666$ , pulse width must be less than 50 ms, for which the corresponding pulse rate is 10 pps  $> 7.1666$ . If the pulse rate at the defined width is less than the calculated pulse rate PPS, the pulse signal is not output correctly. If the configuration exceeds the limits, a configuration error message appears.

### Frequency

Pulse signal with fixed duty ratio of 50 %, pulse width changes according to the value of the assigned process variable and the specified output frequency range for the variable. Characteristics of the signal, such as maximum/minimum frequency, signal at alarm status, can be configured. The range of the frequency signal can be set for LRV or URV is 0 – 10000 Hz. The upper limit of the frequency signal is a frequency of URV + 25 % of the output span, but the maximum frequency that can be output is 12,500 Hz. The minimum frequency that can be output is 0.0001 Hz.

Please use frequency receiving device which is calculating average frequency during 5 second measuring (integration) time. When using frequency counter the parameter GATE TIME should be  $\geq 5$ s. In this case the reading of the values will be within the specified accuracy for the variables. When using frequency receiver with short measuring time like oscilloscope or PLC frequency input module the reading will fluctuate depending on actual frequency and this fluctuation can be interpreted as inaccurate measurement.

### Status

Binary signal, on or off, to transmit specific status of an assigned event or function. Alarm status of process variable, flow direction, status of NAMUR NE107, diagnosis alarm, can be assigned to Status output. On active or Off active can be selected for the output. When On active is selected, output by closed status On is active. When Off active is selected, output by open status Off is active.

### Double pulse

Double pulse mode is a function for outputting a process variable by using 2 frequency signals on 2 Pulse/Status outputs with a phase shift of 0, 90 or 180 degrees between 2 frequency signals. When the measurement range of the process variable is both reverse and forward, the direction of phase shift can be changed by the flow direction. Available when Dbl pls is selected in the parameter Pls/Sts type.

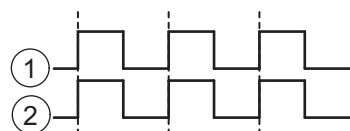


Fig. 8: Double pulse: 0 degrees

- 1 Pulse output 1
- 2 Pulse output 2

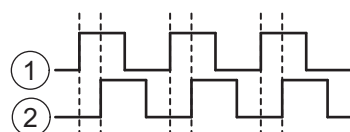


Fig. 9: Double pulse: +90 degrees

- 1 Pulse output 1
- 2 Pulse output 2

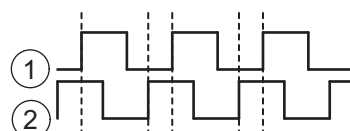


Fig. 10: Double pulse: -90 degrees

- 1 Pulse output 1
- 2 Pulse output 2

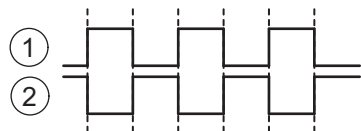


Fig. 11: Double pulse: 180 degrees

- 1 Pulse output 1
- 2 Pulse output 2

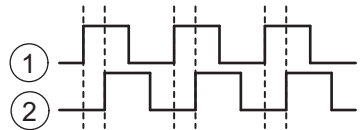


Fig. 12: Double pulse: Quadrature - Forward flow

- 1 Pulse output 1
- 2 Pulse output 2

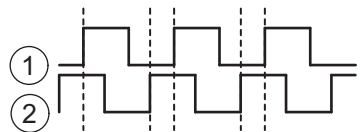


Fig. 13: Double pulse: Quadrature- Reverse flow

- 1 Pulse output 1
- 2 Pulse output 2

## 4.5 Analog input

Analog input on this device can be used for several purposes. The following chart shows a list of functions that use analog input. For more detailed information, see *Detailed setup* [▶ 500].



This function is not available unless the "Analog input" (AI) specification was selected in MS code, i.e. MS Code Position 13 M2, M7.

| Function                      | Outline                                                                                                                                                                                                                                                                                                                                    | Reference                                                                                                                                                                                                                                                                                       |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pressure compensation         | Analog input is used to connect a pressure transmitter to obtain the pressure value of the fluid. The Measured pressure value is used to compensate Mass flow and Density values for higher accuracy. If this function is assigned to an analog input, Mass flow and Density are automatically compensated by the measured pressure value. | Detailed setup <ul style="list-style-type: none"> <li>Pressure [▶ 402]</li> <li>Analog input [▶ 500]</li> </ul>                                                                                                                                                                                 |
| Temperature compensation      | Analog input is used to connect a temperature transmitter to obtain the temperature of the fluid. The temperature obtained is used instead of the measured temperature from the internal temperature sensor to compensate the Mass flow and Density values. Note that the internal temperature sensor is not used in this case.            | Detailed setup <ul style="list-style-type: none"> <li>Temperature [▶ 392]</li> <li>Analog input [▶ 500]</li> </ul>                                                                                                                                                                              |
| Sensor pressure alarm         | If a pressure transmitter is installed on the sensor housing to detect leaking fluid, this function is used to detect leakage.                                                                                                                                                                                                             | Diag/Service <ul style="list-style-type: none"> <li>Std diagnosis [▶ 234]</li> </ul> Detailed setup <ul style="list-style-type: none"> <li>Pressure [▶ 402]</li> <li>Analog input [▶ 500]</li> </ul>                                                                                            |
| Calorific value               | Analog input is used to connect the output signal of the gas chromatograph to obtain the calorific value of the fluid per unit.                                                                                                                                                                                                            | Detailed setup <ul style="list-style-type: none"> <li>Calorific value [▶ 421]</li> <li>Analog input [▶ 500]</li> </ul>                                                                                                                                                                          |
| Viscosity delta pressure      | If a pressure transmitter is installed to detect delta pressure before and after the device, this function is used to calculate the Viscosity of the fluid.<br>It is available if Viscosity option VM is enabled on the device.                                                                                                            | Detailed setup <ul style="list-style-type: none"> <li>Viscosity [▶ 466]</li> <li>Analog input [▶ 500]</li> </ul>                                                                                                                                                                                |
| Pressure compensation and NOC | Analog input is used to connect to pressure transmitter to obtain the pressure value of the fluid. The Measured pressure value is used to compensate Mass flow and Density values for higher accuracy and is used to calculate NOC.<br>It is available if concentration measurement option C5_ is enabled on the device.                   | Detailed setup <ul style="list-style-type: none"> <li>Concentration [▶ 424]</li> <li>Additional function [▶ 430]</li> <li>Net Oil Computing (NOC) set 1 – 4 [▶ 446]</li> <li>Net Oil Computing (NOC) + GVF set 1 – 4 [▶ 442]</li> <li>Pressure [▶ 402]</li> <li>Analog input [▶ 500]</li> </ul> |

| Function     | Outline                                                                                                                                                                                                                                                 | Reference                                                                                                                                                                                                                                                                                                          |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pressure NOC | <p>Analog input is used to connect a pressure transmitter to obtain the pressure value of the fluid. The Measured pressure value is used to calculate NOC.</p> <p>It is available if concentration measurement option C5_ is enabled on the device.</p> | <p>Detailed setup</p> <ul style="list-style-type: none"> <li>▪ Concentration [▶ 424]</li> <li>▪ Additional function [▶ 430]</li> <li>▪ Net Oil Computing (NOC) set 1 – 4 [▶ 446]</li> <li>▪ Net Oil Computing (NOC) + GVF set 1 – 4 [▶ 442]</li> <li>▪ Pressure [▶ 402]</li> <li>▪ Analog input [▶ 500]</li> </ul> |

If an adjustment or correction of the input current is necessary, the Analog input trim function can be used to correct the input current. For more detailed information, see Diag/Service *Input trim* [▶ 153]. Analog input is trimmed at the factory; therefore an adjustment will usually not be necessary.

## 4.6 Totalizer

A maximum of six totalizers can be used on the device to total flow process variables. The following table shows applicable process variables for the totalizer.

|          | Applicable flow process variables for totalizers                                                                                                                                                                                                                                                                      |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Standard | <ul style="list-style-type: none"> <li>▪ Mass flow</li> <li>▪ Volume flow</li> <li>▪ Corrected volume flow</li> <li>▪ Energy</li> </ul>                                                                                                                                                                               |
| Option   | <p>The following parameters are available if the concentration measurement option CST, AC_ or C52 has been enabled:</p> <ul style="list-style-type: none"> <li>▪ Net mass flow 1</li> <li>▪ Net mass flow 2</li> <li>▪ Net volume flow 1</li> <li>▪ Net volume flow 2</li> <li>▪ Net corrected volume flow</li> </ul> |

Each totalizers value can be displayed on the LCD of the Indicator and can be transmitted through Modbus communication. The totalizing mode assigned to a flow process variable can be selected from one of the following 5 modes.

| Totalizer modes | Description                                                               |
|-----------------|---------------------------------------------------------------------------|
| Balanced        | Positive and negative incoming values.                                    |
| Absolute        | Absolute value of positive and negative incoming values.                  |
| Positive only   | Only positive incoming values. Default configuration for Totalizer 1 – 6. |
| Negative only   | Only negative incoming values.                                            |
| Hold            | Value is held, not changed.                                               |

Specific values can be set for each totalizer to generate an alarm, if necessary. Start, stop, reset, preset or set predefined value can be operated by a parameter.

For details on configuring the basic functions of Totalizer 1 – 3, see *Easy setup wizard* [▶ 302] or *Basic setup* [▶ 352].

To configure all functions of Totalizer 1 – 6, refer to *Detailed setup* [▶ 502].



## 4.7 Easy setup wizard

For the most important functions there is a wizard menu, to help with the setup of the device. The following settings can be performed by using the wizard:

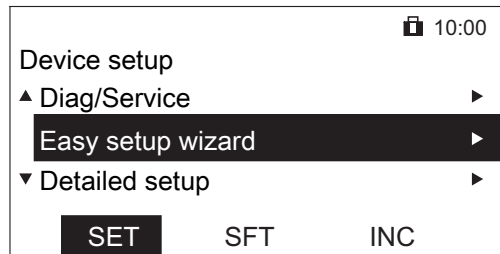
| Wizard menu                | Description                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Installation configuration | <p>Configuration of parameters for basic installation.</p> <ul style="list-style-type: none"> <li>Step-by-step instruction serving as an example, see chapter <i>Installation configuration</i> [ 38].</li> <li>For more detailed information, see chapter <i>Installation configuration</i> in the menu description [ 269].</li> </ul>                                                              |
| Standard device variables  | <p>Configuration for measurement of basic process variables, such as process variable, range, damping, etc.</p> <ul style="list-style-type: none"> <li>Step-by-step instruction serving as an example, see chapter <i>Configure Standard device variables</i> [ 41].</li> <li>For more detailed information, see chapter <i>Standard device variables</i> in the menu description [ 272].</li> </ul> |
| Pulse/Status outputs       | <p>Configuration for pulse/status output, such as process variables, unit, pulse width, pulse rate, etc. or status signal.</p> <ul style="list-style-type: none"> <li>Step-by-step instructions, see chapter <i>Pulse/Status outputs</i> [ 43].</li> <li>For more detailed information, see chapter <i>Pulse/Status outputs</i> in the menu description [ 287].</li> </ul>                           |
| Totalizer                  | <p>Configuration for totalizer, such as process variables, unit, action at alarm, totalizing scheme, etc.</p> <ul style="list-style-type: none"> <li>Step-by-step instruction, see <i>Configure Totalizer</i> [ 48].</li> <li>For more detailed information, see chapter <i>Totalizer</i> in the menu description [ 302].</li> </ul>                                                                 |
| Display select             | <p>Configuration to set process variables to be displayed on 1 to 4 lines on display.</p> <ul style="list-style-type: none"> <li>Step-by-step instruction, see <i>Configure Display select</i> [ 50].</li> <li>For more detailed information, see chapter <i>Display select</i> in the menu description [ 306].</li> </ul>                                                                           |
| Date/Time                  | <p>Configuration of date and time.</p> <ul style="list-style-type: none"> <li>Step-by-step instruction, see <i>Configure Date/Time</i> [ 51].</li> <li>For more detailed information, see chapter <i>Date/Time</i> in the menu description [ 309].</li> </ul>                                                                                                                                        |
| Batch                      | <p>Configuration of Batch function</p> <ul style="list-style-type: none"> <li>Step-by step instruction, see <i>Configure Batch</i> [ 52].</li> </ul> <p>For more detailed information, see chapter <i>Batch</i> in the menu description [ 310].</p>                                                                                                                                                  |
| Analog output              | <p>Configuration for analog output, such as process variables, range, alarm, etc.</p> <ul style="list-style-type: none"> <li>Step-by-step instruction, see chapter <i>Configure Analog output</i> [ 42].</li> <li>For more detailed information, see chapter <i>Analog output</i> in the menu description [ 282].</li> </ul>                                                                         |

#### 4.7.1 Installation configuration

The settings must be downloaded to the device. If the wizard is canceled before this is completed and [setting download] is performed, any changes to the settings will not be reflected on the device.

✓ [specialist] is selected as the *Operation level* [▶ 20] .

1. Press [INC] until [Easy setup wizard] is selected.



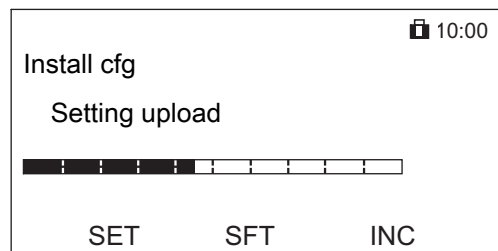
2. Press [SET] to enter the menu [Easy setup wizard].

⇒ Menu [Install cfg] is preselected.



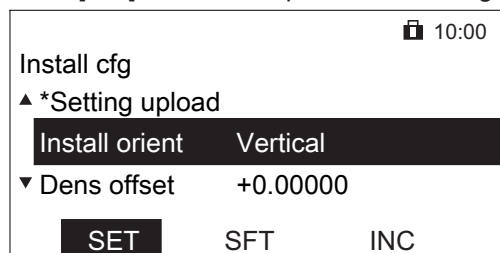
3. Press [SET] to enter the menu [Install cfg].

⇒ [Setting upload] runs automatically and will be marked with a \* after completion.

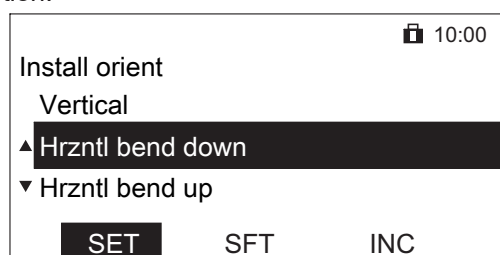


⇒ Parameter [Install orient] is preselected.

4. Press [SET] to enter the parameter settings of [Install orient].



5. Press [INC] until [Hrzntl bend down] is selected and press [SET] to choose the selection.



⇒ The chosen value flashes.

6. Press [SET] to confirm.

7. Press [SET] to go back to the menu [Install cfg].

⇒ Parameter [Install orient] is marked with a \* after completion.

⇒ Parameter [Dens offset] is preselected.

8. Press [SET] to enter the selection [Dens offset].

⇒ The adjustable digit flashes.

9. Press [INC] to increase the value.

10. Press [SFT] to change the adjustable digit.

⇒ The adjustable digit flashes.

11. Press [INC] to increase the value.

12. Continue in the same way until the number is completed.

13. Press [SET] to confirm.

⇒ The configured [Dens offset] value flashes.

14. Press [SET] to set the value.

15. Press [SET] to go back to the menu [Install cfg].

16. Continue to configure the other parameters: [Flow dir] and [Fix val] can be configured in the same way.

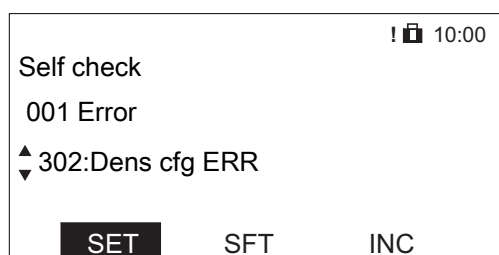
17. After configuration, press [INC] until the parameter [Setting download] is selected.

18. Press [SET] to download the configuration to the device.

⇒ If the device does not have any alarm or warning, [Good] will be displayed.



⇒ If the device has an alarm or warning, the number of errors and the corresponding fault number will be shown.



For additional information, see chapter *Troubleshooting* [▶ 605].

19. Press and hold [SFT] and press [SET] to go back to the menu [Easy setup wizard].

#### 4.7.2 Standard device variables

Wizard to configure the measurement of basic process variables, such as process variable, range, damping, etc. Wizards for Mass flow, Density, Temperature and Volume flow are provided.

##### Configure Standard device variables

Configuration of the standard device variables is shown below using the example of variable mass flow.

The settings must be downloaded to the device. If the wizard is canceled before this is completed and [setting download] is performed, any changes to the settings will not be reflected on the device.

✓ [Specialist] is selected as the *Operation level* [ 20].

1. Press [INC] until [Easy setup wizard] is selected.
2. Press [SET] to enter the menu [Easy setup wizard].
  - ⇒ Menu [Install cfg] is preselected.
3. Press [INC] until [Std dev var] is selected.
4. Press [SET] to enter the menu [Std dev var].
  - ⇒ Menu [Mass] is preselected.
5. Press [SET] to enter the menu [Mass].
  - ⇒ [Setting upload] runs automatically and will be marked with a \* after completion.
  - ⇒ Parameter [Unit] is preselected.
6. Press [SET] to enter the selection [Unit].
7. Press [INC] until the required unit is selected and press [SET] to choose the selection.
  - ⇒ The chosen value flashes.
8. Press [SET] to confirm.
9. Press [SET] to go back to the menu [Mass].
  - ⇒ Parameter [Unit] is marked with a \* after completion.
  - ⇒ Parameter [LRV] is preselected.
10. Press [SET] to enter the selection [LRV].
  - ⇒ The adjustable digit flashes.
11. Press [INC] to increase the value.
12. Press [SFT] to change the adjustable digit.
  - ⇒ The adjustable digit flashes.
13. Press [INC] to increase the value.
14. Continue in the same way until the number is completed.
15. Press [SET] to confirm.
  - ⇒ The configured [LRV] value flashes.
16. Press [SET] to set the value.
17. Press [SET] to go back to the menu [Mass].
  - ⇒ Parameter [LRV] is marked with a \* after completion.
  - ⇒ Parameter [URV] is preselected.
18. Continue to configure the other parameters [URV] and [Damp] in the same way.
19. After configuration, press [INC] until the parameter [Setting download] is selected.

20. Press [SET] to download the configuration to the device.
  - ⇒ If the device does not have any alarm or warning, [Good] will be displayed.
  - ⇒ If the device has an alarm or warning, the number of errors and the corresponding fault number will be shown. For additional information, see chapter *Troubleshooting* [▶ 605].

21. Press and hold [SET] and press [SET] to go back to the menu [Easy setup wizard].

The other standard device variables, such as Density, Temperature and Volume flow, can be configured in the same way.

#### 4.7.3 Analog output

Wizard to configure Analog output, such as process variables, range, alarm, etc.

Wizard to configure Analog output, such as process variables, range, alarm, etc. If the device has IO configuration which does not have Analog output, no wizard for Analog output is provided.

##### Configure Analog output

Configuration of Analog output is shown below.

The settings must be downloaded to the device. If the wizard is canceled before this is completed and [Setting download] is performed, any changes to the settings will not be reflected on the device.

- ✓ [Specialist] is selected as the *Operation level* [▶ 20].
1. Press [INC] until [Easy setup wizard] is selected.
  2. Press [SET] to enter the menu [Easy setup wizard].
    - ⇒ Menu [Install cfg] is preselected.
  3. Press [INC] until [AO] is selected.
  4. Press [SET] to enter the menu [AO].
    - ⇒ [Setting upload] runs automatically and will be marked with a \* after completion.
    - ⇒ Parameter [se1] is preselected.
  5. Press [SET] to enter the selection [se1].
  6. Press [INC] until the process variable to be assigned to Analog output is selected.
  7. Press [SET] to choose the selection.
    - ⇒ The chosen value flashes.
  8. Press [SET] to confirm.
  9. Press [SET] to go back to the menu [AO].
    - ⇒ Parameter [se1] is marked with a \* after completion.
    - ⇒ Parameter [Lo lim] is preselected.
  10. Press [SET] to enter the selection [Lo lim].
    - ⇒ The adjustable digit flashes.
  11. Press [INC] to increase the value.
  12. Press [SHIFT] to change the adjustable digit.
    - ⇒ The adjustable digit flashes.
  13. Press [INC] to increase the value.
  14. Continue in the same way until the number is completed.
  15. Press [SET] to confirm.
    - ⇒ The configured [Lo lim] value flashes.
  16. Press [SET] to set the value.

17. Press [SET] to go back to the menu [AO].
  - ⇒ Parameter [Lo lim] is marked with a \* after completion.
  - ⇒ Parameter [Hi lim] is preselected.
18. Continue to configure the other parameter [Hi lim] in the same way.
19. After configuration, press [INC] until the parameter [Setting download] is selected.
20. Press [SET] to download the configuration to the device.
  - ⇒ If the device does not have any alarm or warning, [Good] will be displayed.
  - ⇒ If the device has an alarm or warning, the number of errors and the corresponding fault number will be shown. For additional information, see chapter *Troubleshooting* [▶ 605].
  - ⇒ Menu [Install cfg] is preselected.
21. Press and hold [SHIFT] and press [SET] to go back to the menu [Easy setup wizard].

#### 4.7.4 Pulse/Status outputs

Wizard to configure Pulse/Status output, such as process variables, unit, pulse width, pulse rate, etc. or status signal. According to IO configuration that device has, applicable wizards are provided.

##### Configure Pulse/Status outputs

Configuration of Pulse/Status outputs is shown below.

The settings must be downloaded to the device. If the wizard is canceled before this is completed and [Setting download] is performed, any changes to the settings will not be reflected on the device.

✓ [Specialist] is selected as the *Operation level* [▶ 20].

1. Press [INC] until [Easy setup wizard] is selected.
2. Press [SET] to enter the menu [Easy setup wizard].
  - ⇒ Menu [Install cfg] is preselected.
3. Press [INC] until [Pls/Sts out] is selected.
4. Press [SET] to enter the menu [Pls/Sts out].
  - ⇒ Menu [Pls/Sts cfg] is preselected.
5. Press [SET] to enter the menu [Pls/Sts cfg].
  - ⇒ [Setting upload] runs automatically and will be marked with a \* after completion.
  - ⇒ Parameter [Pls/Sts type] is preselected.
6. Press [SET] to enter the selection [Pls/Sts type].
7. Press [INC] to select [Sngl pls] or [Dbl pls].
8. Press [SET] to choose the selection.
  - ⇒ The chosen value flashes.
9. Press [SET] to confirm.
10. Press [SET] to go back to the menu [Pls/Sts cfg].
  - ⇒ Parameter [Pls/Sts type] is marked with a \* after completion.
  - ⇒ Parameter [Pls/Sts1 mode] is preselected.
11. Press [SET] to enter the selection [Pls/Sts1 mode].
12. Press [INC] to select [No func], [Fix pls out], [Freq out] or [Sts out]. For additional information, see *Pulse/Status configuration* [▶ 288].
13. Press [INC] to select the output mode.

14. Press [SET] to choose the selection.
  - ⇒ The chosen value flashes.
15. Press [SET] to confirm.
  - ⇒ The chosen [Pls/Sts1 mode] flashes.
16. Press [SET] to go back to the menu [Pls/Sts cfg].
  - ⇒ Parameter [Pls/Sts1 mode] is marked with a \* after completion.
  - NOTICE! Pulse/Status output 2 mode is displayed only if Pulse/Status output 2 is available on the device.**
  - ⇒ Parameter [Pls/Sts2 mode] is preselected.
17. Continue to configure the other parameter [Pls/Sts2 mode] in the same way.
18. After configuration, press [INC] until the parameter [Setting download] is selected.
19. Press [SET] to download the configuration to the device.
  - ⇒ If the device does not have any alarm or warning, [Good] will be displayed.
  - ⇒ If the device has an alarm or warning, the number of errors and the corresponding fault number will be shown. For additional information, see chapter *Troubleshooting* [▶ 605].

### Configure Single Pulse and Frequency output

If Pulse/Status output type is set to Single pulse, the following wizards are available.

The settings must be downloaded to the device. If the wizard is canceled before this is completed and [Setting download] is performed, any changes to the settings will not be reflected on the device.

- ✓ [Specialist] is selected as the *Operation level* [▶ 20].
1. Press [INC] until [Easy setup wizard] is selected.
  2. Press [SET] to enter the menu [Easy setup wizard].
    - ⇒ Menu [Install cfg] is preselected.
  3. Press [INC] until [Pls/Sts out] is selected.
  4. Press [SET] to enter the menu [Pls/Sts out].
    - ⇒ Menu [Pls/Sts cfg] is preselected.
    - NOTICE! Pulse output 1 is displayed only if Pulse/Status output 1 mode is set to Fixed Pulse output.**
  5. Press [INC] until [Pls out1] is selected.
  6. Press [SET] to enter the menu [Pls out1].
    - ⇒ [Setting upload] runs automatically and will be marked with a \* after completion.
    - ⇒ Parameter [se1] is preselected.
  7. Press [SET] to enter the selection [se1].
  8. Press [INC] until the desired variable is selected and press [SET] to choose the selection. For additional information, see *Pulse output 1 – 2* [▶ 289].
    - ⇒ The chosen value flashes.
  9. Press [SET] to confirm.
  10. Press [SET] to go back to the menu [Pls out1].
    - ⇒ Parameter [se1] is marked with a \* after completion.
    - ⇒ Parameter [unit] is preselected.
  11. Press [SET] to enter the selection [unit].
  12. Press [INC] until the required unit is selected and press [SET] to choose the selection. For additional information, see *Pulse output 1 – 2* [▶ 290].
    - ⇒ The chosen value flashes.



13. Press [SET] to confirm.
14. Press [SET] to go back to the menu [Pls out1].
  - ⇒ Parameter [Unit] is marked with a \* after completion.
  - ⇒ Parameter [Width] is preselected.
15. Press [SET] to enter the selection [Width].
16. Press [INC] until the desired value is selected and press [SET] to choose the selection. For additional information, see *Pulse output 1 – 2* [▶ 292].
  - ⇒ The chosen value flashes.
17. Press [SET] to confirm.
18. Press [SET] to go back to the menu [Pls out1].
  - ⇒ Parameter [Width] is marked with a \* after completion.
  - ⇒ Parameter [Rate] is preselected.
19. Press [SET] to enter the selection [Rate].
  - ⇒ The adjustable digit flashes.
20. Press [INC] to increase the value.
21. Press [SFT] to change the adjustable digit.
  - ⇒ The adjustable digit flashes.
22. Press [INC] to increase the value.
23. Continue in the same way until the number is completed.
24. Press [SET] to confirm. For additional information, see *Pulse output 1 – 2* [▶ 294].
  - ⇒ The configured [Rate] value flashes.
25. Press [SET] to set the value.
26. Press [SET] to go back to the menu [Pls out1].
  - ⇒ Parameter [Rate] is marked with a \* after completion.
  - ⇒ Parameter [Setting download] is preselected. Press [SET] to download the configuration to the device.
  - ⇒ If the device does not have any alarm or warning, [Good] will be displayed.
  - ⇒ If the device has an alarm or warning, the number of errors and the corresponding fault number will be shown. For additional information, see chapter *Troubleshooting* [▶ 605].
27. Press and hold [SFT] and press [SET] to go back to the menu [Pls/Sts out].  
**NOTICE! Pulse output 2 is displayed only if Pulse/Status output 2 is available, and Pulse/Status output 2 mode is set to Fixed Pulse output.**
28. Continue to configure [Pls out2] in the same way as [Pls out1].  
**NOTICE! Frequency output 1 is displayed only if Pulse/Status output 1 mode is set to Frequency.**
29. Press [INC] until [Freq out1] is selected.
30. Press [SET] to enter the menu [Freq out1].
  - ⇒ [Setting upload] runs automatically and will be marked with a \* after completion.
  - ⇒ Parameter [se1] is preselected.
31. Press [SET] to enter the selection [se1].
32. Press [INC] until the desired variable is selected and press [SET] to choose the selection. For additional information, see *Frequency output 1 – 2* [▶ 294].
  - ⇒ The chosen value flashes.
33. Press [SET] to confirm.

34. Press [SET] to go back to the menu [Freq out1].
  - ⇒ Parameter [se1] is marked with a \* after completion.
  - ⇒ Parameter [Max freq] is preselected.
35. Press [SET] to enter the selection [Max freq].
  - ⇒ The adjustable digit flashes.
36. Press [INC] to increase the value.
37. Press [SFT] to change the adjustable digit.
  - ⇒ The adjustable digit flashes.
38. Press [INC] to increase the value.
39. Continue in the same way until the number is completed.
40. Press [SET] to confirm.
  - ⇒ The configured [Max freq] value flashes.
41. Press [SET] to go back to the menu [Freq out1].
  - ⇒ Parameter [Max freq] is marked with a \* after completion.
  - ⇒ Parameter [Min freq] is preselected.
42. Press [SET] to enter the selection [Min freq].
  - ⇒ The adjustable digit flashes.
43. Press [INC] to increase the value.
44. Press [SFT] to change the adjustable digit.
  - ⇒ The adjustable digit flashes.
45. Press [INC] to increase the value.
46. Continue in the same way until the number is completed.
47. Press [SET] to confirm.
  - ⇒ The configured [Min freq] value flashes.
48. Press [SET] to go back to the menu [Freq out1].
  - ⇒ Parameter [Min freq] is marked with a \* after completion.
  - ⇒ Parameter [Setting download] is preselected.
49. Press [SET] to download the configuration to the device.
  - ⇒ If the device does not have any alarm or warning, [Good] will be displayed.
  - ⇒ If the device has an alarm or warning, the number of errors and the corresponding fault number will be shown. For additional information, see chapter *Troubleshooting* [▶ 605].
50. Press and hold [SFT] and press [SET] to go back to the menu [Pls/Sts out].  
**NOTICE! Frequency output 2 is displayed only if Pulse/Status output 2 is available, and Pulse/Status output 2 mode is set to Frequency.**
51. Continue to configure [Freq out2] in the same way as [Freq out1 – 2].  
**NOTICE! Status output 1 is displayed only if Pulse/Status output 1 mode is set to Status output.**
52. Press [INC] until [Sts out1] is selected.
53. Press [SET] to enter the menu [Sts out1].
  - ⇒ [Setting upload] runs automatically and will be marked with a \* after completion.
  - ⇒ Parameter [Func] is preselected.
54. Press [SET] to enter the selection [Func].
55. Press [INC] until the desired variable is selected and press [SET] to choose the selection. For additional information, see *Status output 1 – 2* [▶ 297].

56. Press [SET] to choose the selection.
  - ⇒ The chosen value flashes.
57. Press [SET] to confirm.
58. Press [SET] to go back to the menu [sts out1].
  - ⇒ Parameter [Func] is marked with a \* after completion.
  - ⇒ Parameter [Setting download] is preselected.
59. Press [SET] to download the configuration to the device.
  - ⇒ If the device does not have any alarm or warning, [Good] will be displayed.
  - ⇒ If the device has an alarm or warning, the number of errors and the corresponding fault number will be shown. For additional information, see chapter *Troubleshooting* [▶ 605].

**NOTICE! Status output 2 is displayed only if Pulse/Status output 2 is available and Pulse/Status output 2 mode is set to Status output.**
60. Continue to configure [sts out2] in the same way as [sts out1].
61. Press and hold [SFT] and press [SET] to go back to the menu [Easy setup wizard].

### Configure Double pulse output

The settings must be downloaded to the device. If the wizard is canceled before this is completed and [setting download] is performed, any changes to the settings will not be reflected on the device.

✓ [Specialist] is selected as the *Operation level* [▶ 20].

1. Press [INC] until [Easy setup wizard] is selected.
2. Press [SET] to enter the menu [Easy setup wizard].
  - ⇒ Menu [Install cfg] is preselected.
3. Press [INC] until [Pls/Sts out] is selected.
4. Press [SET] to enter the menu [Pls/Sts out].
  - ⇒ Menu [Pls/Sts cfg] is preselected.
5. Press [INC] until [Db1 pls out] is selected.
6. Press [SET] to enter the menu [Db1 pls out].
  - ⇒ [Setting upload] runs automatically and will be marked with a \* after completion.
  - ⇒ Parameter [se1] is preselected.
7. Press [SET] to enter the selection [se1].
8. Press [INC] until the desired variable is selected and press [SET] to choose the selection. For additional information, see *Frequency output 1 select* [▶ 300].
  - ⇒ The chosen value flashes.
9. Press [SET] to confirm.
10. Press [SET] to go back to the menu [Db1 pls out].
  - ⇒ Parameter [se1] is marked with a \* after completion.
  - ⇒ Parameter [Phase shift mode] is preselected.
11. Press [SET] to enter the selection [Phase shift mode].
12. Press [INC] to select [0°], [180°], [-90°], [+90°] or [Quadrature]. For additional information, see *Double pulse phase shift mode* [▶ 301].
13. Press [SET] to choose the selection.
  - ⇒ The chosen value flashes.
14. Press [SET] to confirm.

15. Press [SET] to go back to the menu [db1 pls out].
  - ⇒ Parameter [Phase shift mode] is marked with a \* after completion.
  - ⇒ Parameter [Max freq] is preselected.
16. Press [SET] to enter the selection [Max freq].
  - ⇒ The adjustable digit flashes.
17. Press [INC] to increase the value.
18. Press [SFT] to change the adjustable digit.
  - ⇒ The adjustable digit flashes.
19. Press [INC] to increase the value.
20. Continue in the same way until the number is completed.
21. Press [SET] to confirm.
  - ⇒ The configured [Max freq] value flashes.
22. Press [SET] to go back to the menu [db1 pls out].
  - ⇒ Parameter [Max freq] is marked with a \* after completion.
  - ⇒ Parameter [Min freq] is preselected.
23. Press [SET] to enter the selection [Min freq].
  - ⇒ The adjustable digit flashes.
24. Press [INC] to increase the value.
25. Press [SFT] to change the adjustable digit.
  - ⇒ The adjustable digit flashes.
26. Press [INC] to increase the value.
27. Continue in the same way until the number is completed.
28. Press [SET] to confirm.
  - ⇒ The configured [Min freq] value flashes.
29. Press [SET] to go back to the menu [db1 pls out].
  - ⇒ Parameter [Min freq] is marked with a \* after completion.
  - ⇒ Parameter [Setting download] is preselected.
30. Press [SET] to download the configuration to the device.
  - ⇒ If the device does not have any alarm or warning, [Good] will be displayed.
  - ⇒ If the device has an alarm or warning, the number of errors and the corresponding fault number will be shown. For additional information, see chapter *Troubleshooting* [▶ 605].
31. Press and hold [SFT] and press [SET] to go back to the menu [Easy setup wizard].

#### 4.7.5 Totalizer

Wizard to configure totalizer, such as process variables, unit, action at alarm, totalizing scheme, etc.

##### Configure Totalizer

Configuration of Totalizer 1 – 3 is shown below.

Totalizer 4 – 6 cannot be configured by Easy setup wizard. To configure Totalizer 4 – 6, see *Detailed setup menu* [▶ 377].

The settings must be downloaded to the device. If the wizard is canceled before this is completed and [Setting download] is performed, any changes to the settings will not be reflected on the device.

- ✓ [Specialist] is selected as the *Operation level* [▶ 20].

1. Press [INC] until [Easy setup wizard] is selected.

2. Press [SET] to enter the menu [Easy setup wizard].  
⇒ Menu [Install cfg] is preselected.
3. Press [INC] until [Tt1] is selected.
4. Press [SET] to enter the menu [Tt1].  
⇒ Menu [Tt11] is preselected.
5. Press [SET] to enter the menu [Tt11].  
⇒ [Setting upload] runs automatically and will be marked with a \* after completion.  
⇒ Parameter [channel] is preselected.
6. Press [SET] to enter the selection [channel].
7. Press [INC] until the desired variable is selected and press [SET] to choose the selection. For additional information, see *Total 1 – 3 channel* [▶ 303].  
⇒ The chosen value flashes.
8. Press [SET] to confirm.
9. Press [SET] to go back to the menu [Tt11].  
⇒ Parameter [channel] is marked with a \* after completion.  
⇒ Parameter [unit] is preselected.
10. Press [SET] to enter the selection [unit].
11. Press [INC] until the required unit is selected and press [SET] to choose the selection. For additional information, see *Total 1 – 3 unit* [▶ 304].  
⇒ The chosen value flashes.
12. Press [SET] to confirm.
13. Press [SET] to go back to the menu [Tt11].  
⇒ Parameter [unit] is marked with a \* after completion.  
⇒ Parameter [Fail opt] is preselected.
14. Press [SET] to enter the selection [Fail opt].
15. Press [INC] to select [Run], [Hold] or [Last valid val]. For additional information, see *Total 1 – 3 failure option* [▶ 305].
16. Press [SET] to choose the selection.  
⇒ The chosen value flashes.
17. Press [SET] to confirm.
18. Press [SET] to go back to the menu [Tt11].  
⇒ Parameter [Fail opt] is marked with a \* after completion.  
⇒ Parameter [start/stop] is preselected.
19. Press [SET] to enter the selection [start/stop].
20. Press [INC] to select [stop] or [start]. For additional information, see *Total 1 – 3 start/stop* [▶ 305].
21. Press [SET] to choose the selection.  
⇒ The chosen value flashes.
22. Press [SET] to confirm.
23. Press [SET] to go back to the menu [Tt11].  
⇒ Parameter [start/stop] is marked with a \* after completion.  
⇒ Parameter [Setting download] is preselected.

24. Press [SET] to download the configuration to the device.
  - ⇒ If the device does not have any alarm or warning, [Good] will be displayed.
  - ⇒ If the device has an alarm or warning, the number of errors and the corresponding fault number will be shown. For additional information, see chapter *Troubleshooting* [▶ 605].
  - ⇒ The parameter [Tt12] and [Tt13] can be configured in the same way.
25. Press and hold [SFT] and press [SET] twice to go back to the menu [Easy setup wizard].

#### 4.7.6 Display select

Wizard to configure process variables to be displayed on 1 to 4 lines on display.

##### Configure Display select

Wizard to set process variables to be displayed on 1 to 4 lines on display.

Configuration of the Display select is shown below.

The settings must be downloaded to the device. If the wizard is canceled before this is completed and [Setting download] is performed, any changes to the settings will not be reflected on the device.

- ✓ [Specialist] or [Maintenance] is selected as the *operation level* [▶ 20].
1. Press [INC] until [Easy setup wizard] is selected.
  2. Press [SET] to enter the menu [Easy setup wizard].
    - ⇒ Menu [Install cfg] is preselected.
  3. Press [INC] until [Disp sel] is selected.
  4. Press [SET] to enter the menu [Disp sel].
    - ⇒ [Setting upload] runs automatically and will be marked with a \* after completion.
    - ⇒ Parameter [set1] is preselected.
  5. Press [SET] to enter the selection [set1].
  6. Press [INC] until the variable to be assigned to display line 1 is selected and press [SET] to choose the selection. For additional information, see *Display select 1 – 4* [▶ 306].
    - ⇒ The chosen value flashes.
  7. Press [SET] to confirm.
  8. Press [SET] to go back to the menu [Disp sel].
    - ⇒ Parameter [set1] is marked with a \* after completion.
    - ⇒ Parameter [set2] is preselected.
  9. Continue to configure the other parameters [set2], [set3] and [set4] in the same way.
  10. After configuration, press [INC] until the parameter [Setting download] is selected.
  11. Press [SET] to download the configuration to the device.
    - ⇒ If the device does not have any alarm or warning, [Good] will be displayed.
    - ⇒ If the device has an alarm or warning, the number of errors and the corresponding fault number will be shown. For additional information, see chapter *Troubleshooting* [▶ 605].
  12. Press and hold [SFT] and press [SET] to go back to the menu [Easy setup wizard].

#### 4.7.7 Date/Time

Wizard to configure date and time.

##### Configure Date/Time

Configuration of the date and time is shown below.

“Current date” and “Current time” only display current date and time. To set date and time, write values on “Set current date” and “Set current time”.

The settings must be downloaded to the device. If the wizard is canceled before this is completed and [setting download] is performed, any changes to the settings will not be reflected on the device.

✓ [Specialist] or [Maintenance] is selected as the *operation level* [▶ 20].

1. Press [INC] until [Easy setup wizard] is selected.
2. Press [SET] to enter the menu [Easy setup wizard].
  - ⇒ Menu [Install cfg] is preselected.
3. Press [INC] until [Date/Time] is selected.
4. Press [SET] to enter the menu [Date/Time].
  - ⇒ [Setting upload] runs automatically and will be marked with a \* after completion.
  - ⇒ Menu [Date] is preselected.
5. Press [INC] until [Set date] is selected.
6. Press [SET] to enter the menu [Set date].
7. Press [SET] to set the date.
  - ⇒ Date on display is flashing.
8. Press [INC] until the desired year is displayed.
9. Press [SFT] to switch to the display of the month.
10. Press [INC] until the desired month is displayed.
11. Press [SFT] to switch to the display of the day.
12. Press [INC] until the desired day is displayed.
13. Press [SET] to select the date set.
  - ⇒ The configured value flashes.
14. Press [SET] to set the value.
15. Press [SET] to go back to the menu [Date/Time].
  - ⇒ Parameter [Set date] is marked with a \* after completion.
  - ⇒ Parameter [Set time] is preselected.
16. Press [SET] to enter the selection [Set time].
17. Press [SET] to change the current time.
  - ⇒ Time on display is flashing.
18. Press [INC] until the desired number for the hour is displayed.
19. Press [SFT] to set the minutes.
20. Repeat the two previous steps for minutes and seconds.
21. Press [SET] to select the time set.
  - ⇒ The configured value flashes.
  - ⇒ Parameter [Set time] is marked with a \* after completion.
  - ⇒ Parameter [Setting download] is preselected.
22. Press [SET] twice to set the value.
23. Press [SET] to download the configuration to the device.



- ⇒ If the device does not have any alarm or warning, [Good] will be displayed.
- ⇒ If the device has an alarm or warning, the number of errors and the corresponding fault number will be shown. For additional information, see chapter *Troubleshooting* [▶ 605].

24. Press and hold [SFT] and press [SET] to go back to the menu [Easy setup wizard].

#### 4.7.8 Batch

Wizard to configure Batch function. Only the configuration of 1 stage batch and Batch 1 is available in the wizard for Batch function.

##### Configure Batch 1 configuration

Configuration of Batch 1 configuration is shown below.

The settings must be downloaded to the device. If the wizard is canceled before this is completed and [Setting download] is performed, any changes to the settings will not be reflected on the device.

- ✓ [Specialist] is selected as the *Operation level* [▶ 20].
- 1. Press [INC] until [Easy setup wizard] is selected.
- 2. Press [SET] to enter the menu [Easy setup wizard].
  - ⇒ Menu [Install cfg] is preselected.
- 3. Press [INC] until [Batch1] is selected.
- 4. Press [SET] to enter the menu [Batch1].
  - ⇒ Menu [Install cfg] is preselected.
- 5. Press [SET] to enter the menu [TuHC cfg].
  - ⇒ [Setting upload] runs automatically and will be marked with a \* after completion.
  - ⇒ Parameter [Mode] is preselected.
- 6. Press [SET] to enter the selection [Mode].
- 7. Press [INC] to select [Yes] or [No]
- 8. Press [SET] to choose the selection.
  - ⇒ The chosen value flashes.
- 9. Press [SET] to confirm.
- 10. Press [SET] to go back to the menu [TuHC cfg].
  - ⇒ Parameter [Mode] is marked with a \* after completion.
  - ⇒ Parameter [var sel] is preselected.
- 11. Press [SET] to enter the selection [var sel].
- 12. Press [INC] to select the desired variable and press [SET] to choose the selection. For additional information, see *Batch variable select 1* [▶ 311].
  - ⇒ The chosen variable flashes.
- 13. Press [SET] to confirm.
  - ⇒ The chosen variable flashes.
- 14. Press [SET] to go back to the menu [TuHC cfg].
  - ⇒ Parameter [var sel] is marked with a \* after completion.
  - ⇒ Parameter [Pls/Sts1 mode] is preselected.
- 15. Continue to configure the other parameter [Pls/Sts1 mode] in the same way.
- 16. After configuration, press [INC] until the parameter [Setting download] is selected.
- 17. Press [SET] to download the configuration to the device.
  - ⇒ If the device does not have any alarm or warning, [Good] will be displayed.



- ⇒ If the device has an alarm or warning, the number of errors and the corresponding fault number will be shown. For additional information, see chapter *Troubleshooting* [▶ 605].

### Configure Batch 1 setting

Configuration of Batch 1 setting is shown below.

The settings must be downloaded to the device. If the wizard is canceled before this is completed and [setting download] is performed, any changes to the settings will not be reflected on the device.

- ✓ [Specialist] is selected as the *Operation level* [▶ 20].

1. Press [INC] until [Easy setup wizard] is selected.
2. Press [SET] to enter the menu [Easy setup wizard].
  - ⇒ Menu [Install cfg] is preselected.
3. Press [INC] until [Batch1] is selected.
4. Press [SET] to enter the menu [Batch1].
  - ⇒ Press [INC] to select [Setting].
5. Press [SET] to enter the menu [Setting].
  - ⇒ [Setting upload] runs automatically and will be marked with a \* after completion.
  - ⇒ Parameter [Unit] is preselected.
6. Press [SET] to enter the selection [Unit].
7. Press the desired variable is selected and press [SET] to choose the selection. For additional information, see *Batch unit 1* [▶ 313].
8. Press [SET] to choose the selection.
  - ⇒ The chosen value flashes.
9. Press [SET] to confirm.
10. Press [SET] to go back to the menu [Setting].
  - ⇒ Parameter [Unit] is marked with a \* after completion.
  - ⇒ Parameter [Qty] is preselected.
11. Press [SET] to enter the selection [Qty].
12. Press the desired variable is entered and press [SET] to choose the selection. For additional information, see *Batch quantity 1* [▶ 314].
  - ⇒ The chosen value flashes.
13. Press [SET] to confirm.
  - ⇒ The chosen [Qty] flashes.
14. Press [SET] to go back to the menu [Setting].
  - ⇒ Parameter [Qty] is marked with a \* after completion.
  - ⇒ Parameter [Fix comp val] is preselected.
15. Continue to configure the other parameter [Fix comp val] in the same way. For additional information, see *Fixed compensation value 1* [▶ 314].
16. Continue to configure the other parameter [End judge val] in the same way. For additional information, see *Batch end judgment value 1* [▶ 315].
17. Continue to configure the other parameter [Max qty] in the same way. For additional information, see *Max batch quantity* [▶ 315].
18. Continue to configure the other parameter [Func] in the same way. For additional information, see *Status output 1 function* [▶ 315].
19. Continue to configure the other parameter [Sts out1] in the same way. For additional information, see *Batch status output 1* [▶ 318].
20. After configuration, press [INC] until the parameter [Setting download] is selected.

21. Press [**SET**] to download the configuration to the device.

- ⇒ If the device does not have any alarm or warning, [**Good**] will be displayed.
- ⇒ If the device has an alarm or warning, the number of errors and the corresponding fault number will be shown. For additional information, see chapter *Troubleshooting* [▶ 605].

## 4.8 Event management

### Definition

Event management is intended for the overall management of setting and handling events in terms of categorization, indication, registration, actions and behavior.

An event is defined as an occurrence that causes an unusual or an extraordinary condition in this instrument, such as a special operation, alarm or warning. It can occur periodically or once, and can be planned or unexpected.

Examples of typical events:

- Autozero, a planned event
- Sensor temperature failure, an unexpected event
- Mass Flow HH/LL Alarm, an unexpected event set up by the user

### Configuration

Steps to configure an event management function:

- ▶ Set up a condition for the occurrence of an event
- ▶ Set up an event setting behavior when the event occurs, see chapter *Event setting* [▶ 55]
- ▶ Set up an output signal behavior when the event occurs, see chapter *Output signal behavior* [▶ 58]
- ▶ Set up an output signal settings when the event occurs. For detailed information, see the corresponding chapters in the menu description:
  - *Analog output* [▶ 470]
  - *Pulse/Status outputs* [▶ 474]
  - *Totalizer* [▶ 502]
  - *Burn out* [▶ 145]



Data on the microSD card cannot be viewed on the display. The content of the microSD card can be read by removing it from the device and reading the file on a computer equipped with a microSD card reader port.

- ▶ To unmount the microSD card, refer to the parameter *microSD unmount* [▶ 603].

### 4.8.1 Event setting

Rotamass Total Insight includes the following six event setting behavior types when an event occurs. The preset behavior is executed when an event occurs.

Tab. 6: Description of event setting behavior types

| Behavior type         | Description                                                                                                                                                                                                                                            |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ignore                | No event notification; output is not changed.                                                                                                                                                                                                          |
| History only          | No event notification; output is not changed. Occurrence of the event is recorded.                                                                                                                                                                     |
| Generate              | Event notification; output is changed. Occurrence or reset of the event is recorded.                                                                                                                                                                   |
| Acknowledge           | Event notification; output is changed. Alarm persists until it is acknowledged. Generation, reset, and acknowledgement of the event are recorded.                                                                                                      |
| Monitor               | Event notification; output is changed. Occurrence and reset of the event and 3 samples of data before and after the event – 6 samples total – are recorded.                                                                                            |
| Monitor + acknowledge | Event notification; output is changed. Status to indicate occurrence of event is not reset until it is acknowledged. Occurrence, reset and acknowledgement of event and 3 samples of data before and after the event – 6 samples total – are recorded. |

**Configurable behavior**

Configurable event behaviors can be defined by setting the value in the event setting parameters, see chapters *Alarm/Event behavior settings* [▶ 190] in the menu description.

The following table provides a description of behavior types that can be defined in the parameters when an event occurs.

Tab. 7: Event setting behavior when event occurs

| Behavior type         | Notification    | Output signal   | Record of history |                 | Acknowledgement |
|-----------------------|-----------------|-----------------|-------------------|-----------------|-----------------|
|                       |                 |                 | Event             | Data            |                 |
| Ignore                | X               | X               | X                 | X               | X               |
| History only          | X               | X               | ✓ <sup>3)</sup>   | X               | X               |
| Generate              | ✓ <sup>1)</sup> | ✓ <sup>2)</sup> | ✓ <sup>4)</sup>   | X               | X               |
| Acknowledge           | ✓ <sup>1)</sup> | ✓ <sup>2)</sup> | ✓ <sup>4)</sup>   | X               | ✓ <sup>6)</sup> |
| Monitor               | ✓ <sup>1)</sup> | ✓ <sup>2)</sup> | ✓ <sup>4)</sup>   | ✓ <sup>5)</sup> | X               |
| Monitor + acknowledge | ✓ <sup>1)</sup> | ✓ <sup>2)</sup> | ✓ <sup>4)</sup>   | ✓ <sup>5)</sup> | ✓ <sup>6)</sup> |

<sup>1)</sup> Notification of the event by display.

<sup>2)</sup> Output signal is changed according to the setting for output when the event occurs. For detailed information, see chapter Output signal behavior [▶ 58].

<sup>3)</sup> Occurrence of the event is recorded along with time information in the event history. For detailed information, see chapter Event history [▶ 61].

<sup>4)</sup> Reset of the event is recorded along with time information in the event history. For detailed information, see chapter Event history [▶ 61].

<sup>5)</sup> Three samples of data before and after the event – six samples total – are recorded in monitoring. For detailed information, see chapter Monitoring history [▶ 61].

<sup>6)</sup> Occurrence of the event must be acknowledged to reset event. For detailed information, see chapter Event acknowledge [▶ 57].

**Non-configurable behavior**

The event setting behavior for non-configurable events is fixed at the behavior type Generate. An overview of all events is available in the chapter *Possible events and related settings and behavior* [▶ 64].

Behavior for critical events that affect the reliability of the device is fixed and cannot be changed. For examples of such critical events, see failures 101 – 108 in the *menu description* [▶ 120].

#### 4.8.2 Event acknowledge

If Acknowledge or Monitor + acknowledge is selected in the event setting parameters, it is necessary to acknowledge the event to reset the event status.

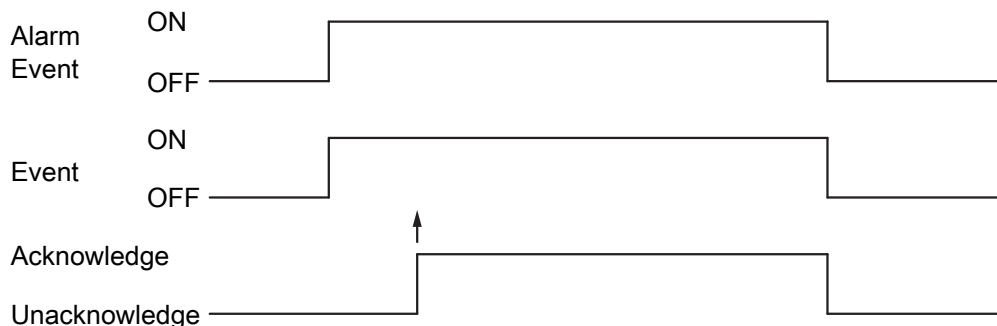
When event setting parameters are set to Acknowledge or Monitor + acknowledge, even if the cause of the event ends, the status of the event occurrence continues until Event acknowledge is set to acknowledged.

If Event acknowledge is set to Acknowledged, but the event continues, the value of Event acknowledge remains acknowledged; and it becomes unacknowledged when the event ends.

The relationships between the cause of an event, such as an alarm, the event status and the event acknowledge are shown in the following examples.

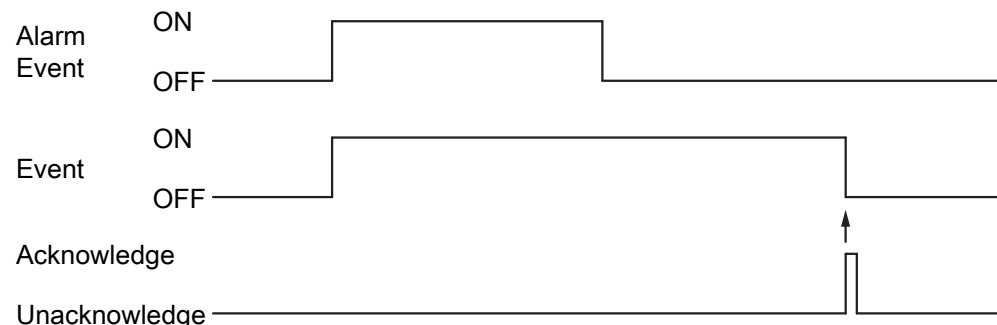
##### Example 1:

Event is generated. When the event is acknowledged (arrow marks user acknowledgement), it is not reset if the event is still happening. The event is reset after the event ends:



##### Example 2:

Event is generated. When the event ends, if the event has not been acknowledged, it is not reset. The event is reset after the event has been acknowledged (arrow marks user acknowledgement):



#### Acknowledge an event and reset event status

- ✓ An event that has to be acknowledged was configured.
  - ✓ Operation level is *selected* [▶ 20].
1. Press [INC] until [Diag/Service] is selected.
  2. Press [SET] to enter the menu [Diag/Service].
    - ⇒ Menu [Sts/Self test] is preselected.
  3. Press [SET] to enter the menu [Sts/Self test].
    - ⇒ Parameter [Evt Ack] is preselected.
  4. Press [SET] to enter the parameter settings of [Evt Ack].
  5. Press [INC] until the value [Ack] is selected and press [SET] to choose the selection.
    - ⇒ [Ack] flashes.
  6. Press [SET] to confirm.

### 4.8.3 Output signal behavior

There are 2 types of output signal behavior:

- Device behavior: the behavior of the output signal during occurrence of an event after acknowledgement of the event
- Acknowledge behavior: the behavior of the output signal from occurrence of an event to acknowledgement of the event

Some behaviors are fixed for certain events, while others may not be available. For more detailed information, see chapter *Possible events and related settings and behavior* [▶ 64].

If generate, acknowledge, Monitor or Monitor + acknowledge is defined as the behavior for an event, a predefined behavior of the output signal is executed when an event occurs.

Four types of output signal behaviors can be defined as shown in the table below.

Tab. 8: Description of the output signal behavior types

| Output signal behavior type | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Burnout                     | <p>Predefined for critical events that affect the reliability of the device. For such events, output signal behavior cannot be changed and is fixed as burnout.</p> <p>The burnout condition will occur when the device is damaged in such a way that the firmware fails to function for hardware reasons.</p> <p>When the event occurs, analog out is set to either high, 22 mA, or low, 0 mA, or 2.2 mA in case of software burnout. The direction of the switch is set by the hardware burnout switch.</p>                                                                                                                                         |
| Software burnout            | <p>A software burnout condition can be set up to show that the user deems the device to be in an unreliable state due to the occurrence of an event.</p> <p>For more detailed information about the setup of the burnout mode, see the general instruction manual, IM 01U10B00-00EN-R.</p>                                                                                                                                                                                                                                                                                                                                                            |
| Alarm out                   | <p>The output of the analog out and pulse out when an event occurs depends on the value of the parameter. For example, the signal behavior of the analog out can be selected and set to the following.</p> <ul style="list-style-type: none"> <li>▪ Fixed current: fixed output of 4 mA, 20 mA, etc.</li> <li>▪ Measured value: continue to output measured value, same as continue</li> <li>▪ Hold: fixed output value just before the event occurred</li> </ul> <p>Not all outputs react to all alarms even if they are configured to react to alarms. For details, see chapter <i>Possible events and related setting and behavior</i> [▶ 64].</p> |
| Continue                    | <p>Output signal does not change. Output signal of measured value continues in normal operation.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

If generate, acknowledge, Monitor or Monitor + acknowledge is defined as the corresponding behavior when an event occurs, the output signal is changed according to the setting of the acknowledge behavior and device behavior parameters.

Tab. 9: Output signal behavior types and their effect on the output signals and totalizer functions

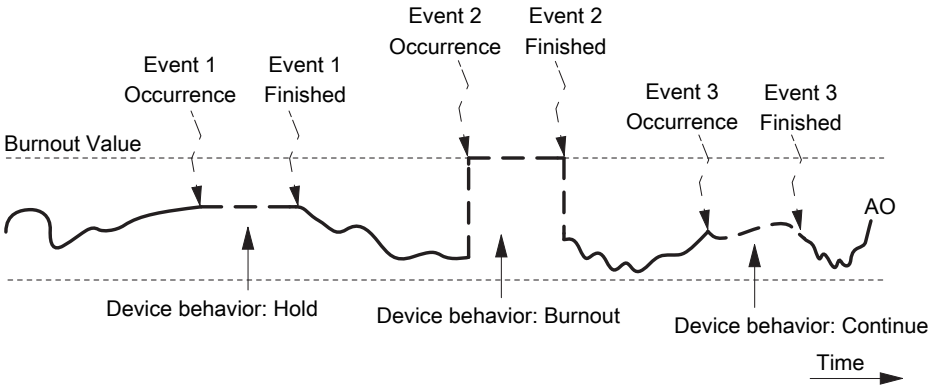
| Output signal behavior type | Current output                                                                                      | Totaling               | Pulse/Status outputs <sup>1)</sup>  |                        |                        |
|-----------------------------|-----------------------------------------------------------------------------------------------------|------------------------|-------------------------------------|------------------------|------------------------|
|                             |                                                                                                     |                        | Pulse                               | Freq.                  | Status                 |
| Burnout                     | Burnout, the direction set by burnout switch                                                        | Hold                   | Stop                                |                        | Configurable<br>[ 297] |
| Alarm out                   | Configurable<br>[ 473]                                                                              | Configurable<br>[ 505] | Configurable<br>[ 482] or<br>[ 494] | Configurable<br>[ 487] |                        |
| Continue                    | Output may become undefined depending on the content of the alarm, and is therefore not guaranteed. |                        |                                     |                        |                        |

<sup>1)</sup> Only one of the three modes is available. Corresponding parameter must be set.

Examples of Device behavior, Acknowledge behavior and Analog output

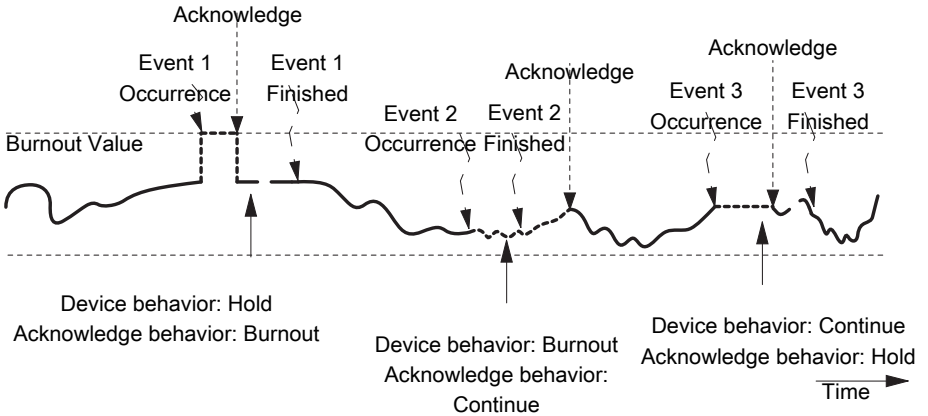
Example 1:

The following figure shows how the Analog output (current signal) changes when an Event occurs, if the configuration of the device behavior for the 1<sup>st</sup> event is Hold, for the 2<sup>nd</sup> Burn out, for the 3<sup>rd</sup> Continue.



Example 2:

For 1<sup>st</sup> event, Device behavior is set to Hold and Acknowledge behavior is set to Burnout, for 2<sup>nd</sup> event, Device behavior is set to Burnout and Acknowledge behavior is set to Continue, for 3<sup>rd</sup> event, Device behavior is set to Continue and Acknowledge behavior is set to Hold. Example of Analog output behaviors (current signal) and Acknowledge operation when an event occurs.



**Call up menu Alarm/Event behavior setting**

- ✓ [Specialist] is selected as the *Operation level* [▶ 20].
- 1. Press [INC] until [Diag/Service] is selected.
- 2. Press [SET] to enter the menu [Diag/Service].
- 3. Press [INC] until [Alm/Evt bhvr set] is selected.
- 4. Press [SET] to enter the menu [Alm/Evt bhvr set].
  - ⇒ Parameter [Alm/Evt add] is preselected.
- 5. Press [SET] to enter the parameter settings of [Alm/Evt add].
- 6. Press [INC] until the value [Apply] is selected and press [SET] to choose the selection.
  - ⇒ [Apply] flashes.
- 7. Press [SET] to confirm.
- 8. Press [SET] to go back to the menu [Alm/Evt bhvr set].
- 9. Continue to configure the desired alarms as described in the table above. For additional information, see menu *description* [▶ 190].



#### 4.8.4 Event history

If History only, Generate, Monitor or Monitor + acknowledge is defined as behavior, the following information is saved as the event history when an event occurs:

- Event No. that identifies Event
- Event date and event time
- Event behavior when the event occurred

The transmitter can store up to 10 events in event history. If the number of saved the events exceeds 10, the oldest one is deleted to make room for each new event. If a dedicated microSD card is inserted into the device, the event history can be saved on the card as well as the transmitter.



The number of events that can be saved on the microSD card depends on the capacity of the card.

#### Call up Event history menu

✓ An event has occurred and [Hist only], [Generate], [Monitor] or [Monitor+ack] is defined as the event setting behavior of an event.

✓ Operation level has been selected [▶ 20].

1. Press [INC] until [Diag/Service] is selected.
2. Press [SET] to enter the menu [Diag/Service].  
⇒ Menu [Sts/Self test] is preselected.
3. Press [SET] to enter the menu [Sts/Self test].
4. Press [INC] until the menu [Evt hist] is selected.
5. Press [SET] to enter the menu [Evt hist].
6. Press [INC] until the menu [Evt hist1 - 10] is selected.
7. Press [SET] to enter the menu [Evt hist1 - 10].  
⇒ The display parameters of the menu [Evt hist1 - 10] can be called up as described in the *menu description* [▶ 139].

#### 4.8.5 Monitoring history

If Monitor or Monitor + acknowledge is defined as behavior, three samples of data both before and after the event are saved with event information – 6 data samples total. The sampling interval is 1 second.

The transmitter stores up to 4 sets of monitoring data on the last 4 events. If the number of saved data sets exceeds 4, the oldest one is deleted to make room for new data. These parameters are supported only on Modbus.

If a dedicated microSD card is inserted into the device, the monitoring data can be stored on the card as well as the transmitter. The number of data set that can be stored on the microSD card depends on the capacity of the card. The monitoring data in the file on the microSD card is displayed from left to right in the same order as in the table below.

| Order | Parameter                 | Example of value |
|-------|---------------------------|------------------|
| 1     | Event no 1                | ID00703          |
| 2     | Event 1 date              | 1900/00/00       |
| 3     | Event 1 time              | 00:02:37         |
| 4     | Event 1 mass flow last 3  | 0.00E+00         |
| 5     | Event 1 mass flow last 2  | 0.00E+00         |
| 6     | Event 1 mass flow last 1  | 0.00E+00         |
| 7     | Event 1 mass flow after 1 | 0.00E+00         |
| 8     | Event 1 mass flow after 2 | 0.00E+00         |

| Order | Parameter                           | Example of value |
|-------|-------------------------------------|------------------|
| 9     | Event 1 mass flow after 3           | 0.00E+00         |
| 10    | Event 1 resonance frequency last 3  | 0.00E+00         |
| 11    | Event 1 resonance frequency last 2  | 0.00E+00         |
| 12    | Event 1 resonance frequency last 1  | 0.00E+00         |
| 13    | Event 1 resonance frequency after 1 | 0.00E+00         |
| 14    | Event 1 resonance frequency after 2 | 0.00E+00         |
| 15    | Event 1 resonance frequency after 3 | 0.00E+00         |
| 16    | Event 1 temperature last 3          | 3.20E+01         |
| 17    | Event 1 temperature last 2          | 3.20E+01         |
| 16    | Event 1 temperature last 1          | 3.20E+01         |
| 19    | Event 1 temperature after 1         | 3.20E+01         |
| 20    | Event 1 temperature after 2         | 3.20E+01         |
| 21    | Event 1 temperature after 3         | 3.20E+01         |
| 22    | Event 1 pressure last 3             | 0.00E+00         |
| 23    | Event 1 pressure last 2             | 0.00E+00         |
| 24    | Event 1 pressure last 1             | 0.00E+00         |
| 25    | Event 1 pressure after 1            | 0.00E+00         |
| 26    | Event 1 pressure after 2            | 0.00E+00         |
| 27    | Event 1 pressure after 3            | 0.00E+00         |
| 28    | Event 1 net mass flow 1 last 3      | 0.00E+00         |
| 29    | Event 1 net mass flow 1 last 2      | 0.00E+00         |
| 30    | Event 1 net mass flow 1 last 1      | 0.00E+00         |
| 31    | Event 1 net mass flow 1 after 1     | 0.00E+00         |
| 32    | Event 1 net mass flow 1 after 2     | 0.00E+00         |
| 33    | Event 1 net mass flow 1 after 3     | 0.00E+00         |
| 34    | Event 1 net volume flow 1 last 3    | 0.00E+00         |
| 35    | Event 1 net volume flow 1 last 2    | 0.00E+00         |
| 36    | Event 1 net volume flow 1 last 1    | 0.00E+00         |
| 37    | Event 1 net volume flow 1 after 1   | 0.00E+00         |
| 38    | Event 1 net volume flow 1 after 2   | 0.00E+00         |
| 39    | Event 1 net volume flow 1 after 3   | 0.00E+00         |
| 40    | Event 1 concentration last 3        | 0.00E+00         |
| 41    | Event 1 concentration last 2        | 0.00E+00         |
| 42    | Event 1 concentration last 1        | 0.00E+00         |
| 43    | Event 1 concentration after 1       | 0.00E+00         |
| 44    | Event 1 concentration after 2       | 0.00E+00         |
| 45    | Event 1 concentration after 3       | 0.00E+00         |
| 46    | Event 1 phase difference last 3     | 0.00E+00         |
| 47    | Event 1 phase difference last 2     | 0.00E+00         |
| 48    | Event 1 phase difference last 1     | 0.00E+00         |
| 49    | Event 1 phase difference after 1    | 0.00E+00         |
| 50    | Event 1 phase difference after 2    | 0.00E+00         |
| 51    | Event 1 phase difference after 3    | 0.00E+00         |
| 52    | Event 1 drive gain last 3           | 0.00E+00         |
| 53    | Event 1 drive gain last 2           | 0.00E+00         |
| 54    | Event 1 drive gain last 1           | 0.00E+00         |
| 55    | Event 1 drive gain after 1          | 3.79E-03         |
| 56    | Event 1 drive gain after 2          | 1.36E-03         |

| Order | Parameter                               | Example of value |
|-------|-----------------------------------------|------------------|
| 57    | Event 1 drive gain after 3              | 0.00E+00         |
| 58    | Event 1 drive current last 3            | 0.00E+00         |
| 59    | Event 1 drive current last 2            | 0.00E+00         |
| 60    | Event 1 drive current last 1            | 0.00E+00         |
| 61    | Event 1 drive current after 1           | 0.00E+00         |
| 62    | Event 1 drive current after 2           | 0.00E+00         |
| 63    | Event 1 drive current after 3           | 0.00E+00         |
| 64    | Event 1 density last 3                  | 0.00E+00         |
| 65    | Event 1 density last 2                  | 0.00E+00         |
| 66    | Event 1 density last 1                  | 0.00E+00         |
| 67    | Event 1 density after 1                 | 8.35E+00         |
| 68    | Event 1 density after 2                 | 8.35E+00         |
| 69    | Event 1 density after 3                 | 8.35E+00         |
| 70    | Event 1 transmitter temperature last 3  | 3.20E+01         |
| 71    | Event 1 transmitter temperature last 2  | 3.20E+01         |
| 72    | Event 1 transmitter temperature last 1  | 3.20E+01         |
| 73    | Event 1 transmitter temperature after 1 | -7.20E+01        |
| 74    | Event 1 transmitter temperature after 2 | -7.20E+01        |
| 75    | Event 1 transmitter temperature after 3 | -7.20E+01        |
| 76    | Autozero value 1                        | 0.00E+00         |
| 77    | Autozero standard deviation 1           | 0.00E+00         |
| 78    | Autozero density 1                      | 0.00E+00         |
| 79    | Autozero temperature 1                  | 3.20E+01         |
| 80    | Autozero drive current 1                | 0.00E+00         |
| 81    | Autozero resonance frequency 1          | 0.00E+00         |
| 82    | Autozero pressure 1                     | 0.00E+00         |
| 83    | Sensor max temperature 1                | -7.20E+01        |

#### 4.8.6 Data logging

Data logging is the function to save a maximum of 4 process and related variables on a microSD card for a defined logging interval and duration. Logging can be started by manual operation of a parameter or by an event that is defined as Monitor or *Monitor + acknowledge* [▶ 63]. As long as data logging is running, the status icon *Access to microSD card* blinks on the LCD display *Status icons* [▶ 15], and the value of the parameter Logging execute is changed to "Execute". See also *Data logging* [▶ 262].

Logged data on the microSD card cannot be read by the LCD display of Indicator, except for the trend display. The file format of the logged data is CSV; general-purpose software can therefore be used to read and analyze the data. To unmount the microSD card, refer to the parameter *microSD unmount* [▶ 603].

If the additional functions for display are *enabled* [▶ 64], trend charts of logged process variables can be shown on the main *display* [▶ 64].

Trend charts of LRV and URV can also be shown on the main display. For additional information, see chapters *Trend Offline LRV* [▶ 546] and *Trend Offline URV* [▶ 546] in the menu description.

#### Set data logging functions

✓ [Specialist] is selected as the *operation level* [▶ 20].

1. Press [INC] until [Diag/Service] is selected.
2. Press [SET] to enter the menu [Diag/Service].
3. Press [INC] until the menu [Data log] is selected.

4. Press [SET] to enter the menu [Data log].
5. Configure parameters: Choose interval time [Interval time], select logging type [Pv sel1 - 4], choose end time [End time] and execute [Exe] the data logging manually as described in *Data logging* [▶ 258].

#### Enable Additional function menu

- ✓ [Specialist] is selected as the *operation level* [▶ 20].
  - ✓ Corresponding data logging functions have been set.
1. Press [INC] until the menu [Detailed setup] is selected.
  2. Press [SET] to enter the menu [Detailed setup].
  3. Press [INC] until the menu [Disp] is selected.
  4. Press [SET] to enter the menu [Disp].
    - ⇒ Parameter [Disp add] is preselected.
  5. Press [SET] to change the parameter settings of [Disp add].
  6. Press [INC] until the value [Apply] is selected and press [SET] to choose the selection.
    - ⇒ [Apply] flashes.
  7. Press [SET] to confirm.

#### Show trend charts on main display

- ✓ [Specialist] is selected as the *operation level* [▶ 20].
  - ✓ Corresponding data logging functions are set.
  - ✓ Menu [Add func] has been enabled.
1. Press [INC] until [Detailed setup] is selected.
  2. Press [SET] to enter the menu [Detailed setup].
  3. Press [INC] until [Disp] is selected.
  4. Press [SET] to enter the menu [Disp].
  5. Press [INC] until the menu [Disp op cfg] is selected.
  6. Press [SET] to enter the menu [Disp op cfg].
  7. Press [INC] until [Add func] is selected.
  8. Press [SET] to enter the menu [Add func].
  9. Press [INC] until [Meas mode] is selected.
  10. Press [SET] to enter the parameter settings of [Meas mode].
  11. Press [INC] until the value [Trend] is selected and press [SET] to choose the selection.
    - ⇒ [Trend] flashes.
  12. Press [SET] to confirm.

#### 4.8.7 Possible events and related settings and behavior

The following tables show the name of the event and default category of NAMUR NE107, explanations or cross-references to the menu description chapters of related event setting parameters, device behavior parameters and acknowledge behavior parameters, current output when the event occurs, totaling, and pulse behavior:

- *System alarms* [▶ 65]
- *Process alarms* [▶ 67]
- *Setting alarms* [▶ 70]
- *Warnings* [▶ 73]
- *Information* [▶ 75]

There is not always a one-to-one correspondence between events and their corresponding event setting and behavior parameters. Depending on the type of event, a single event setting and behavior parameter may correspond to multiple events. Output signal behavior in the case of an event that does not have a corresponding event setting parameter and behavior parameter is fixed and cannot be modified.

Configuration of NAMUR NE107 classification for each status parameter. Event classification according to NAMUR NE107 can be changed by selecting the following statuses:

Tab. 10: Explanation of statuses

| Status | Explanation          |
|--------|----------------------|
| N      | No effect            |
| M      | Maintenance required |
| F      | Failure              |
| S      | Out of specification |
| C      | Function check       |

For additional information about the configuration of the NAMUR NE107 classification, see chapter *NE 107 map* [► 124] in the menu description.



Some "Event/Alarm name" displays on the LCD display may differ from those in the Modbus configuration tools.

### System alarms

Tab. 11: System alarms 101 – 108

| NE 107 | Alarm No. | Event/Alarm name            | Event setting | Output signal behavior |                       | Totaling | Current output        | Pulse/Status outputs <sup>1)</sup> |       |
|--------|-----------|-----------------------------|---------------|------------------------|-----------------------|----------|-----------------------|------------------------------------|-------|
|        |           |                             |               | Device                 | Ack.                  |          |                       | Pulse                              | Freq. |
| F      | 101       | Resonance frequency failure | Generate      | Burnout                | N/A                   | Hold     | Burnout <sup>2)</sup> | Stop                               |       |
| F      | 102       | Signal failure              |               |                        |                       |          |                       |                                    |       |
| F      | 103       | Pick off 1 failure          |               |                        |                       |          |                       |                                    |       |
| F      | 104       | Pick off 1 failure          |               |                        |                       |          |                       |                                    |       |
| F      | 105       | Pick off 2 failure          |               |                        |                       |          |                       |                                    |       |
| F      | 106       | Pick off 2 failure          |               |                        |                       |          |                       |                                    |       |
| F      | 107       | Temperature range failure   |               | Configurable<br>▶ 191] | Depends <sup>3)</sup> |          |                       |                                    |       |
| F      | 108       | Temperature failure sensor  |               |                        |                       |          |                       |                                    |       |

<sup>1)</sup> The status of the Pulse/Status outputs is configurable for all alarms.

<sup>2)</sup> Output value is set by burnout switch: either high (more than 21.6 mA) or low (less than 2.4 mA). For more detailed information about the setup of the burnout mode, see general instruction manual.

<sup>3)</sup> If alarm out is selected as output signal behavior, outputs and totalizer functions can be defined. For additional information, see table on page [► 59].

Tab. 12: System alarms 121 – 129

| NE 107 | Alarm no. | Event/Alarm name             | Event setting | Output signal behavior |      | Totaling    | Current output        | Pulse/Status outputs <sup>1)</sup> |       |
|--------|-----------|------------------------------|---------------|------------------------|------|-------------|-----------------------|------------------------------------|-------|
|        |           |                              |               | Device                 | Ack. |             |                       | Pulse                              | Freq. |
| F      | 121       | Main board CPU failure       | Generate      | Burnout                | N/A  | Not defined | Burnout <sup>2)</sup> | Not defined                        |       |
| F      | 122       | Main board EEPROM failure    |               |                        |      | Hold        |                       | Stop                               |       |
| F      | 123       | Parameter restore incomplete |               |                        |      |             |                       |                                    |       |
| F      | 124       | Sensor board failure         |               |                        |      |             |                       |                                    |       |
| F      | 125       | Sensor board mismatch        |               |                        |      |             |                       |                                    |       |
| F      | 126       | Sensor communication error   |               |                        |      |             |                       |                                    |       |
| F      | 127       | Option board failure         |               |                        |      |             |                       |                                    |       |
| F      | 128       | Option board EEPROM failure  |               |                        |      |             |                       |                                    |       |
| F      | 129       | Option board mismatch        |               |                        |      |             |                       |                                    |       |

<sup>1)</sup> The status of the Pulse/Status outputs is configurable for all alarms.

<sup>2)</sup> Output value is set by burnout switch: either high (more than 21.6 mA) or low (less than 2.4 mA). For more detailed information about the setup of the burnout mode, see general instruction manual.

Tab. 13: System alarms 130 – 135

| NE 107 | Alarm no. | Event/Alarm name               | Event setting | Output signal behavior  |      | Totaling | Current output        | Pulse/Status outputs <sup>1)</sup> |       |
|--------|-----------|--------------------------------|---------------|-------------------------|------|----------|-----------------------|------------------------------------|-------|
|        |           |                                |               | Device                  | Ack. |          |                       | Pulse                              | Freq. |
| F      | 130       | Indicator board failure        | Generate      | Configurable<br>[► 191] | N/A  |          | Depends <sup>2)</sup> |                                    |       |
| F      | 131       | Indicator board EEPROM failure |               |                         |      |          |                       |                                    |       |
| F      | 132       | LCD driver failure             |               |                         |      |          |                       |                                    |       |
| F      | 133       | Indicator board mismatch       |               |                         |      |          |                       |                                    |       |
| F      | 134       | Indicator communication error  |               |                         |      |          |                       |                                    |       |
| F      | 135       | microSD card failure           |               |                         |      |          |                       |                                    |       |

<sup>1)</sup> The status of the Pulse/Status outputs is configurable for all alarms.

<sup>2)</sup> Output value is set by burnout switch: either high (more than 21.6 mA) or low (less than 2.4 mA). For more detailed information about the setup of the burnout mode, see general instruction manual.

## Process alarms

Tab. 14: Process alarms 201 – 212

| NE 107 | Alarm no. | Event/Alarm name                  | Event setting           | Output signal behavior  |                         | Total-ing                 | Current output | Pulse/Status outputs <sup>1)</sup> |       |
|--------|-----------|-----------------------------------|-------------------------|-------------------------|-------------------------|---------------------------|----------------|------------------------------------|-------|
|        |           |                                   |                         | Device                  | Ack.                    |                           |                | Pulse                              | Freq. |
| M      | 201       | Slug detection                    | Configurable<br>[▶ 194] | Configurable<br>[▶ 193] | Configurable<br>[▶ 195] | Depends <sup>2), 3)</sup> |                |                                    |       |
| M      | 202       | Empty pipe detection              | Configurable<br>[▶ 196] | Configurable<br>[▶ 195] | Configurable<br>[▶ 196] |                           |                |                                    |       |
| M      | 203       | Corrosion detection               | Configurable<br>[▶ 197] | Configurable<br>[▶ 197] | Configurable<br>[▶ 198] |                           |                |                                    |       |
| M      | 204       | Autozero judgement multiphase     | Generate                | Configurable<br>[▶ 202] | N/A                     | Depends <sup>3)</sup>     |                |                                    |       |
| M      | 205       | Autozero judgement flow           |                         |                         |                         |                           |                |                                    |       |
| M      | 206       | Autozero judgement temperature    |                         |                         |                         |                           |                |                                    |       |
| M      | 207       | Batch time exceeded               | Configurable<br>[▶ 203] | Configurable<br>[▶ 203] | Configurable<br>[▶ 203] |                           |                |                                    |       |
| M      | 208       | Batch overrun/underrun            |                         |                         |                         |                           |                |                                    |       |
| M      | 209       | Max flow while batching           |                         |                         |                         |                           |                |                                    |       |
| S      | 210       | Oil density calculation failure   | Generate                | Continue                | N/A                     | Continue                  |                |                                    |       |
| S      | 211       | Water density calculation failure |                         |                         |                         |                           |                |                                    |       |
| S      | 212       | NOC calculation failure           |                         |                         |                         |                           |                |                                    |       |

<sup>1)</sup> The status of the Pulse/Status outputs is configurable for all alarms.

<sup>2)</sup> If Generate, Acknowledge, Monitor or Monitor + acknowledge are defined as the event setting behavior, a selectable output signal behavior is executed when an event occurs.

<sup>3)</sup> If Alarm out is selected as the output signal behavior, outputs and totalizer functions can be defined. For additional information, see table on page [▶ 59].

Tab. 15: Process alarms 221 – 236

| NE 107 | Alarm no. | Event/Alarm name                                  | Event setting | Output signal behavior  |      | Total-ing | Current output         | Pulse/Status outputs <sup>1)</sup> |       |
|--------|-----------|---------------------------------------------------|---------------|-------------------------|------|-----------|------------------------|------------------------------------|-------|
|        |           |                                                   |               | Device                  | Ack. |           |                        | Pulse                              | Freq. |
| N      | 221       | Analog input failure                              | Generate      | Configurable<br>[▶ 199] | N/A  | Continue  | De-pends <sup>2)</sup> | Continue                           |       |
| N      | 222       | Mass flow high high low low alarm                 |               | Configurable<br>[▶ 200] |      |           |                        |                                    |       |
| N      | 223       | Density high high low low alarm                   |               | Configurable<br>[▶ 201] |      |           |                        |                                    |       |
| N      | 224       | Temperature high high low low alarm               |               | Configurable<br>[▶ 201] |      |           |                        |                                    |       |
| N      | 225       | Pressure high high low low alarm                  |               | Configurable<br>[▶ 202] |      |           |                        |                                    |       |
| N      | 226       | Volume flow high high low low alarm               |               | Continue                | N/A  | Continue  |                        |                                    |       |
| N      | 227       | Corrected volume flow high high low low alarm     |               |                         |      |           |                        |                                    |       |
| N      | 228       | Concentration high high low low alarm             |               |                         |      |           |                        |                                    |       |
| N      | 229       | Net mass flow 1 high high low low alarm           |               |                         |      |           |                        |                                    |       |
| N      | 230       | Net mass flow 2 high high low low alarm           |               |                         |      |           |                        |                                    |       |
| N      | 231       | Net volume flow 1 high high low low alarm         |               |                         |      |           |                        |                                    |       |
| N      | 232       | Net volume flow 2 high high low low alarm         |               |                         |      |           |                        |                                    |       |
| N      | 233       | Corrected net volume flow high high low low alarm |               |                         |      |           |                        |                                    |       |
| N      | 234       | Relative density high high low low alarm          |               |                         |      |           |                        |                                    |       |
| N      | 235       | Reference density high high low low alarm         |               |                         |      |           |                        |                                    |       |
| N      | 236       | Viscosity high high low low alarm                 |               |                         |      |           |                        |                                    |       |

<sup>1)</sup> The status of the Pulse/Status outputs is configurable for all alarms.

<sup>2)</sup> If Alarm out is selected as the output signal behavior, outputs and totalizer functions can be defined. For additional information, see table on page [▶ 59].



Tab. 16: Process alarms 241 – 246

| NE 107 | Alarm no. | Event/Alarm name               | Event setting | Output signal behavior  |      | Totaling | Current output             | Pulse/Status outputs <sup>1)</sup> |       |
|--------|-----------|--------------------------------|---------------|-------------------------|------|----------|----------------------------|------------------------------------|-------|
|        |           |                                |               | Device                  | Ack. |          |                            | Pulse                              | Freq. |
| N      | 241       | Totalizer 1 threshold exceeded | Generate      | Configurable<br>[▶ 199] | N/A  | Continue | De-<br>pends <sup>2)</sup> | Continue                           |       |
| N      | 242       | Totalizer 2 threshold exceeded |               | Continue                |      |          |                            |                                    |       |
| N      | 243       | Totalizer 3 threshold exceeded |               |                         |      |          |                            |                                    |       |
| N      | 244       | Totalizer 4 threshold exceeded |               |                         |      |          |                            |                                    |       |
| N      | 245       | Totalizer 5 threshold exceeded |               |                         |      |          |                            |                                    |       |
| N      | 246       | Totalizer 6 threshold exceeded |               |                         |      |          |                            |                                    |       |

<sup>1)</sup> The status of the Pulse/Status outputs is configurable for all alarms.

<sup>2)</sup> If Alarm out is selected as the output signal behavior, outputs and totalizer functions can be defined. For additional information, see table on page [▶ 59].

## Setting alarms

Tab. 17: Setting alarms 301 – 320

| NE 107 | Alarm no. | Event/Alarm name                                 | Event setting | Output signal behavior  |      | Current output | Totaling | Pulse/status outputs <sup>1)</sup> |       |
|--------|-----------|--------------------------------------------------|---------------|-------------------------|------|----------------|----------|------------------------------------|-------|
|        |           |                                                  |               | Device                  | Ack. |                |          | Pulse                              | Freq. |
| C      | 301       | Mass flow configuration error                    | Generate      | Configurable<br>[P 207] | N/A  |                |          | Depends <sup>2)</sup>              |       |
| C      | 302       | Density configuration error                      |               | Configurable<br>[P 207] |      |                |          |                                    |       |
| C      | 303       | Temperature configuration error                  |               | Configurable<br>[P 208] |      |                |          |                                    |       |
| C      | 304       | Analog input temperature configuration error     |               | Configurable<br>[P 208] |      |                |          |                                    |       |
| C      | 305       | Pressure configuration error                     |               | Configurable<br>[P 209] |      |                |          |                                    |       |
| C      | 306       | Analog input pressure configuration error        |               | Configurable<br>[P 209] |      |                |          |                                    |       |
| C      | 307       | Volume flow configuration error                  |               | Configurable<br>[P 208] |      |                |          |                                    |       |
| C      | 308       | Reference density configuration error            |               | Configurable<br>[P 209] |      |                |          |                                    |       |
| C      | 309       | Relative density configuration error             |               | Configurable<br>[P 210] |      |                |          |                                    |       |
| C      | 310       | Corrected volume flow configuration error        |               | Configurable<br>[P 210] |      |                |          |                                    |       |
| C      | 311       | Calorific value configuration error              |               | Configurable<br>[P 211] |      |                |          |                                    |       |
| C      | 312       | Analog input calorific value configuration error |               | Configurable<br>[P 211] |      |                |          |                                    |       |
| C      | 313       | Concentration configuration error                |               | Configurable<br>[P 212] |      |                |          |                                    |       |
| C      | 314       | Net mass flow 1 configuration error              |               | Configurable<br>[P 213] |      |                |          |                                    |       |
| C      | 315       | Net mass flow 2 configuration error              |               | Configurable<br>[P 213] |      |                |          |                                    |       |
| C      | 316       | Net volume flow 1 configuration error            |               | Configurable<br>[P 213] |      |                |          |                                    |       |
| C      | 317       | Net volume flow 2 configuration error            |               | Configurable<br>[P 213] |      |                |          |                                    |       |
| C      | 318       | Net corrected volume flow configuration error    |               | Configurable<br>[P 214] |      |                |          |                                    |       |
| C      | 319       | Velocity configuration error                     |               | Continue                |      | Continue       |          |                                    |       |
| C      | 320       | Viscosity configuration error                    |               | Configurable<br>[P 214] |      |                |          |                                    |       |

<sup>1)</sup> The status of the Pulse/Status outputs is configurable for all alarms.

- <sup>2)</sup> If Alarm out is selected as the output signal behavior, outputs and totalizer functions can be defined. For additional information, see table on page [ 59].

Tab. 18: Setting alarms 322 – 333

| NE 107 | Alarm no. | Event/Alarm name                               | Event setting | Output signal behavior |      | Current output        | Totaling | Pulse/status outputs <sup>1)</sup>    |                                       |
|--------|-----------|------------------------------------------------|---------------|------------------------|------|-----------------------|----------|---------------------------------------|---------------------------------------|
|        |           |                                                |               | Device                 | Ack. |                       |          | Pulse                                 | Freq.                                 |
| C      | 322       | Analog output configuration error              | Generate      | Configurable<br>▶ 215] | N/A  | Depends <sup>2)</sup> | Continue | Continue                              |                                       |
| C      | 323       | Pulse output 1 configuration error             |               | Configurable<br>▶ 216] |      |                       |          | Depends or Continue <sup>2), 3)</sup> | Continue                              |
| C      | 324       | Frequency output 1 configuration error         |               |                        |      |                       |          | Continue                              | Depends or Continue <sup>2), 5)</sup> |
| C      | 325       | Status output 1 configuration error            |               |                        |      |                       |          | Continue                              |                                       |
| C      | 326       | Pulse output 2 configuration error             |               | Configurable<br>▶ 216] |      |                       |          | Depends or Continue <sup>2), 4)</sup> | Continue                              |
| C      | 327       | Frequency output 2 configuration error         |               |                        |      |                       |          | Continue                              | Depends or Continue <sup>2), 6)</sup> |
| C      | 328       | Status output 2 configuration error            |               |                        |      |                       |          | Continue                              |                                       |
| C      | 329       | Pulse/Status output 2 mode configuration error |               |                        |      |                       |          | Stop                                  |                                       |
| C      | 330       | Double pulse configuration error               |               | Configurable<br>▶ 217] |      |                       |          | Depends <sup>2), 7)</sup>             | Continue                              |
| C      | 333       | Analog input configuration error               |               | Configurable<br>▶ 217] |      |                       |          | Depends <sup>2)</sup>                 |                                       |

- <sup>1)</sup> The status of the Pulse/Status outputs is configurable for all alarms.
- <sup>2)</sup> If Alarm out is selected as the output signal behavior, outputs and totalizer functions can be defined. For additional information, see table on page [ 59].
- <sup>3)</sup> If Alarm out is selected as the output signal behavior for the Pulse output 1 configuration error, the output signal behavior for the Pulse output 2 configuration error will automatically change to Continue.
- <sup>4)</sup> If Alarm out is selected as the output signal behavior for the Pulse output 2 configuration error, the output signal behavior for the Pulse output 1 configuration error will automatically change to Continue.
- <sup>5)</sup> If Alarm out is selected as the output signal behavior for the Frequency output 2 configuration error, the output signal behavior for the Pulse output 1 configuration error will automatically change to Continue.
- <sup>6)</sup> If Alarm out is selected as the output signal behavior for the Frequency output 2 configuration error, the output signal behavior for the Pulse output 1 configuration error will automatically change to Continue.
- <sup>7)</sup> It relates to the Frequency output of double pulse.

Tab. 19: Setting alarms 335 – 343

| NE 107 | Alarm no. | Event/Alarm name                | Event setting | Output signal behavior |      | Current output        | Totaling | Pulse/status outputs <sup>1)</sup> |          |
|--------|-----------|---------------------------------|---------------|------------------------|------|-----------------------|----------|------------------------------------|----------|
|        |           |                                 |               | Device                 | Ack. |                       |          | Pulse                              | Freq.    |
| C      | 335       | Totalizer 1 configuration error | Generate      | Configurable<br>▶ 211] | N/A  | Depends <sup>2)</sup> |          |                                    | Continue |
| C      | 336       | Totalizer 2 configuration error |               |                        |      |                       |          |                                    |          |
| C      | 337       | Totalizer 3 configuration error |               |                        |      |                       |          |                                    |          |
| C      | 338       | Totalizer 4 configuration error |               |                        |      |                       |          |                                    |          |
| C      | 339       | Totalizer 5 configuration error |               |                        |      |                       |          |                                    |          |
| C      | 340       | Totalizer 6 configuration error |               |                        |      |                       |          |                                    |          |
| C      | 341       | Batch configuration error       |               | Configurable<br>▶ 218] |      |                       |          |                                    |          |
| C      | 342       | Data logging not started        |               | Continue               |      |                       |          |                                    |          |
| C      | 343       | Option function mismatch        |               |                        |      |                       |          |                                    |          |

<sup>1)</sup> If Alarm out is selected as the output signal behavior, outputs and totalizer functions can be defined. For additional information, see table on page [▶ 59].

## Warnings

Tab. 20: Warnings 702 – 720

| NE 107 | Alarm no. | Event/Alarm name              | Event setting           | Output signal behavior |                         | Totaling | Current output | Pulse/Status outputs <sup>1)</sup> |       |
|--------|-----------|-------------------------------|-------------------------|------------------------|-------------------------|----------|----------------|------------------------------------|-------|
|        |           |                               |                         | Device                 | Ack.                    |          |                | Pulse                              | Freq. |
| C      | 702       | Analog output fixed           | Generate                | Continue               | N/A                     | Continue | Continue       |                                    |       |
| C      | 703       | Density fixed                 | Configurable<br>[▶ 219] |                        |                         |          |                |                                    |       |
| C      | 704       | Temperature fixed             | Configurable<br>[▶ 220] |                        |                         |          |                |                                    |       |
| C      | 705       | Pressure fixed                | Configurable<br>[▶ 221] |                        |                         |          |                |                                    |       |
| C      | 706       | Reference density fixed       | Configurable<br>[▶ 221] |                        |                         |          |                |                                    |       |
| C      | 707       | Calorific value fixed         | Configurable<br>[▶ 222] |                        |                         |          |                |                                    |       |
| C      | 708       | Process variable simulation   | Generate                |                        |                         |          |                |                                    |       |
| C      | 709       | Analog output simulation      |                         |                        |                         |          |                |                                    |       |
| C      | 710       | Pulse output simulation       |                         |                        |                         |          |                |                                    |       |
| C      | 711       | Status output simulation      |                         |                        |                         |          |                |                                    |       |
| C      | 715       | Process variable trimming     | Configurable<br>[▶ 223] |                        |                         |          |                |                                    |       |
| S      | 717       | Analog output saturated       | Configurable<br>[▶ 225] |                        | Configurable<br>[▶ 225] |          |                |                                    |       |
| S      | 718       | Pulse output 1 saturated      | Configurable<br>[▶ 225] |                        | Configurable<br>[▶ 227] |          |                |                                    |       |
| S      | 719       | Pulse output saturated        | Configurable<br>[▶ 226] |                        | Configurable<br>[▶ 227] |          |                |                                    |       |
| S      | 720       | Double pulse output saturated | Configurable<br>[▶ 228] |                        | Configurable<br>[▶ 229] |          |                |                                    |       |

<sup>1)</sup> The status of the Pulse/Status outputs is configurable for all alarms.

Tab. 21: Warnings 721 – 735

| NE 107 | Alarm no. | Event/Alarm name                     | Event setting | Output signal behavior |      | Totaling | Current output          | Pulse/Status outputs <sup>1)</sup> |          |
|--------|-----------|--------------------------------------|---------------|------------------------|------|----------|-------------------------|------------------------------------|----------|
|        |           |                                      |               | Device                 | Ack. |          |                         | Pulse                              | Freq.    |
| C      | 721       | Autozero running                     | Generate      | Continue               | N/A  | Continue | Hold                    |                                    |          |
| N      | 722       | Tube health check execution error    |               |                        |      |          | Configurable<br>[▶ 230] | Continue                           |          |
| N      | 723       | Date/Time not set                    |               |                        |      |          |                         |                                    |          |
| N      | 724       | Display over warning                 | Generate      |                        |      |          |                         |                                    | Continue |
| N      | 725       | microSD card size warning            |               |                        |      |          |                         |                                    |          |
| S      | 726       | microSD card mismatch                |               |                        |      |          |                         |                                    |          |
| M      | 728       | microSD card removal procedure error |               |                        |      |          |                         |                                    |          |
| M      | 729       | Parameter backup incomplete          | Generate      |                        |      |          |                         |                                    | Continue |
| C      | 730       | Parameter restore running            |               |                        |      |          | Configurable<br>[▶ 229] | Continue                           |          |
| N      | 732       | Batch progress indication            |               |                        |      |          |                         |                                    |          |
| M      | 733       | Viscosity not calculated             | Continue      | Continue               |      |          |                         |                                    |          |
| M      | 734       | Viscosity not reliable               |               |                        |      |          |                         |                                    |          |
| M      | 735       | Autozero warning                     |               |                        |      |          |                         |                                    |          |

<sup>1)</sup> The status of the Pulse/Status outputs is configurable for all alarms.

<sup>2)</sup> If Alarm out is selected as the output signal behavior, outputs and totalizer functions can be defined. For additional information, see table on page [▶ 59].

## Information

Tab. 22: Information 901 – 929

| NE 107 | Alarm no. | Event/Alarm name                | Event setting           | Output signal behavior |      | Total-ing | Current output        | Pulse/Status outputs <sup>1)</sup> |       |
|--------|-----------|---------------------------------|-------------------------|------------------------|------|-----------|-----------------------|------------------------------------|-------|
|        |           |                                 |                         | Device                 | Ack. |           |                       | Pulse                              | Freq. |
| N      | 901       | Device configuration locked     | Configurable<br>[▶ 232] | Continue               | N/A  | Continue  | Continue              |                                    |       |
| N      | 902       | Device configuration not locked | Configurable<br>[▶ 233] |                        |      |           |                       |                                    |       |
| N      | 903       | Parameter backup running        | Generate                |                        |      |           |                       |                                    |       |
| N      | 904       | Data logging running            |                         |                        |      |           |                       |                                    |       |
| N      | 905       | Tube health check running       |                         |                        |      |           |                       |                                    |       |
| N      | 906       | Batch running                   |                         |                        |      |           |                       |                                    |       |
| N      | 907       | Batch hold                      |                         |                        |      |           |                       |                                    |       |
| C      | 909       | Maintenance mode running        | Configurable<br>[▶ 231] | Continue               | N/A  | Continue  | Depends <sup>2)</sup> |                                    |       |
| N      | 921       | Event history cleared           | History only            |                        |      |           |                       |                                    |       |
| N      | 923       | microSD card inserted           |                         |                        |      |           |                       |                                    |       |
| N      | 925       | Power on                        |                         |                        |      |           |                       |                                    |       |
| N      | 926       | Watchdog reset executed         |                         |                        |      |           |                       |                                    |       |
| N      | 927       | Instant power fail              |                         |                        |      |           |                       |                                    |       |
| N      | 929       | Tube health check complete      | Monitor                 |                        |      |           |                       |                                    |       |

<sup>1)</sup> The status of the Pulse/Status outputs is configurable for all alarms.

<sup>2)</sup> If Alarm out is selected as the output signal behavior, outputs and totalizer functions can be defined. For additional information, see table on page [▶ 59].

#### 4.8.8 Change log

When parameter is changed, the following information is saved as the change log history:

- Parameter identification No. that identifies Parameter
  - For parameter identification information, see *Units of the parameters* [▶ 819]
- Event date and event time
- "CHG" symbol



The number of change logs that can be saved on the microSD card depends on the capacity of the card.



Data on the microSD card cannot be viewed on the display. The content of the microSD card can be read by removing it from the device and reading the file on a computer equipped with a microSD card reader port.

- ▶ To unmount the microSD card, refer to the parameter *microSD unmount* [▶ 603].

4.9 Backup and restore

The Rotamass Total Insight has an embedded memory and the optional feature of using a microSD card in the Indicator module.

The measured data or device configurations can be stored there.  
The saved data or configuration can be restored as a configuration to the same or another device.

The file name on the microSD card that is used for backup and restore (or duplication) is defined in the parameter *Backup File Name* [▶ 265].

**i** If a backup file with the file name defined in Backup File Name does not exist on the microSD card, restore (or duplication) is not performed.

**i** If a file with the same name as the value of Backup File Name already exists on the microSD card, the file is overwritten when a backup to the microSD card is performed.

To confirm the contents of the microSD card, refer to the parameter microSD contents. To unmount the microSD card, refer to the parameter microSD unmount.

4.9.1 Backup

The configuration of the device can be stored in the embedded memory or on the microSD card in the Indicator module. A maximum of three configurations can be stored in the embedded memory.

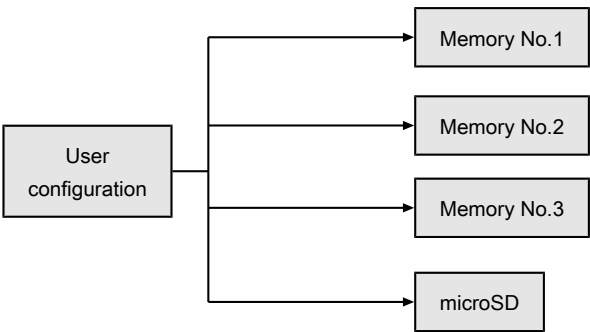
**i** Note the chapter containing *Handling of microSD* [▶ 77].

The configuration of the device can be backed up by using the parameter *User configuration backup* [▶ 265].

The following operations can be performed. For details, see *Parameter backup/restore* [▶ 265].

Backing up the user configuration

The user configuration, such as settings to measure process variables and alarm or other conditions, can be stored in the embedded memory or on the microSD card in the Indicator module. The file name to be stored on the microSD card is defined by a parameter, see *microSD file name backup* [▶ 265].





#### 4.9.2 Restore

The backup file in the embedded memory or on the microSD card in the Indicator module can be restored to the device. There are two functions to restore a backup to the device, Restore [Restore] and Duplicate [Duplicate SD]. Restore is used for the device that has the same hardware and firmware configurations/functions as the one from which the backup file was made. The Restore function restores device-specific data, such as sensor data, to the device along with user configurations. The Duplicate function restores user configurations to the device, but not device-specific data.



When Duplicate/Restore from Indicator to another device is performed, refer to IM01U10A00-00\_--R to confirm the procedure for switching the Indicator module, and switch the Indicator accordingly.



Before performing a Restore, it is recommended that you backup the current configuration. When a Restore is performed, all configurations are changed to the configurations in the restored backup file.



Modified settings for each process variable, such as offset, adjusted gain or autozero value, will also be replaced by the data in the backup file. After the Restoration, confirm that each process variable shows the correct value. If necessary, perform necessary adjustments, such as autozero.



An option that has been activated by the Feature On Demand function after delivery has to be activated again after a Restore has been performed. Have the activation key ready for re-activation when performing a Restore on the device. Be sure to keep the key secure.

#### Restoring a backup file

A backup can be restored to the device by using a parameter, Restoration. The following operations can be performed. For details, refer to *Parameter backup/restore* [▶ 265].

Restore a backup file in the embedded memory or on the microSD card in the Indicator module to the device. Backup data in the embedded memory or data in a file on the microSD card is restored to the device. The file name on the microSD card is defined by the parameter Backup File Name, see *Parameter backup/restore* [▶ 267].

All configurations, including device-specific data, such as sensor data, in the backup file are restored.

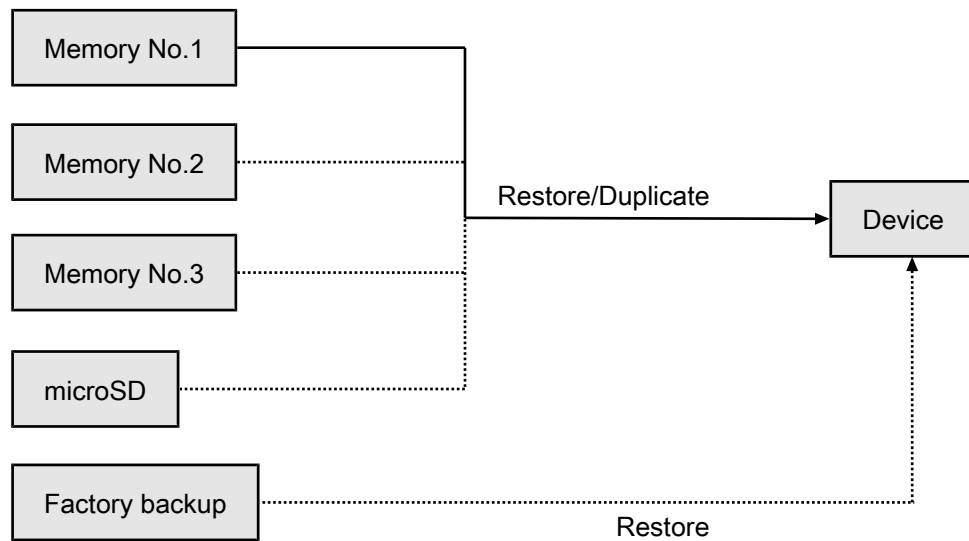
If the function cannot be used, e.g., the hardware configuration is different from that in the backup file, an error message appears and the backup is not restored.

#### Duplicating the user configuration in a backup file

Duplicate user configuration in a backup file in the embedded memory or on a microSD card on Indicator to the device. User configurations in backup data in the embedded memory, or data in a file on a microSD card is copied to the device. The file name on the microSD card is defined by the parameter Backup File Name, see *Parameter backup/restore* [▶ 267]. Device-specific data is not restored. If the function is not fully applicable, e.g., the options in the firmware configuration differ from the backup file, only basic configurations that are common to all devices are restored.

**Restoring the factory backup to the device**

The configuration when the device is shipped from the factory is stored on the device. This initial configuration at the factory can be restored to the device.

**Handling of microSD cards**

Read the handling instructions carefully and use the microSD card safely.

- Only use the dedicated microSD card that is provided by Yokogawa. The transmitter functions cannot be guaranteed if a different card is used.
- Backing up the microSD card periodically is recommended. Yokogawa assumes no responsibility for the loss of any data on the microSD card.
- Data stored on the microSD card may be deleted when one of the following situations occurs:
  - Unmounting the microSD card from the device or turning off the device during formatting, reading or writing.
  - Using the microSD card in a location where it is affected by static electricity or electrical noise.
- The microSD card must be formatted in the device. If the formatting is performed on other instruments, the functions cannot be guaranteed.
- Be sure to insert the microSD card in the right direction when inserting it in to the device. Inserting it in the wrong direction may cause physical failure of the microSD card or transmitter.
- Any impact, bending, dropping, or water must be avoided for unmounted microSD cards. Do not touch its terminals. Do not store it in a location with high temperature or humidity, or where the atmosphere is dusty or includes corrosive gas. Such conditions may cause the microSD card to fail.

## 4.10 Concentration and petroleum measurement

The following types of concentration calculation functions are optionally available:

- **Standard concentration calculation:** used for a mixture of 2 liquids that do not dissolve in each other, such as water and oil.
- **Advanced concentration calculation:** used for a general mixture of 2 liquids, even if the liquids dissolve in each other, such as water and alcohol.
- **Net Oil Computing (NOC) calculation:** oil density and water density is calculated based on API and other calculation formula.
- **NOC with Gas Void Fraction (GVF)**

For each concentration calculation function, a maximum of 4 sets of calculation configurations, or parameter settings, can be set, and the configuration can be selected or switched via a parameter setting.

For more detailed information, see *Detailed setup* [▶ 424].

### 4.10.1 Standard concentration calculation

#### Outline

The standard concentration measurement function of this device is capable of computing the concentrations of suspended and emulsified substances, based on measured density and calculated density of each component. Data on each component's density and its variation with temperature is required. The variations of most liquids' density with temperature may be described by a second-order polynomial. The values of three parameters must be provided for each component in order to uniquely define the second-order polynomials involved:

- Reference density, i.e., their density at the reference temperature, expressed in the density units to be employed.
- First-order density-temperature coefficient, which may be either taken from tables or determined by users.
- Second-order density-temperature coefficient, which may also be either taken from tables or determined by users.

Knowledge of the density of each component at the temperatures to be used then allows determination of their concentrations by weight.

#### Equations for the mass densities and concentrations involved in standard concentration measurements

The following section lists the equations employed for computing the densities of single components and their concentrations. The variables used are defined as follows:

| Variable                     | Description                                                                                |
|------------------------------|--------------------------------------------------------------------------------------------|
| $T_{\text{ref}}$             | Reference temperature, i.e., the temperature at which reference densities are measured     |
| $\rho_{\text{ref(carrier)}}$ | Reference density of the carrier liquid, i.e., its density at the reference temperature    |
| $a_{\text{carrier}}$         | First-order density-temperature coefficient of the carrier liquid                          |
| $b_{\text{carrier}}$         | Second-order density-temperature coefficient of the carrier liquid                         |
| $\rho_{\text{carrier}}$      | Density of the carrier liquid at the current temperature                                   |
| $\rho_{\text{ref(product)}}$ | Reference density of the product/substance, i.e., its density at the reference temperature |
| $a_{\text{product}}$         | First-order density-temperature coefficient of the product/substance                       |
| $b_{\text{product}}$         | Second-order density-temperature coefficient of the product/substance                      |
| $\rho_{\text{product}}$      | Density of the product/substance at the current temperature                                |

Based on these definitions, the density of the carrier liquid at the current temperature  $T_{\text{meas}}$  is calculated as follows:

$$\rho_{\text{carrier}} = \rho_{\text{ref(carrier)}} [1 + a_{\text{carrier}} (T_{\text{meas}} - T_{\text{ref}}) + b_{\text{carrier}} (T_{\text{meas}} - T_{\text{ref}})^2]$$

and the density of the product or material at the current temperature  $T_{\text{meas}}$  is calculated as follows:

$$\rho_{\text{product}} = \rho_{\text{ref(product)}} [1 + a_{\text{product}} (T_{\text{meas}} - T_{\text{ref}}) + b_{\text{product}} (T_{\text{meas}} - T_{\text{ref}})^2]$$

Once the densities of both components have been computed, the resulting concentration of the product/substance,  $\text{conc}_{\text{product(meas)}}$ , may be computed from the following relation, assuming that  $\rho_{\text{meas}}$  is the measured density, total density, of the mixture:

$$\text{conc}_{\text{product(meas)}} = \frac{\rho_{\text{product}} (\rho_{\text{meas}} - \rho_{\text{carrier}})}{\rho_{\text{meas}} (\rho_{\text{product}} - \rho_{\text{carrier}})} \times 100\% = \frac{1 - \frac{\rho_{\text{carrier}}}{\rho_{\text{meas}}}}{1 - \frac{\rho_{\text{carrier}}}{\rho_{\text{product}}}} \times 100\%$$

For detailed information on parameters for configuring this function, see *Standard concentration set 1 – 4* [▶ 426].

| Variable                     | Parameter on the device                             |
|------------------------------|-----------------------------------------------------|
| $T_{\text{ref}}$             | Concentration reference temperature set 1 – 4       |
| $\rho_{\text{ref(carrier)}}$ | Concentration reference density carrier set 1 – 4   |
| $a_{\text{carrier}}$         | Concentration temperature coeff A carrier set 1 – 4 |
| $b_{\text{carrier}}$         | Concentration temperature coeff B carrier set 1 – 4 |
| $\rho_{\text{ref(product)}}$ | Concentration reference density product set 1 – 4   |
| $a_{\text{product}}$         | Concentration temperature coeff A product set 1 – 4 |
| $b_{\text{product}}$         | Concentration temperature coeff B product set 1 – 4 |

To calculate, evaluate and define these coefficients for the Standard concentration, DTM provides a tool. Refer to IM01U10C11-00EN-R.

#### 4.10.2 Advanced concentration calculation

Advanced concentration calculation uses concentration data on suspensions, emulsions, or solutions to interpolate or extrapolate the concentrations of individual components, rather than computing the concentrations of the individual components of mixtures from measured mass densities. The concentration data involved describes the changes in mixture density with both temperature and component concentrations. That data is computed by using the equation below.

##### Mass density and concentration equations

Since the equation below covers the relationship between concentration and measured mixture density for a single temperature only, at least two such data sets will have to be provided in order to also obtain the variation of mixture density with temperature. This device then both interpolates between points on such concentration-density-temperature curves and extrapolates them beyond their stated temperature ranges. Eight sets of parameters are the maximum that can be handled.

$$\text{conc} = A_n (T_n) \rho_{\text{meas}}^2 + B_n (T_n) \rho_{\text{meas}} + \frac{C_n}{\rho_{\text{meas}}} + D_n (T_n)$$

| Variable             | Description                                                                    |
|----------------------|--------------------------------------------------------------------------------|
| $T_n$                | Reference temperature in the density/concentration relation for data set 1...8 |
| $A_n$                | Coefficient A in the density/concentration relation for data set 1...8         |
| $B_n$                | Coefficient B in the density/concentration relation for data set 1...8         |
| $C_n$                | Coefficient C in the density/concentration relation for data set 1...8         |
| $D_n$                | Coefficient D in the density/concentration relation for data set 1...8         |
| $\rho_{\text{meas}}$ | Measured density of the fluid                                                  |

Advanced concentration measurements should be used whenever the behavior of density over the required range of temperatures and/or concentrations is highly nonlinear, which will normally be the case for highly concentrated salt, soda, or alcohol solutions.

For detailed information on parameters for configuring this function, see *Advanced concentration set 1...4* [ 432].

| Variable | Parameter on the device                   |
|----------|-------------------------------------------|
| $T_n$    | Concentration temperature 1...8 set 1...4 |
| $A_n$    | Concentration A 1...8 set 1...4           |
| $B_n$    | Concentration B 1...8 set 1...4           |
| $C_n$    | Concentration C 1...8 set 1...4           |
| $D_n$    | Concentration D 1...8 set 1...4           |

#### 4.10.3 Net Oil Computing (NOC), Gas Void Fraction (GVF)

The Net Oil Computing function uses the same concentration calculation formula as the Standard Concentration function, with oil density and water density calculation as explained below.

One of the following **concentration values** can be displayed on the LCD display and Modbus:

- mass concentration of oil
- volume concentration of oil
- volume concentration of water (Watercut)

One of the following **net flow values** can be displayed on the LCD display and Modbus, depending on the selection of the flow unit:

- net mass flow of oil
- net volume flow of oil

| Parameter Name                  | Variable                           | Explanation                                                                                                                                                                                       |
|---------------------------------|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NOC Conc Value Select           | -                                  | Selects the type of the concentration value: <ul style="list-style-type: none"> <li>0 = Concentration (mass)</li> <li>1 = Concentration (volume)</li> <li>2 = Water cut</li> </ul>                |
| NOC Conc Mass Flow Value        | $\text{conc}_{\text{oil, mass}}$   | Indicates the value of Concentration Mass Flow when "0 = Concentration (mass)" is selected under NOC Conc Value Select.                                                                           |
| NOC Conc Volume Flow Value      | $\text{conc}_{\text{oil, volume}}$ | Indicates the value of Concentration Volume Flow when "1 = Concentration (volume)" is selected under NOC Conc Value Select.                                                                       |
| NOC Conc Water Cut Value        | water cut                          | Indicates the value of Water Cut when "2 = Water cut" is selected under NOC Conc Value Select.                                                                                                    |
| NOC Oil Density                 | $\rho_{\text{oil}}$                | Indicates the value of Oil Density.<br>The unit set under Density unit applies.                                                                                                                   |
| NOC Water Density               | $\rho_{\text{water}}$              | Indicates the value of Water Density.<br>The unit set under Density unit applies.                                                                                                                 |
| Net Mass Flow 1 Value           | $\text{MassFlow}_{\text{oil}}$     | Indicates the value of Mass Flow of Net oil when Net Oil Computing is available under Concentration measurement select.<br>The unit set under Net mass flow 1 unit applies.                       |
| Net Volume Flow 1 Value         | $\text{VolFlow}_{\text{oil}}$      | Indicates the value of Volume Flow of Net oil when Net Oil Computing is available under Concentration measurement select.<br>The unit set under Net volume flow 1 unit applies.                   |
| Net Mass Flow 2 Value           | $\text{MassFlow}_{\text{water}}$   | Indicates the value of Mass Flow of Net water when Net Oil Computing is available under Concentration measurement select.<br>The unit set under Net mass flow 2 unit applies.                     |
| Net Volume Flow 2 Value         | $\text{VolFlow}_{\text{water}}$    | Indicates the value of Volume Flow of Net water when Net Oil Computing is available under Concentration measurement select.<br>The unit set under Net volume flow 2 unit applies.                 |
| Net Corrected Volume Flow Value | $\text{NetCorrVol}_{\text{oil}}$   | Indicates the value of Corrected volume Flow of Net oil when Net Oil Computing is available under Concentration measurement select.<br>The unit set under Net corrected volume flow unit applies. |
| NOC GVF Value                   | GVF                                | Indicates the value of GVF (Gas Void Fraction).                                                                                                                                                   |
| NOC GVF Select                  | -                                  | Selects the mode of "Inhibit" or "Enable" for the value of GVF (Gas Void Fraction). <ul style="list-style-type: none"> <li>0 = Disable</li> <li>1 = Enable</li> </ul>                             |

| Parameter Name                   | Variable                          | Explanation                                                                                                                                                                                                                                                    |
|----------------------------------|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NOC Pressure Value Fixed         | P                                 | Sets the value of Pressure for NOC calculation.<br>The unit set under Pressure unit applies.                                                                                                                                                                   |
| NOC Reference Oil Density        | $\rho_{60}(\text{oil})$           | Sets the value of reference oil density at 60°F and 0 psig for NOC operation.<br>The unit set under Density unit applies.                                                                                                                                      |
| NOC Reference Water Density      | $\rho_{\text{ref}}(\text{water})$ | Sets the value of reference water density at reference temperature for NOC operation.<br>The unit set under Density unit applies.                                                                                                                              |
| NOC Oil Calculator               | -                                 | Selects the calculation method for oil density: <ul style="list-style-type: none"> <li>0 = Off</li> <li>1 = Crude oil</li> <li>2 = Products</li> <li>3 = Lubricating oil</li> <li>4 = Fixed thermal exp factor</li> <li>5 = Other</li> </ul>                   |
| NOC Oil Thermal Expansion Factor | $\alpha_{60}$                     | Defines a linear temperature coefficient of the oil density.                                                                                                                                                                                                   |
| NOC Oil K0                       | -                                 | Defines a coefficient K0 for NOC calculation, when "5=Other" is selected in NOC Oil Calculator                                                                                                                                                                 |
| NOC Oil K1                       | -                                 | Defines a coefficient K1 for NOC calculation, when "5=Other" is selected under NOC Oil Calculator                                                                                                                                                              |
| NOC Oil K2                       | -                                 | Defines a coefficient K2 for NOC calculation, when "5=Other" is selected under NOC Oil Calculator                                                                                                                                                              |
| NOC Water Calculator             | -                                 | Selects the calculation method for water density: <ul style="list-style-type: none"> <li>0 = SMOW</li> <li>1 = UNESCO1980</li> <li>2 = Fresh water</li> <li>3 = Produced water</li> <li>4 = Brine water</li> <li>5 = STD formula (Standard formula)</li> </ul> |
| NOC Salinity ppt                 | $S_{\text{unesco}}$               | Defines the value of salinity of the brine water, when "4=Brine water" is selected under NOC Water Calculator                                                                                                                                                  |
| NOC Salinity Value Fixed         | $S_{\text{brine}}$                | Defines the fixed value of salinity, when "3:Produced water" is selected and "NOC Reference Water Density" is set to 0.                                                                                                                                        |
| NOC Water Density UNESCO1980     | -                                 | Selects the type of density for calculation: <ul style="list-style-type: none"> <li>0 = SMOW</li> <li>1 = VSMOW</li> </ul> <p>This parameter is necessary in situations where "1 = UNESCO1980" has been selected under NOC Water Calculator.</p>               |

| Parameter Name                          | Variable          | Explanation                                                                                                                                                                      |
|-----------------------------------------|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NOC Water Density Reference Temperature | $T_{ref}$         | Sets the value of base (reference) temperature to be used in the water density calculation, when "3:Produced water" is selected.<br>The unit set under Temperature unit applies. |
| NOC Density Hysteresis                  | $\rho_{hys\ noc}$ | Sets the value of hysteresis which is used in the NOC calculation,<br>The unit set under Density unit applies.                                                                   |
| GVF Density Hysteresis                  | $\rho_{hys\ gvf}$ | Sets the value of hysteresis which is used in the GVF calculation,<br>The unit set under Density unit applies.                                                                   |
| Current K0 – K2 Coefficient             | -                 | Indicates the current value which is used in oil density calculation.                                                                                                            |
| Current Thermal Expansion Factor        | -                 | Indicates the current value which is used in oil density calculation.                                                                                                            |

### Calculation of oil density

To calculate the oil density, the oil commodity type as defined in the API MPMS Chapter 11 Section 1, chapter 11.1.6.1, has to be specified first (Crude Oil, Refined Products, or Lubricating Oil). Also, the values for P and  $\rho_{60}(\text{oil})$  have to be specified, based on the characteristics of the fluid and oil.

If  $\alpha_{60}$ , the thermal expansion factor of oil at 60 °F (°F-1), is known, it can be specified instead of selecting commodity type and specifying P and  $\rho_{60}(\text{oil})$ .

The density of oil at operating conditions ( $\text{kg/m}^3$ ) is calculated by the following formula with given parameters and measured temperature of fluid  $T_{meas}$ :

$$\rho_{oil} = f(\rho_{60}(\text{oil}) \text{ or } \alpha_{60}, P, T_{meas})$$

- P            Pressure of fluid (psig), fixed value
- $\rho_{60}(\text{oil})$    Oil density at base conditions (60 °F and 0 psig) ( $\text{kg/m}^3$ )
- f( )        Formula defined in API MPMS 11.1.6.1 (refer to the API MPMS Chapter 11 Section 1, chapter 11.1.6.1)



**Calculation of water density**

The density of the water,  $\rho_{\text{water}}$ , is calculated by using one of following 6 formulas. The user can select one of them depending on the actual status of the water portion in the target fluid. If Fahrenheit is used as temperature unit, the temperature process values will be converted to Celsius, and then the following calculations will be performed:

**Density of  
Standard Mean  
Ocean Water  
(SMOW)**

Density  $\rho_{\text{water(snow)}}$  (kg/m<sup>3</sup>) of Standard Mean Ocean Water at temperature  $t_c$  (°C) is calculated as follows:

$$\begin{aligned}\rho_{\text{water(snow)}} = & 999.842594 + 6.793952 \times 10^{-2} \times t_c - 9.095290 \times 10^{-3} \times t_c^2 \\ & + 1.001685 \times 10^{-4} \times t_c^3 - 1.120083 \times 10^{-6} \times t_c^4 \\ & + 6.536332 \times 10^{-9} \times t_c^5\end{aligned}$$

**Water Density by  
UNESCO1980**

According to "The one Atmosphere International Equation of State of Seawater, 1980", the density of seawater  $\rho_{\text{water(1980)}}$  (kg/m<sup>3</sup>) at temperature  $t_c$  (°C) is calculated by the following equation.

$\rho_{\text{ref}}$ , the density (kg/m<sup>3</sup>) of produced water at 15 (°C) or 60 (°F), or  $S_{\text{unesco}}$ , the salinity of produced water, have to be specified by the user. The salinity of produced water  $S_{\text{unesco}}$ , is calculated by the following equation from  $\rho_{\text{ref}}$ , the density (kg/m<sup>3</sup>) of produced water at 15 (°C) or 60 (°F):

$$S_{\text{unesco}} = \frac{(\rho_{\text{ref}} - 999.0)}{7.2} \times 10$$

$\rho_{\text{water(1980)}}$  (kg/m<sup>3</sup>), water density according to UNESCO1980 at temperature  $t_c$  (°C) is calculated by the following equation.  $\rho_{\text{water(snow)}}$  or  $\rho_{\text{water(vsmow)}}$  can be used as base density of this calculation:

$$\begin{aligned}\rho_{\text{water(1980)}} = & \rho_{\text{water(snow)}} \\ & + (8.24493 \times 10^{-1} - 4.0899 \times 10^{-3} \times t_c + 7.6438 \times 10^{-5} \times t_c^2 - 8.2467 \times 10^{-7} \times t_c^3 \\ & + 5.3875 \times 10^{-9} \times t_c^4) \times S + (-5.72466 \times 10^{-3} + 1.0227 \times 10^{-4} \times t_c - 1.6546 \times 10^{-6} \times t_c^2) \times S_{\text{unesco}}^{1.5} \\ & + 4.8314 \times 10^{-4} \times S_{\text{unesco}}^2\end{aligned}$$

or

$$\begin{aligned}\rho_{\text{water(1980)}} = & \rho_{\text{water(vsmow)}} \\ & + (8.24493 \times 10^{-1} - 4.0899 \times 10^{-3} \times t_c + 7.6438 \times 10^{-5} \times t_c^2 - 8.2467 \times 10^{-7} \times t_c^3 \\ & + 5.3875 \times 10^{-9} \times t_c^4) \times S + (-5.72466 \times 10^{-3} + 1.0227 \times 10^{-4} \times t_c - 1.6546 \times 10^{-6} \times t_c^2) \times S_{\text{unesco}}^{1.5} \\ & + 4.8314 \times 10^{-4} \times S_{\text{unesco}}^2\end{aligned}$$

**Fresh Water  
Density by API  
MPMS 11.4**

This equation corresponds to the VSMOW equation (Vienna Mean Standard Ocean Water). According to API MPMS 11.4, the density of fresh water,  $\rho_{\text{water(fresh)}}$  (kg/m<sup>3</sup>), at measured temperature  $t_c$  (°C) is calculated as follows:

$$\rho_{\text{water(fresh)}} = f(\rho_0, T_0, t_c)$$

$f()$  Formula defined in API MPMS 11.4 (refer to the API MPMS Chapter 11 Section 4 Part 1, formula (1))

$\rho_0$  999.97358 (kg/m<sup>3</sup>), density of fresh water at  $t_0$

$t_0$  3.9818 (°C)

**Produced Water  
Density by API  
MPMS 20.1  
Appendix A.2**

$\rho_{ref}$ , the density (kg/m<sup>3</sup>) of produced water at 15 (°C) or 60 (°F) has to be specified by the user. According to API MPMS 20.1 Appendix A.2, the density of produced water,  $\rho_{water(MPMS)}$  (kg/m<sup>3</sup>), at measured temperature  $t_C$  (°C) is calculated as follows:

$$\rho_{water(MPMS)} = f(\rho_{ref}, t_C)$$

$f()$  Formula defined in API MPMS 20.1. Appendix A.2 (refer to the API MPMS Chapter 20 Section 1 Appendix A.2)

**Brine water  
density by El-  
Dessouky, Ettouy  
(2002)**

This formula is applicable for water in the following conditions:

- Salinity: 0 to 160ppt
- Temperature: 10 to 180°C
- Pressure: 1 atm

The salinity of produced water,  $S_{brine}$  (ppt), has to be specified by the user.  $\rho_{water(brine)}$  (kg/m<sup>3</sup>), water density by El-Dessouky, Ettouy (2002) at temperature  $t_C$  (°C) is calculated as follows:

$$\rho_{water(brine)} = (A_1 \times F_1 + A_2 \times F_2 + A_3 \times F_3 + A_4 \times F_4) \times 10^3$$

|       |                                                                                                  |
|-------|--------------------------------------------------------------------------------------------------|
| A     | $(2 \times t_C - 200)/160$                                                                       |
| B     | $(2 \times S_{brine} - 150)/150$                                                                 |
| $F_1$ | 0.5                                                                                              |
| $F_2$ | A                                                                                                |
| $F_3$ | $2 \times A^2 - 1$                                                                               |
| $F_4$ | $4 \times A^3 - 3 \times A$                                                                      |
| $G_1$ | 0.5                                                                                              |
| $G_2$ | B                                                                                                |
| $G_3$ | $2 \times B^2 - 1$                                                                               |
| $A_1$ | $4.032219 \times G_1 + 0.115313 \times G_2 + 3.26 \times 10^{-4} \times G_3$                     |
| $A_2$ | $-0.108199 \times G_1 + 1.571 \times 10^{-3} \times G_2 - 4.23 \times 10^{-4} \times G_3$        |
| $A_3$ | $-0.012247 \times G_1 + 1.74 \times 10^{-3} \times G_2 - 9.0 \times 10^{-6} \times G_3$          |
| $A_4$ | $6.92 \times 10^{-4} \times G_1 - 8.7 \times 10^{-5} \times G_2 - 5.3 \times 10^{-5} \times G_3$ |

**Water density  
calculation by  
standard  
concentration  
formula**

The density of water is calculated by using density equation that is used for Standard Concentration. Each parameter has to be specified by the user based on the actual water characteristics:

$$\rho_{water(std.conc)} = \rho_{ref(water)} [1 + a_{water} (T_{meas} - T_{ref}) + b_{water} (T_{meas} - T_{ref})^2]$$

|                  |                                                         |
|------------------|---------------------------------------------------------|
| $T_{ref}$        | reference temperature                                   |
| $T_{ref(water)}$ | reference density of water at the reference temperature |
| $a_{water}$      | first-order density-temperature coefficient of water    |
| $b_{water}$      | second-order density-temperature coefficient of water   |
| $\rho_{water}$   | density of water at the current temperature             |

**Calculation of Net Oil**

GVF (Gas Void Fraction) is a function to switch the calculation equation for Net Oil. When GVF is active, the calculation equation for Net Oil is switched based on the measured density value.

**When GVF is not active**

Mass concentration and volume concentration of oil can be calculated as follows:

$$conc_{oil, mass} = \frac{1 - \frac{\rho_{water}}{\rho_{meas}}}{1 - \frac{\rho_{water}}{\rho_{oil}}} \times 100 \% = \frac{\rho_{oil} \times (\rho_{meas} - \rho_{water})}{\rho_{meas} \times (\rho_{oil} - \rho_{water})} \times 100 \%$$

$$conc_{oil, volume} = \frac{conc_{oil, mass} \times \rho_{meas}}{\rho_{oil}}$$

|                      |                                                                   |
|----------------------|-------------------------------------------------------------------|
| $conc_{oil, mass}$   | calculated mass concentration of the oil (Wt%)                    |
| $conc_{oil, volume}$ | calculated volume concentration of the oil (Vol%)                 |
| $\rho_{oil}$         | calculated density of the oil at the current temperature          |
| $\rho_{water}$       | calculated density of the water liquid at the current temperature |
| $\rho_{meas}$        | actual measured density of the mixture at the current temperature |

Net mass flow of oil and net volume flow of oil can be calculated as follows:

$$MassFlow_{oil} = MassFlow_{meas} \times \frac{conc_{oil, mass}}{100}$$

$$MassFlow_{water} = MassFlow_{meas} \times \frac{100 - conc_{oil, mass}}{100}$$

$$VolFlow_{oil} = \frac{MassFlow_{oil}}{\rho_{oil}}$$

$$VolFlow_{water} = \frac{MassFlow_{water}}{\rho_{water}}$$

|                    |                                                          |
|--------------------|----------------------------------------------------------|
| $MassFlow_{meas}$  | actual measured mass flow of the mixture                 |
| $MassFlow_{oil}$   | net mass flow of oil                                     |
| $MassFlow_{water}$ | net mass flow of water                                   |
| $VolFlow_{oil}$    | net volume flow of oil                                   |
| $VolFlow_{water}$  | net volume flow of water                                 |
| $conc_{oil, mass}$ | calculated mass concentration of the oil (Wt%)           |
| $\rho_{oil}$       | calculated density of the oil at the current temperature |

Net corrected volume flow of oil is calculated as follows:

$$NetCorrVol_{oil} = \frac{MassFlow_{oil}}{\rho_{refoil}}$$

$NetCorrVol_{oil}$  net corrected volume flow of oil  
 $MassFlow_{oil}$  net mass flow of oil  
 $\rho_{refoil}$  reference density of the oil

### When GVF is active

Oil sometimes contains entrained gas, which is why the measured overall density might drop significantly. The density of the gas is very low in comparison to liquids and therefore may be neglected. The condition for the GVF function is as follows:

*if  $\rho_{meas} < (\rho_{oil} - \rho_{hys\ gvf})$  : GVF = active*

*if  $\rho_{meas} > (\rho_{oil} + \rho_{hys\ noc})$  : GVF = NOT active*

*if  $(\rho_{oil} - \rho_{hys\ gvf}) < \rho_{meas} < \rho_{oil}$  , then  $conc_{oil, mass} = 100\ Wt\%$  and  $conc_{oil, volume} = 100\ Vol\%$*

*if  $(\rho_{oil} + \rho_{hys\ noc}) > \rho_{meas} > \rho_{oil}$  , then  $conc_{oil, mass} = 100\ Wt\%$  and  $conc_{oil, volume} = 100\ Vol\%$*

$conc_{oil, mass}$  calculated mass concentration of the oil (Wt%)  
 $conc_{oil, volume}$  calculated volume concentration of the oil (Vol%)  
 $\rho_{meas}$  actual measured density  
 $\rho_{oil}$  calculated density of the oil at the measured temperature  
 $\rho_{hys\ gvf}$  GVF hysteresis value for threshold density  
 $\rho_{hys\ noc}$  NOC hysteresis value for threshold density



Since the concentration of 3 components can't be calculated, the assumption is that there is no water in the oil at this time. If there is a significant amount of water, this function will lead to deviation in the oil net volume flow.

### Net Oil for GVF active

If GVF is active, the calculation is changed as follows:

$$conc_{oil, mass} = 100\ \%$$

$$conc_{oil, volume} = \frac{\rho_{meas}}{\rho_{oil}} \times 100\ \%$$

$$GVF = \left( 1 - \frac{\rho_{meas}}{\rho_{oil}} \right) \times 100\ \%$$

$conc_{oil, mass}$  calculated mass concentration of the oil (Wt%)  
 $conc_{oil, volume}$  calculated volume concentration of the oil (Vol%)  
 $\rho_{oil}$  calculated density of the oil at the current temperature  
 $\rho_{meas}$  actual measured density of the mixture  
GVF gas void fraction (Vol %)

Net mass flow of oil and net volume flow of oil is calculated as follows:

$$MassFlow_{oil} = MassFlow_{meas}$$

$$VolFlow_{oil} = \frac{MassFlow_{oil}}{\rho_{oil}}$$

$MassFlow_{meas}$

actual measured mass flow of the mixture

$MassFlow_{oil}$

net mass flow of oil

$VolFlow_{oil}$

net volume flow of oil

$\rho_{oil}$

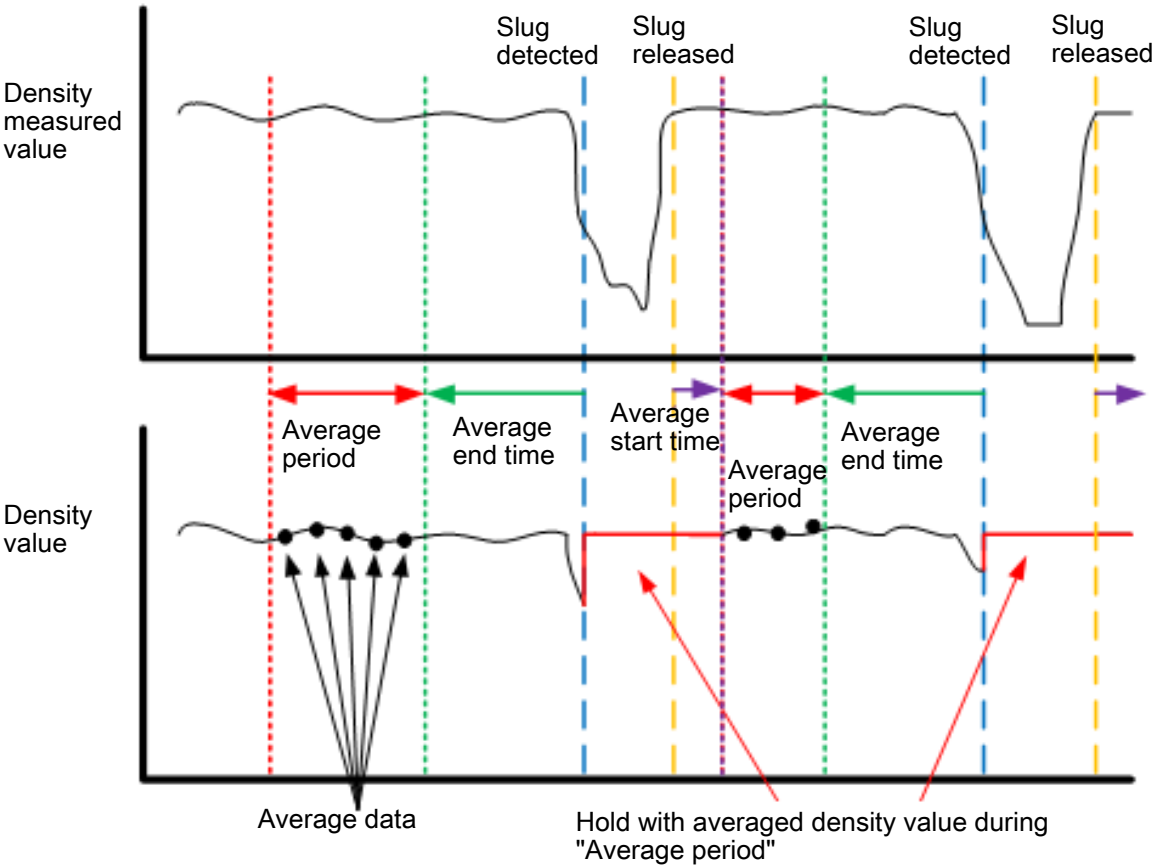
calculated density of the oil at the current temperature

## 4.11 Diagnosis

### 4.11.1 Slug detection

This function detects the bubble flow of fluid. The detection is based on an unusual level of drive current at the sensor which may be caused by slug inside the sensor. If the drive current exceeds a defined threshold level, this device assumes that slug appears in the fluid and alarm 201 appears. This function is not available for gas measurement.

| Parameter                        | Setting                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Slug detection level             | Threshold level of drive current to activate slug alarm.                                                                                                                                                                                                                                                                                                                                                        |
| Slug hysteresis                  | Hysteresis value when slug alarm is deactivated, to avoid activating the alarm at very short intervals.                                                                                                                                                                                                                                                                                                         |
| After slug mass flow             | Mass flow value during slug alarm or when driving current exceeds Slug detection level. Measured value, hold and Fixed value can be selected.                                                                                                                                                                                                                                                                   |
| After slug density               | Density value during slug alarm or when driving current exceeds Slug detection level. Measured value, hold and Fixed value can be selected.                                                                                                                                                                                                                                                                     |
| After slug mass flow fixed value | Sets fixed value of mass flow when slug is detected. This value is only available when Fixed value is selected in After slug mass flow.                                                                                                                                                                                                                                                                         |
| After slug density fixed value   | Sets fixed value of density when slug is detected. This value is only available when Fixed value is selected in After slug density.                                                                                                                                                                                                                                                                             |
| Slug alarm delay                 | Delay time between slug detection and the occurrence of the alarm.                                                                                                                                                                                                                                                                                                                                              |
| Drive current damping            | Damping time for drive current, to average rapid change of drive current for the detection.                                                                                                                                                                                                                                                                                                                     |
| Average start time               | Sets the time after Slug detection alarm is released. When "Hold" in After slug density is selected, averaged density value for "Hold" is calculated using sampling data during Average Period when Slug Detection Occurred as follows. Parameter of status of density value becomes Uncertain when Slug Detection occurred. Refer to the following figure.                                                     |
| Average end time                 | Sets the time which is finished for calculation of averaged density value before Slug Detection occurred. When "Hold" in After slug density is selected, averaged density value for "Hold" is calculated using sampling data during Average Period when Slug Detection Occurred as follows. Parameter of status of density value becomes Uncertain when Slug Detection occurred. Refer to the following figure. |



- Average Period Shows the period which is used for calculation of averaged density value before Slug Detection occurred.
- Average Start Time Shows the time which is started for calculation of averaged density value after Slug Detection is released.
- Average End Time Shows the time which is finished for calculation of averaged density value before Slug Detection occurred.

For details of parameters to configure this function, see *Standard diagnostics* [ 234].

4.11.2 Empty pipe detection

This function detects an empty state inside the sensor. The detection is based on an unusually low density value because of the empty state. If the defined density criterion is smaller than the URV of the density measurement (or LRV, whichever is higher), alarm 202 appears, if the measured density value is lower than the criteria. This function is not available for gas measurement.

| Parameter              | Setting                                                                             |
|------------------------|-------------------------------------------------------------------------------------|
| Empty Pipe Criteria    | Threshold value for the density value to activate empty alarm.                      |
| After Empty Pipe       | Mass flow value during empty pipe alarm. 0, measured value or hold can be selected. |
| Empty Pipe Alarm Delay | Delay time between empty pipe detection and the occurrence of the alarm.            |

For details on parameters for configuring this function, see *Standard diagnostics* [ 238].

### 4.11.3 Corrosion detection

This function is based on measured density and is only good for liquids with relatively constant density. Its criteria are based on the density value. If that density level with defined damping time is reached permanently, alarm 203 appears. This function is not available for gas measurement.

| Parameter           | Setting                                                              |
|---------------------|----------------------------------------------------------------------|
| Corrosion criterion | Threshold value of density to activate corrosion alarm.              |
| Corrosion damping   | Damping time for density value that is used for corrosion detection. |

For details on parameters for configuring this function, see *Standard diagnostics* [▶ 239].

### 4.11.4 Tube health check

This function is an optional function to perform a health check of the sensor's measuring tube, by measuring changes in the stiffness of the measuring tubes. It is not for measuring the absolute stiffness value, but rather for measuring changes in stiffness from the time when reference data is acquired. This function measures changes in stiffness of measuring tubes without being affected by the fluid. When the wall thickness of the measuring tubes diminishes uniformly by corrosion, the stiffness varies almost proportionally to the change of wall thickness. If the change in stiffness measured exceeds the defined threshold value, corrosion is deemed to have occurred and alarm 203 appears.

#### Principle of the function

In normal operation the drive gain of the measuring tubes is automatically controlled and adjusted by the automatic gain control, AGC. When the function is performed, the device fixes the drive gain of the measuring tubes to a certain level and changes it to another specific fixed level; and it then measures vibration amplitudes on the measuring tubes at the fixed drive gains. This function calculates the stiffness of the measuring tubes from the slope and change per time of the vibration amplitude. In normal operation this does not affect flow and/or density measurements. The measuring status in normal operation before and after the fixed drive gain can determine the stability of the diagnostic conditions, and a warning is produced if these are unstable. It takes approximately 90 – 120 seconds for a single-shot diagnostic, but 120 – 180 seconds is necessary for reference data acquisition and initial diagnostics after the power is turned on. Not only single-shot diagnostics, but also consecutive diagnostics with a defined number of times and interval can be configured and performed.

#### Recommended conditions when performing this function

The result of diagnostics may be affected by the stability of the measuring environment. The recommended measuring conditions are as follows:

- Temperature: The difference in temperature between when reference data is obtained and when the test is conducted should be within 20 °C. A warning is produced in measurement results if fluid (sensor) temperature fluctuates radically. Stabilize temperature so fluctuation does not exceed 0.1 °C/min.
- Pressure: If pressure is not input from outside, set pressure value manually. A warning is produced in measurement results if the pressure fluctuates radically.
- Density: A compensation is performed, but reference data should be acquired using fluid when test is executed. Variation should not exceed  $\pm 0.1$  kg/L when reference data is acquired and when test is conducted. An error is produced in measurement results if density fluctuates radically.
- Flow: "Flow noise" is produced by fluid flow, which in turn produces disparity in test values. If sufficient accuracy cannot be obtained, a warning is output to test results. Test should be conducted with low flow rate (max. 25 % of  $Q_{nom}$ ).  $Q_{nom}$  is refer to General Specification (GS) of each product.
- Flow: Foam/secondary flow could affect test results. A high flow rate should therefore be avoided.



**Before first use – Getting reference value**

Before starting to use this function, a reference value for stiffness has to be obtained.

Procedure to get the reference value:

1. Fill measuring tubes of the meter with fluid.
2. Turn the power on.
3. Wait for a moment to stabilize fluid conditions, such as temperature or pressure.
4. Select and set Take Reference in the parameter *TuHC Enable*. For more detailed information see *Total health check* [▶ 240].
  - ⇒ Procedure to take the reference is executed.
5. Wait for around 3 minutes to complete the process.
  - ⇒ During this procedure, a bar chart showing the progress is displayed.

If no error or warning message appears:

6. Do nothing.
  - ⇒ The procedure is finished, the bar chart disappears and the LCD display returns to the normal measurement status.
  - ⇒ The reference has been successfully obtained.

If any error or warning appears:

7. Try to obtain the reference again.

**Performing a tube health check**

For applications with demanding chemical compatibility requirements, e.g., measuring strong acids, Rotamass Giga sensors with wetted parts made of Ni alloy C-22/2.4602 should be used. These parts may show some initial surface layer etching before the full chemical compatibility is implemented. To check for this, changes to the TuHC change ratio of inlet/outlet stiffness should be monitored. If significant changes are observed, the device may need a recalibration at the factory even before the TuHC Stiffness Change Limit is exceeded.

The following is the procedure for performing a tube health check.

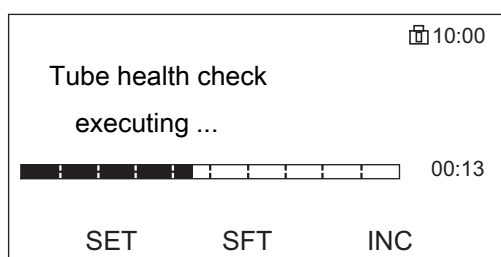
- ✓ Appropriate reference values for the tube health check must be obtained.

1. Fill measuring tubes of the meter with fluid.
2. Turn the power on.
3. Wait for a moment to stabilize fluid conditions, such as temperature or pressure.
4. Set the following parameters to configure the conditions of the function, such as number of checks, interval, threshold for detection and conditions to retry the check when an alarm is detected. For more detailed information, see *TuHC configuration* [▶ 246].

| Configuration           | Parameter                   | Outline                                                                                                            |
|-------------------------|-----------------------------|--------------------------------------------------------------------------------------------------------------------|
| Check interval          | TuHC Continue Interval      | Setting range: 0 – 65535 min.<br>Default value is 60 min.                                                          |
| Number of checks        | TuHC Continue Number        | Setting range: 0 – 65535.<br>Default value is 1.<br>If 0 is set, the check continues until it is manually aborted. |
| Threshold for detection | TuHC Stiffness Change Limit | Threshold value for tube stiffness.<br>Setting range: 0.5 – 100 %.<br>Default value is 4.0 %.                      |

| Configuration                                    | Parameter           | Outline                                                                                                                                  |
|--------------------------------------------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| Max. number of retries when an alarm is detected | TuHC Retry Number   | Maximum number of retries for the check when an alarm is detected during the check.<br>Setting range: 0 – 65535.<br>Default value is 3.  |
| Interval for retry when an alarm is detected     | TuHC Retry Interval | Interval for retry of the check when an alarm is detected during the check.<br>Setting range: 0 – 65535 mins.<br>Default value is 2 min. |
| Condition for retry when an alarm is detected    | TuHC Setting Retry  | Parameter to configure whether a retry is performed, when an alarm is detected during the check.                                         |

5. Select and set Start tube health check in parameter *TuHC Enable* to start the check. For more detailed information, refer to *TuHC Enable* [▶ 242].
  - ⇒ The check is performed according to the configuration.
  - ⇒ During the checking procedure, a bar chart to show the progress is displayed as shown below.



6. Wait for around 2 minutes, for a single a tube health check.
  - ⇒ When the check is finished, the bar chart disappears and the LCD display returns to the normal measurement status.
  - ⇒ If the check result exceeds the predefined threshold value, alarm 203 occurs and a message is displayed on the screen.
  - ⇒ If the result does not exceed the threshold, the display returns to the normal measurement status.
  - ⇒ If a retry of the check is defined, the check repeats according to the configuration.
  - ⇒ The current result of the check is stored in the parameter *TuHC total health result*.

Values of *TuHC total health result* and their meanings:

| Value        | Description                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Not executed | Test is not executed.                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Warning      | <p>Warning or alarm was detected during the check. Detailed information about the warning or alarm can be confirmed by checking the value of the following parameters:</p> <ul style="list-style-type: none"> <li>▪ TuHC Alarm</li> <li>▪ TuHC Warning</li> </ul> <p>When this status occurs, the check is retried according to the configuration of the parameters, TuHC Setting Retry, TuHC Retry Number and TuHC Retry Interval.</p> |
| Error        | Change of tube stiffness exceeds the threshold value and alarm 203 occurs.                                                                                                                                                                                                                                                                                                                                                              |
| OK           | Change of tube stiffness does not exceed the threshold value.                                                                                                                                                                                                                                                                                                                                                                           |

7. To abort the check while performing a single check or repeated check, set Not running in parameter *TuHC Enable*.

⇒ The check is aborted.



### Configuration of the number of checks and retries

If the number of configured checks is not one and the value of *TuHC Continue Number* is not 1, the check is repeated according to the repeat interval that is defined in the parameter, *TuHC Continue Interval*. The following chart shows an example of repeating the check 5 times.

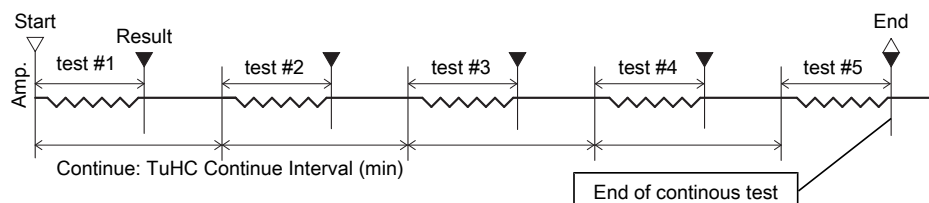


Fig. 14: Test with *TuHC continue number* = 5

If one check cannot be completed for some reason during the time interval that is defined in the *TuHC Continue Interval*, the check in that sequence is skipped.

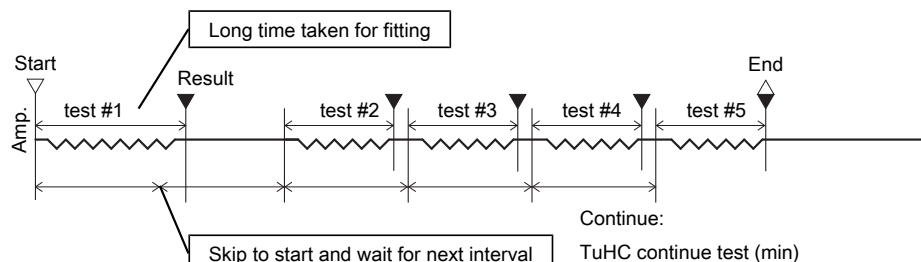


Fig. 15: Test with *TuHC continue number* = 5

If retry when a warning or an alarm occurs is configured (setting in parameter, *TuHC Setting Retry*), it is recommended that the interval between multiple checks be set for longer than the time necessary to perform the maximum number of retries (value of *TuHC Retry Interval*\* value of *TuHC Retry Number*). If the interval time for multiple checks is shorter than the time for the maximum number of retries, there may not be a severe problem, but the next check may be started before the maximum number of retries for the previous check have been finished. In this case, the check for which retries has not been completed is skipped and it is not counted as a check for the *TuHC Continue Number*.

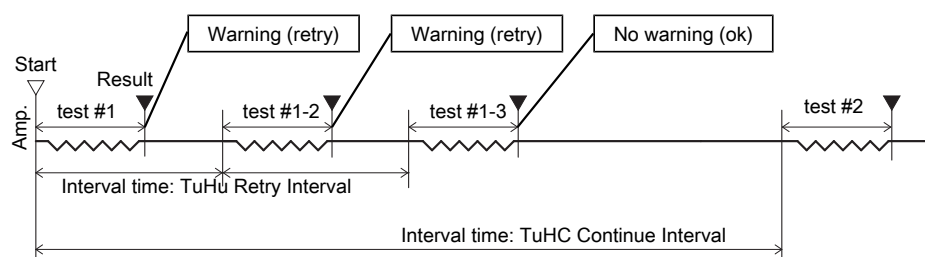


Fig. 16: Execute *Continue*: number times



In order to perform Tube health check without count limitation, the TuHC retry interval needs to be set to more than 1440 minutes if TuHC retry number is 0.

## 4.12 Batch function

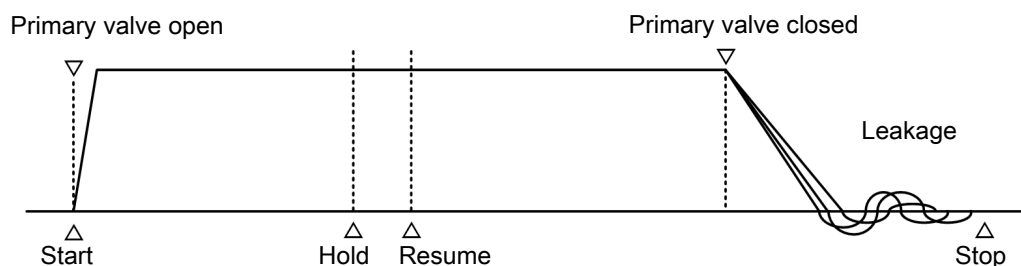
### 4.12.1 Overview

This function can control the flow for Batching application using Status output/input. There are 2 modes to control the flow of 1 stage and 2 stage batch. This function is available only for /BT option.

#### 1 stage batch

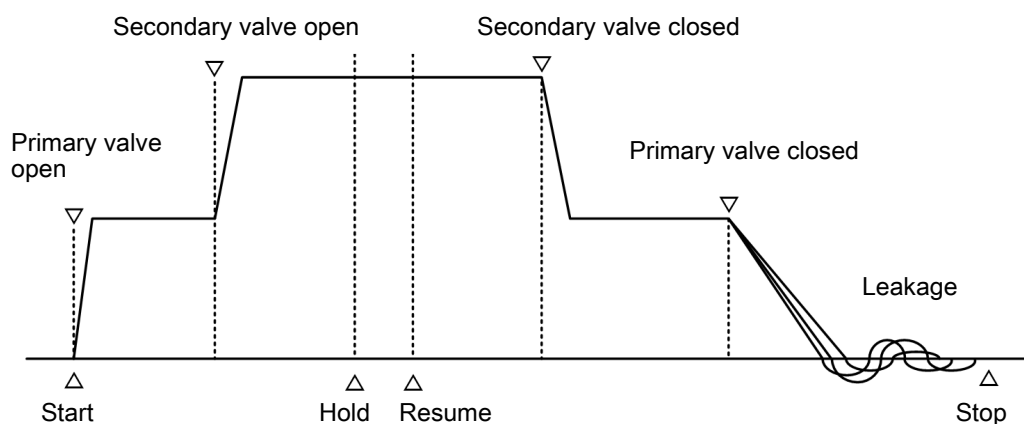
The mode controls one valve. A primary valve is Open(ed) by Start signal. A flow and totalizer is started at first. If a predetermined totalizer value is reached, it will become the primary valve close. The fluid by which after the primary valve close remains in piping is added as a leakage value. A Hold state closes all the valves. Internal coded data maintains the present state. Resume becomes a new start from an intermediate state.

- Start: Valve open
- Stop: The end of 1 batch
- Hold: The state which Close(d) the valve in the middle of the batch
- Resume: Release of a Hold state
- Leakage: A part for the leak behind the primary valve Close



#### 2 stage batch

The mode controls two valves. In the case of one valve, if a flow is large, Leakage Value at the time of Valve Close will become large, and accuracy will become bad. On the other hand, if a flow is restricted in order to high accuracy, the time per one batch will become long. Shortening of time and the method of making accuracy high have use of two valves. Batch time becomes short by setting up the flow of the 2nd valve greatly. High precision is obtained by making the flow at the time of an end small.



Short time batching under 10 sec is not supported.  
This function can be applied for more than 10 sec only.

**4.12.2 Settings**

Settings for Batch application can be held until 5 sets. To use Batch functionality, Batch mode parameter needs to be changed to Yes. Many relevant parameters are necessary to use this function. The following is the parameter for Batching.

If there is 1 or more inconsistency of the following parameter settings, 341:Batch configuration error occurs. Check the relevant parameters based on the following parameter descriptions if the alarm is shown after Batch parameter settings are finished.

**Basic setting parameters for 1 stage batch**

| Parameter                      | Setting                                                                                                                                                                                                          |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Batch mode                     | When Yes is selected by this parameter, this device works as batch transmitter.                                                                                                                                  |
| Batch select                   | Select used batch setting in Batch 1 – 5.                                                                                                                                                                        |
| Batch variable select          | Select the device variables in Batch.<br>Mass Flow, Volume Flow, Corrected Volume Flow, Net Mass Flow 1, Net Mass Flow 2, Net Volume Flow 1, Net Volume Flow 2, Net Corrected Volume Flow                        |
| Pulse/Status output 1 mode     | Status output needs to be selected when Batch functionality is used.                                                                                                                                             |
| Batch unit 1 – 5               | Select the unit for Batch.<br>When this unit doesn't meet with Batch variable select, 341:Batch configuration error occurs.                                                                                      |
| Batch quantity 1 – 5           | Set the batch quantity.<br>Batch can assign to Analog output. Then, this value becomes URV and LRV is 0.                                                                                                         |
| Fixed compensation value 1 – 5 | Set the leakage compensation value.<br>Valve is closed when quantity reaches (Batch quantity 1 – 5 - Fixed compensation value 1 – 5).                                                                            |
| Batch end judgment value 1 – 5 | Set the judgment value of leakage value.<br>The unit is depend on Process variable which is selected by Batch variable select 1 – 5.                                                                             |
| Max batch quantity 1 – 5       | Set threshold value of maximum flow.<br>When flow rate for batch operation is bigger than the parameter value, 208:Batch overrun/underrun alarm occurs. If this value is set to 0, this threshold is not active. |
| Status output 1 function       | Batch function needs to be selected when Batch functionality is used.                                                                                                                                            |
| Batch status output 1          | Set the status output function for Batch.                                                                                                                                                                        |

**Additional setting parameters for 1/2 stage batch**

| Parameter                        | Setting                                                                                                                                                                                                                     |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Batch type select 1 – 5          | Select the type of Batch in 1 stage batch or 2 stage batch.                                                                                                                                                                 |
| Batch primary valve open 1 – 5   | Set the quantity when the primary valve is opened.<br>Setting of valve control function is set by Status output 1 – 3 function.                                                                                             |
| Batch secondary valve open 1 – 5 | Set the quantity when the secondary valve is opened.<br>This parameter is available when 2 stage batch is selected in Batch type select 1 – 5.<br>Setting of valve control function is set by Status output 1 – 3 function. |

| Parameter                         | Setting                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Batch secondary valve close 1 – 5 | <p>Set the quantity when the secondary valve is closed.</p> <p>This parameter is available when 2 stage batch is selected in Batch type select 1 – 5.</p> <p>Setting of valve control function is set by Status output 1 – 3 function.</p>                                                                                                                                                                                                                                                                |
| Compensation mode select 1 – 5    | <p>Set the mode to calculate leakage value.</p> <p>Off, Mode 1, Mode 2 or Mode 3</p> <p>Off: Fixed compensation mode</p> <p>Mode 1: A leakage value until crossing the first leakage judgment value after valve is closed.</p> <p>Mode 2: A leakage value that it becomes less than the leakage judgment value for leakage hysteresis time after valve is closed.</p> <p>Mode 3: A leakage value until it goes through mode 3 leakage time from the point which first-crosses leakage judgment value.</p> |
| Calculation mode sel 1 – 5        | <p>Set the number of data which calculate a leakage value.</p> <p>The calculation data number is depend on Averaging data number 1 – 5.</p> <p>All: All values are used to calculate average value</p> <p>Select: Average value is caculated by the data except the maximum and the minimum.</p>                                                                                                                                                                                                          |
| Averaging data number 1 – 5       | <p>Set the number of data for average value calculation of a leakage value.</p> <p>This value is used when Calculation mode sel 1 – 5 is set to Select.</p> <p>If value of this parameter is 2 or less, then average value is calculated using All data.</p>                                                                                                                                                                                                                                              |
| Leakage hysteresis time 1 – 5     | Set the hysteresis value for leakage when Mode 2 in Compensation mode select 1 – 5 is selected.                                                                                                                                                                                                                                                                                                                                                                                                           |
| Max leakage time 1 – 5            | Set the end judgment value when Mode 3 in Compensation mode select 1 – 5 is selected.                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Auto compensation 1 – 5           | <p>Select whether Primary Valve Close Point is automatically corrected or not in internal algorithm.</p> <p>This setting is available when Mode 1 – 3 is selected in Compensation mode select 1 – 5</p>                                                                                                                                                                                                                                                                                                   |
| Max batch time 1 – 5              | <p>Set threshold value of maximum batch time.</p> <p>When batch operation time is larger than the parameter value, 207:Batch time exceeded alarm occurs.</p> <p>If this value is set to 0, this threshold is not active.</p>                                                                                                                                                                                                                                                                              |
| Min batch quantity 1 – 5          | <p>Set threshold value of minimum batch quantity.</p> <p>When quantity is smaller than the parameter value, 208:Batch overrun/underrun alarm occurs.</p> <p>If this value is set to 0, this threshold is not active.</p>                                                                                                                                                                                                                                                                                  |
| Max batch flow 1 – 5              | <p>Set threshold value of maximum flow rate for batch.</p> <p>When flow rate is larger than the parameter value, 209:Max flow while batching alarm occurs.</p> <p>If this value is set to 0, this threshold is not active</p>                                                                                                                                                                                                                                                                             |
| Progress indication 1 – 5         | <p>Set threshold value to inform the current quantity of batch.</p> <p>When quantity is larger than the parameter value, 732:Batch progress indication alarm occurs.</p> <p>If this value is set to 0, this threshold is not active</p>                                                                                                                                                                                                                                                                   |

| Parameter                    | Setting                                                                                                                                                            |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Batch up down select         | Set the quantity mode whether quantity value is started from 0 by upward or from Batch quantity 1 – 5 by downward.<br>Batch upwards value<br>Batch downwards value |
| Pulse/Status output 2 mode   | Status output needs to be selected when Batch functionality is used with 2 stage batch.                                                                            |
| Status output 2 – 3 function | Batch function needs to be selected when Batch functionality is used with 2 stage batch.                                                                           |
| Batch status input           | Set batch operation using Status input in Start/Stop, Hold/Resume or Reset.                                                                                        |

### Display setting parameters for batch

| Parameter                  | Setting                                                                                                                                              |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| Display measurement mode   | Set Batch control if batch function is operated on Indicator                                                                                         |
| Batch display select 1 – 4 | Set Display select for batch if batch variables are shown on Indicator. This is available when Batch control is selected in Display measurement mode |
| Display format batch       | Set Display format for batch if batch variables are shown on Indicator. This is available when Batch control is selected in Display measurement mode |

### Parameters to perform batch

| Parameter        | Setting                                                 |
|------------------|---------------------------------------------------------|
| Batch start/stop | Selects batch operation in Start, Stop, Hold or Resume. |
| Batch reset      | Resets batch quantity.                                  |

The following figure shows the image of leakage compensation mode:

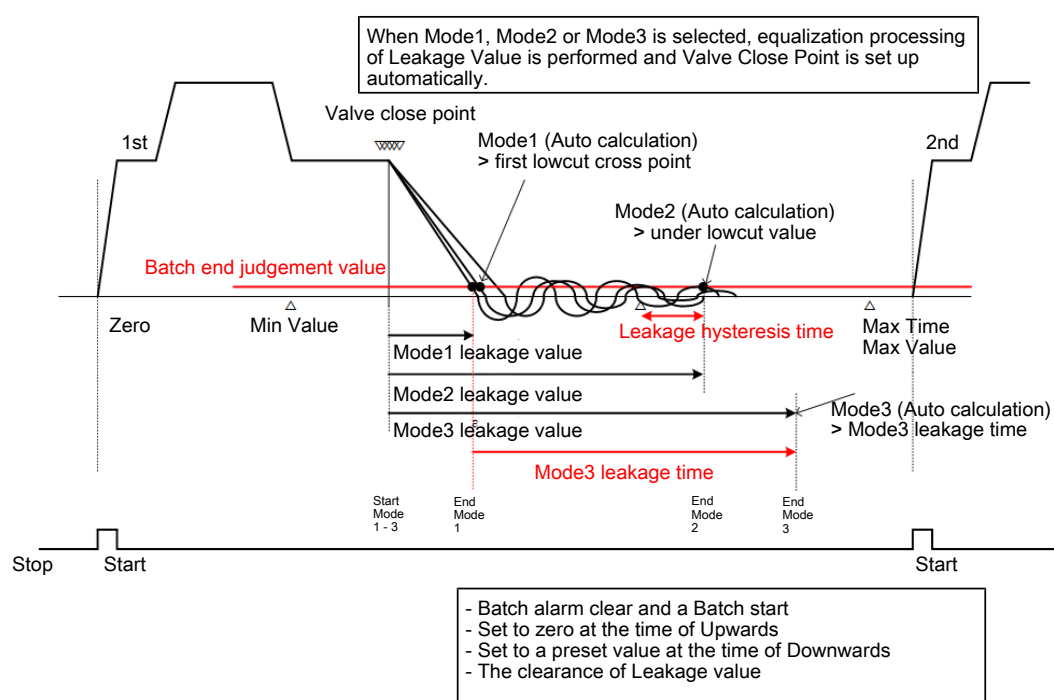


Fig. 17: Leakage compensation mode



**Additional setting parameters for 1/2 stage batch**

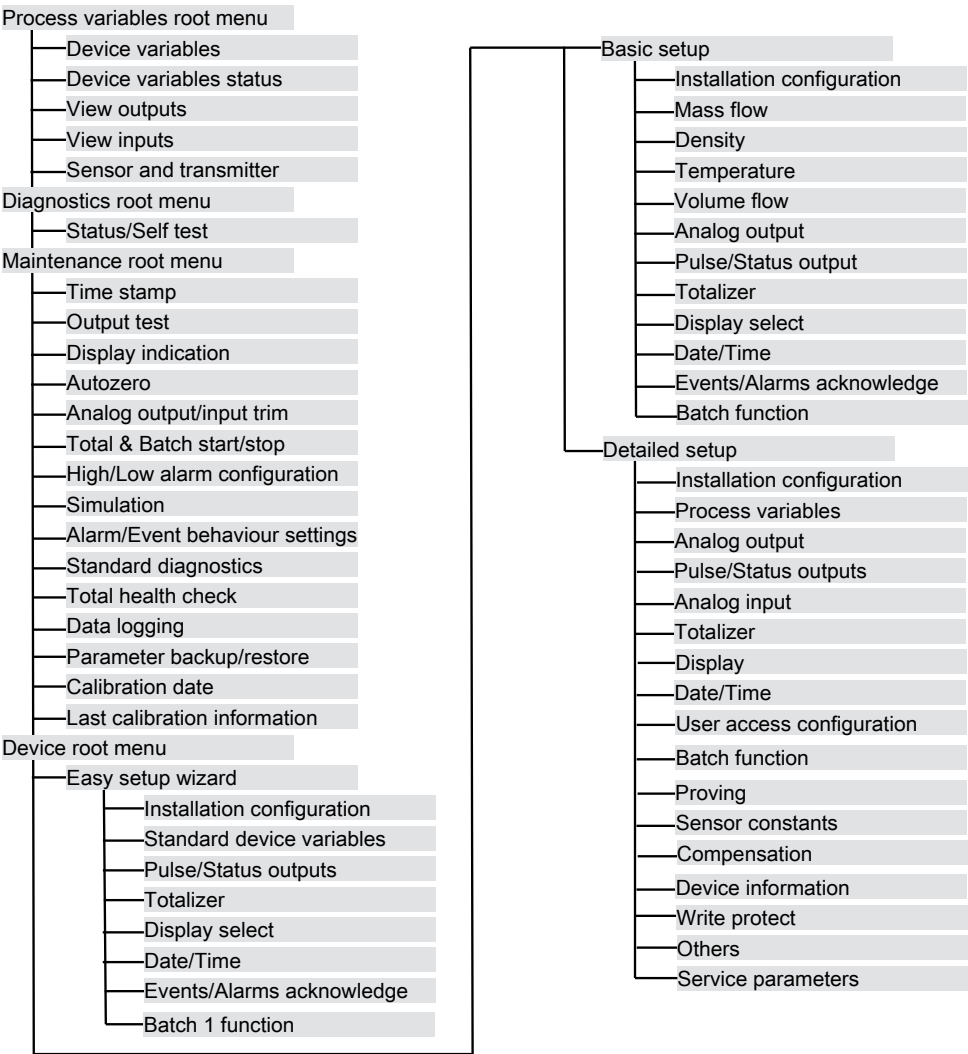
| Parameter                         | Setting                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Batch type select 1 – 5           | Select the type of Batch in 1 stage batch or 2 stage batch.                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Batch primary valve open 1 – 5    | Set the quantity when the primary valve is opened.<br>Setting of valve control function is set by Status output 1 – 3 function.                                                                                                                                                                                                                                                                                                                                                |
| Batch secondary valve open 1 – 5  | Set the quantity when the secondary valve is opened.<br>This parameter is available when 2 stage batch is selected in Batch type select 1 – 5.<br>Setting of valve control function is set by Status output 1 – 3 function.                                                                                                                                                                                                                                                    |
| Batch secondary valve close 1 – 5 | Set the quantity when the secondary valve is closed.<br>This parameter is available when 2 stage batch is selected in Batch type select 1 – 5.<br>Setting of valve control function is set by Status output 1 – 3 function.                                                                                                                                                                                                                                                    |
| Compensation mode select 1 – 5    | Set the mode to calculate leakage value.<br>Off, Mode 1, Mode 2 or Mode 3<br>Off: Fixed compensation mode<br>Mode 1: A leakage value until crossing the first leakage judgment value after valve is closed.<br>Mode 2: A leakage value that it becomes less than the leakage judgment value for leakage hysteresis time after valve is closed.<br>Mode 3: A leakage value until it goes through mode 3 leakage time from the point which first-crosses leakage judgment value. |
| Calculation mode sel 1 – 5        | Set the number of data which calculate a leakage value.<br>The calculation data number is depend on Averaging data number 1 – 5.<br>All: All values are used to calculate average value<br>Select: Average value is caculated by the data except the maximum and the minimum.                                                                                                                                                                                                  |
| Averaging data number 1 – 5       | Set the number of data for average value calculation of a leakage value.<br>This value is used when Calculation mode sel 1 – 5 is set to Select.<br>If value of this parameter is 2 or less, then average value is calculated using All data.                                                                                                                                                                                                                                  |
| Leakage hysteresis time 1 – 5     | Set the hysteresis value for leakage when Mode 2 in Compensation mode select 1 – 5 is selected.                                                                                                                                                                                                                                                                                                                                                                                |
| Max leakage time 1 – 5            | Set the end judgment value when Mode 3 in Compensation mode select 1 – 5 is selected.                                                                                                                                                                                                                                                                                                                                                                                          |
| Auto compensation 1 – 5           | Select whether Primary Valve Close Point is automatically corrected or not in internal algorithm.<br>This setting is available when Mode 1 – 3 is selected in Compensation mode select 1 – 5                                                                                                                                                                                                                                                                                   |
| Max batch time 1 – 5              | Set threshold value of maximum batch time.<br>When batch operation time is larger than the parameter value, 207:Batch time exceeded alarm occurs.<br>If this value is set to 0, this threshold is not active.                                                                                                                                                                                                                                                                  |

| Parameter                    | Setting                                                                                                                                                                                                                  |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Min batch quantity<br>1 – 5  | Set threshold value of minimum batch quantity.<br>When quantity is smaller than the parameter value, 208:Batch overrun/underrun alarm occurs.<br>If this value is set to 0, this threshold is not active.                |
| Max batch flow 1 – 5         | Set threshold value of maximum flow rate for batch.<br>When flow rate is larger than the parameter value, 209:Max flow while batching alarm occurs.<br>If this value is set to 0, this threshold is not active           |
| Progress indication<br>1 – 5 | Set threshold value to inform the current quantity of batch.<br>When quantity is larger than the parameter value, 732:Batch progress indication alarm occurs.<br>If this value is set to 0, this threshold is not active |
| Batch up down select         | Set the quantity mode whether quantity value is started from 0 by upward or from Batch quantity 1 – 5 by downward.<br>Batch upwards value<br>Batch downwards value                                                       |
| Pulse/Status output 2 mode   | Status output needs to be selected when Batch functionality is used with 2 stage batch.                                                                                                                                  |
| Status output 2 – 3 function | Batch function needs to be selected when Batch functionality is used with 2 stage batch.                                                                                                                                 |
| Batch status input           | Set batch operation using Status input in Start/Stop, Hold/Resume or Reset.                                                                                                                                              |

5 Menu description

An appropriate operation level must be selected under *Operation level* [▶ 20] to enter the device setup. The following descriptions show the menu path without a user role selected.

First 3 levels of the Modbus menu structure



### Explanation of menu symbols

The menu description provides an overview of all menu items for Rotamass Ultimate and Rotamass Essential, that are available via the display and via the Modbus configuration tool (Device Type Manager using FieldMate or other).

|   | ① Full name      | Display name | Modbus name        | Page   |
|---|------------------|--------------|--------------------|--------|
| – | Current Date     | [Date]       | [Current Date]     | [ 297] |
| ② | Current Time     | [Time]       | [Current Time]     | [ 297] |
| – | Set current date | [Set date]   | [Set current date] | [ 298] |
| – | Set current time | [Set time]   | [Set current time] | [ 298] |

③ **Current Date** ④ [Easy setup wizard] ► [Date/Time] ► [Date]

⑤ [Device root menu] ► [Easy setup wizard] ► [Date/Time] ► [Current Date]

Current Date shows the current date on the device.

| Value ⑥ | Description ⑦                                                                                |
|---------|----------------------------------------------------------------------------------------------|
| – Date  | Shows the actual current date if the date was set correctly when the device started running. |

Fig. 18: Explanation of the menu description

- ① Menu overview
- ② Availability for display: no restrictions
- ③ Full name of the menu item
- ④ Display menu path
- ⑤ [Modbus] menu path
- ⑥ Values or parameters of the menu item
- ⑦ Description of the corresponding value or display parameter

Tab. 23: Explanation of font styles used in the menu description

| Font style  | Description                                    |
|-------------|------------------------------------------------|
| Mass flow   | Full name of a menu item.                      |
| [Mass]      | Menu item on display.                          |
| [Mass Flow] | Menu item for the [Modbus] configuration tool. |

Basically, the menu items are available for all devices. Exceptions are marked with corresponding symbols. Factory default values for parameters that are not listed in this document can be found in a [.csv] file on the CD and the microSD card accompanying the device.

Tab. 24: Explanation of symbols used in the menu description

| Symbols | Description                                                                                           |
|---------|-------------------------------------------------------------------------------------------------------|
| Ⓐ       | Menu item or menu path is available via display.                                                      |
| Ⓜ       | Menu item or menu path is available via the [Modbus] configuration tool.                              |
| Ⓞ       | Menu item is optional. It is available only if a transmitter with the corresponding function is used. |
| –       | No restrictions.                                                                                      |

The following overview shows the selectable menu items within the main menu. Except for the Basic setup menu, all menus are available for all devices. Basic setup is available via Modbus communication only.

Some menu items differ in the menu on the display because of special items that are only available via the Modbus communication tool. These are called Method and, depending on the purpose of each item, are used to set some items via a text-based interactive user interface.

|   | Full name                 | Display name        | [Modbus] name       | Page    |
|---|---------------------------|---------------------|---------------------|---------|
| Ⓒ | Events/Alarms acknowledge | [Evt/Alm ack]       | —                   | [▶ 105] |
| Ⓒ | Language                  | [Lang]              | —                   | [▶ 107] |
| — | Process variables         | [Process variables] | [Process variables] | [▶ 108] |
| Ⓒ | Diag/Service              | [Diag/Service]      | —                   | [▶ 119] |
| — | Easy setup wizard         | [Easy setup wizard] | [Easy setup wizard] | [▶ 269] |
| Ⓜ | Basic setup               | —                   | [Basic setup]       | [▶ 323] |
| — | Detailed setup            | [Detailed setup]    | [Detailed setup]    | [▶ 377] |

## 5.1 Events/Alarms acknowledge

For Event/Alarms acknowledge, there is a wizard menu for confirming the status of events and for acknowledging the events. The procedure for confirming and acknowledging follows.

The settings must be downloaded to the device. If the wizard is canceled before this is completed, any changes to the settings will not be saved.

✓ [Specialist] is selected as the *operation level* [▶ 20].

1. Press [INC] until the menu [Evt/Alm ack] is selected.
2. Press [SET] to enter the menu [Evt/Alm ack].
  - ⇒ [Setting upload] runs automatically and will be marked with a \* after completion.
  - ⇒ A list of status groups appears.

|             |                 |       |
|-------------|-----------------|-------|
| Evt/Alm ack |                 | 00:15 |
| ▲           | *Setting upload |       |
|             | Status 0 00H    |       |
| ▼           | Status 1 00H    |       |
|             | SET SFT INC     |       |

The list of status groups and the status are displayed. The hexadecimal value shows the consolidated status of events/alarms in each group. 00H means there are no events/alarms, any other value means that at least one event/alarm has been activated in that group.

3. Press [INC] to confirm the status of each status group.
  - ⇒ Status groups 0 – 5, 14 – 23 are displayed and can be selected.
4. Press [SET] to choose the status to be confirmed in detail.
  - ⇒ Statuses of events/alarms in the corresponding status group are displayed.

|          |                      |       |
|----------|----------------------|-------|
| Status 0 |                      | 00:29 |
| ▲        | □101:Freq FAIL       |       |
|          | □102:Signal FAIL     |       |
| ▼        | □103,4:Pckoff 1 FAIL |       |
|          | SET SFT INC          |       |

Activated events are displayed with a filled square (■) and others are with an empty square (□). For detailed information on the assignment of events to a parameter, see chapter Alarm/Event device status *Alarm/Event device status* [▶ 120].

5. After confirmation of events/alarms, press [Esc] to return to the previous screen.
6. Press [INC] until [Evt Ack] is selected.
7. Press [SET] to choose [Evt Ack].

8. Press **[INC]** to select **[Ack]**.
9. Press **[SET]** to acknowledge the events.
10. Press **[SET]** to confirm the selection.
  - ⇒ Parameter **[setting download]** is preselected.
11. Press **[SET]** to download and validate the acknowledgement of events.
  - ⇒ If the device does not have any alarm or warning, **[No err]** will be displayed.
  - ⇒ If the device has an alarm or warning, the number of errors and the corresponding fault number will be shown. For additional information, see chapter *Troubleshooting* [ 605].

### Status group 0 – 5, 14 – 23

Ⓐ **[Evt/Alm ack]** ► **[Status 0 – 5, 14 – 23]**

The status information of events that can be displayed is selected in the menus *Status group 0 – 5, 14 – 23*. For detailed information on the assignment of events to a parameter, see chapter *Alarm/Event device status* [ 120].

|   | Display parameter                                       | Description                      |
|---|---------------------------------------------------------|----------------------------------|
| Ⓐ | Status 0 – 5, 14 – 23<br><b>[status 0 – 5, 14 – 23]</b> | Status group 6 – 13 is not used. |

### Event acknowledge

Ⓐ **[Evt/Alm ack]** ► **[Evt Ack]**

This parameter can be set in the following menu/menus:

- *Diag/Service* [ 120]
- *Basic setup* [ 363]

If *Acknowledge* or *Monitor + acknowledge* is selected in the event setting parameters, it is necessary to acknowledge the event to reset the event status. For additional information, see chapter *Event setting* [ 55].

|   | Value                            | Description                                                                                                                                         |
|---|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Acknowledged<br><b>[Ack]</b>     | Status when the generated event has been acknowledged. After the event is acknowledged, its status automatically reverts to <i>Unacknowledged</i> . |
| – | Unacknowledged<br><b>[Unack]</b> | An event was not generated, or if it was, it was not acknowledged.                                                                                  |

5.2 Language

Language

⌚ [Lang]

This parameter can be set in the following menu/menus:

- *Detailed setup* [► 543]

Only available if the device is equipped with a display.

Sets the language to be used on the LCD display.

|   | Value                      | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | English<br>[English]       | The desired display language can be selected. Available languages depend on the language package that was ordered:<br><br><i>Package 1:</i> <ul style="list-style-type: none"><li>▪ English</li><li>▪ French</li><li>▪ German</li><li>▪ Italian</li><li>▪ Spanish</li><li>▪ Portuguese</li><li>▪ Japanese</li></ul> <i>Package 2:</i> <ul style="list-style-type: none"><li>▪ English</li><li>▪ German</li><li>▪ Russian</li><li>▪ Kazakh</li><li>▪ Polish</li></ul> <i>Package 3:</i> <ul style="list-style-type: none"><li>▪ English</li><li>▪ German</li><li>▪ Italian</li><li>▪ Spanish</li><li>▪ Portuguese</li><li>▪ Chinese</li></ul> |
| – | French<br>[French]         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| – | German<br>[German]         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| – | Italian<br>[Italian]       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| – | Spanish<br>[Spanish]       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| – | Portuguese<br>[Portuguese] |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| – | Russian<br>[Russian]       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| – | Kazakh<br>[Kazakh]         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| – | Chinese<br>[Chinese]       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| – | Japanese<br>[Japanese]     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| – | Polish<br>[Polish]         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

### 5.3 Process variables

The following menus/settings are available:

|   | Full name               | Display name  | [Modbus] name             | Page    |
|---|-------------------------|---------------|---------------------------|---------|
| – | Device variables        | [Dev var]     | [Device variables]        | [▶ 110] |
| Ⓢ | Additional function     | [Add func]    | [Additional function]     | [▶ 111] |
| Ⓢ | Device variables status |               | [Device variables status] | [▶ 113] |
| Ⓢ | View outputs            | [View out]    | [View outputs]            | [▶ 117] |
| Ⓢ | View inputs             | [View in]     | [View inputs]             | [▶ 117] |
| – | Sensor and transmitter  | [Snsr/Trsmtr] | [Sensor and transmitter]  | [▶ 118] |

The value Relative density is available for liquid models only.

The values Concentration, Net mass flow 1 – 2, Net volume flow 1 – 2 and Net corrected volume flow can only be selected, if the concentration function is available on the device.

|        | Value                                            | Description                                                                                                                                                                                |
|--------|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓢ      | Mass flow<br>[Mass flow]                         | Measured mass flow value.                                                                                                                                                                  |
| Ⓢ      | Density<br>[Density]                             | Measured density value.                                                                                                                                                                    |
| Ⓢ      | Temperature<br>[Temperature]                     | Measured temperature value.                                                                                                                                                                |
| Ⓢ      | Pressure<br>[Pressure]                           | Measured pressure value.                                                                                                                                                                   |
| Ⓢ      | Volume flow<br>[Volume flow]                     | Measured volume flow value.                                                                                                                                                                |
| Ⓢ      | Reference density<br>[Reference density]         | Calculated reference density value at reference temperature.                                                                                                                               |
| Ⓢ      | Relative density<br>[Relative density]           | Relative density value, which is calculated from the measured density and the selected unit using the equation.                                                                            |
| Ⓢ      | Corrected volume flow<br>[Corrected volume flow] | Corrected volume flow, which is calculated from the measured mass flow and the reference density.                                                                                          |
| Ⓢ      | Calorific value<br>[Calorific value]             | Calorific fixed value or variable value, if equipped with a function for analog input and Calorific value has been set to Analog input select.<br>Calorific value is not available for PV. |
| Ⓢ<br>Ⓢ | Concentration<br>[Concentration]                 | Concentration of process medium as determined by the standard/advanced concentration function.                                                                                             |
| Ⓢ<br>Ⓢ | Net mass flow 1<br>[Net mass flow 1]             | Net flow as determined from the concentration percentage and total mass flow.                                                                                                              |
| Ⓢ<br>Ⓢ | Net mass flow 2<br>[Net mass flow 2]             | Net flow as determined from the concentration percentage and total mass flow.                                                                                                              |
| Ⓢ<br>Ⓢ | Net volume flow 1<br>[Net volume flow 1]         | Net flow as determined from the concentration percentage and total volume flow.                                                                                                            |



|        | Value                                                           | Description                                                                                                                                                                       |
|--------|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓜ<br>Ⓢ | <b>Net volume flow 2</b><br>[Net volume flow 2]                 | Net flow as determined from the concentration percentage and total volume flow.                                                                                                   |
| Ⓜ<br>Ⓢ | <b>Net corrected volume flow</b><br>[Net corrected volume flow] | Net volume flow at the reference temperature as determined from the concentration percentage, temperature, reference density of product and Net mass flow 1 or Net volume flow 1. |

## 5.3.1 Device variables

## Device variables

Ⓐ [Process variables] ► [Dev var]

Ⓜ [Process variables root menu] ► [Device variables]

The menu item *Device variables* displays the process variables.

|   | Display parameter                                              | Description                                                                                                                                                                                             |
|---|----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Mass flow<br>[Mass]<br>[Mass flow]                             | Measured mass flow value.<br>For configuration of mass flow measurement, see Mass flow settings [▶ 381].                                                                                                |
| – | Density<br>[Dens]<br>[Density]                                 | Measured density value.<br>For configuration of density measurement, see Density settings [▶ 387].                                                                                                      |
| – | Temperature<br>[Temp]<br>[Temperature]                         | Measured temperature value.<br>For configuration of temperature measurement, see Temperature settings [▶ 392].                                                                                          |
| – | Volume flow<br>[Vol]<br>[Volume flow]                          | Measured volume flow value.<br>For configuration of volume flow measurement, see Volume flow settings [▶ 397].                                                                                          |
| – | Pressure<br>[Pres]<br>[Pressure]                               | Measured pressure value, if pressure sensor is connected to the analog current input.<br>For configuration of pressure measurement, see Pressure settings [▶ 402].                                      |
| – | Reference density<br>[Ref dens]<br>[Reference density]         | Calculated reference density value at reference temperature.<br>For configuration of reference density measurement, see Reference density settings [▶ 408].                                             |
| – | Relative density<br>[Rel dens]<br>[Relative density]           | Relative density value, which is calculated from the measured density, the selected unit and the equation.<br>For configuration of relative density measurement, see Relative density settings [▶ 412]. |
| – | Corrected volume flow<br>[Corr vol]<br>[Corrected volume flow] | Volume flow, which is calculated from the measured mass flow and the reference density.<br>For more detailed Information, see Corrected volume flow settings [▶ 416].                                   |
| Ⓜ | Calorific value<br>[Calorific value]                           | Calculated calorific value.<br>For configuration of calorific value measurement, see Calorific value settings [▶ 421].                                                                                  |
| – | Velocity<br>[Vel]<br>[Velocity]                                | Calculated velocity of fluid inside the measuring tube.<br>For configuration of velocity measurement, see Velocity settings [▶ 424].                                                                    |
| – | Totalizer 1 – 6<br>[Tt1 1 – 6]<br>[Totalizer 1 – 6]            | Values of the Totalizer 1 – 6.<br>For configuration of totalizer functions, see Totalizer settings [▶ 502].                                                                                             |

5.3.2 Additional function

Additional function

 [Process variables] ► [Dev var] ► [Add func]

 [Process variables root menu] ► [Device variables] ► [Additional function]

The menu item *Additional function* displays the concentration and the net flow.

|                                                                                                                                      | Display parameter         | Description                                                                                                                                     |
|--------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
|  [Conc]<br>[Concentration]                          | Concentration             | Measured concentration.                                                                                                                         |
|  [Net mass 1 - 2]<br>[Net mass flow 1 - 2]          | Net mass flow 1 - 2       | Net mass flow of a component, product or carrier of mixed fluid.                                                                                |
|  [Net volume flow 1 - 2]<br>[Net volume flow 1 - 2] | Net volume flow 1 - 2     | Net volume flow of a component, product or carrier of mixed fluid.                                                                              |
|  [Net corr vol]<br>[Net corrected volume flow]    | Net corrected volume flow | Net corrected volume flow of a component or product of mixed fluid.                                                                             |
|  [Batch]<br>[Batch]                               | Batch                     | Calculated batch quantity.                                                                                                                      |
|  [Visc]<br>[Viscosity]                            | Viscosity                 | Viscosity value, which is calculated from the delta pressure which is received from external differential pressure instrument via Analog input. |

## 5.3.3 Dynamic variables status

## Dynamic variables status

④ [Process variables root menu] ► [Dynamic variables status]

The menu item *Dynamic variables status* displays the status of the dynamic variables. The display parameters *Pressure data quality* and *Pressure limit status* are only available, if a pressure sensor is connected to the analog current input.

Tab. 25: Description of data quality statuses

| Status        | Description                                                                         |
|---------------|-------------------------------------------------------------------------------------|
| Good          | The value may be used in control.                                                   |
| Poor accuracy | The quality of the value is lower than standard, but the value may still be useful. |
| Manual/Fixed  | The value has been manually adjusted.                                               |
| Bad           | The value is not useful.                                                            |

Tab. 26: Description of limit statuses

| Status       | Description                                                   |
|--------------|---------------------------------------------------------------|
| Constant     | The value cannot be changed, no matter what the process does. |
| Low limited  | The value is below the low limit.                             |
| High limited | The value is above the high limit.                            |
| Not limited  | The value is free to change.                                  |

|   | Display parameter                    | Description                                                          |
|---|--------------------------------------|----------------------------------------------------------------------|
| ④ | PV data quality<br>[PV data quality] | Possible statuses: good, poor accuracy, manual/fixed, bad.           |
| ④ | PV limit status<br>[PV limit status] | Possible statuses: constant, low limited, high limited, not limited. |
| ④ | SV data quality<br>[SV data quality] | Possible statuses: good, poor accuracy, manual/fixed, bad.           |
| ④ | SV limit status<br>[SV limit status] | Possible statuses: constant, low limited, high limited, not limited. |
| ④ | TV data quality<br>[TV data quality] | Possible statuses: good, poor accuracy, manual/fixed, bad.           |
| ④ | TV limit status<br>[TV limit status] | Possible statuses: constant, low limited, high limited, not limited. |
| ④ | QV data quality<br>[QV data quality] | Possible statuses: good, poor accuracy, manual/fixed, bad.           |
| ④ | QV limit status<br>[QV limit status] | Possible statuses: constant, low limited, high limited, not limited. |

### 5.3.4 Device variables status

The following overview shows the selectable menu items within the submenu Dynamic variables.

|        | Full name                        | Display name | [Modbus] name                      | Page    |
|--------|----------------------------------|--------------|------------------------------------|---------|
| Ⓜ      | Standard device variables status | —            | [Standard device variables status] | [▶ 113] |
| Ⓜ      | Totalizer status                 | —            | [Totalizer status]                 | [▶ 115] |
| Ⓜ<br>Ⓜ | Menu additional function         | —            | [Menu additional function]         | [▶ 115] |

#### Standard device variables status

Ⓜ [Process variables root menu] ▶ [Device variables status] ▶ [Standard device variables status]

The menu item *Standard device variables status* shows the status of the standard device variables.

Tab. 27: Description of data quality statuses

| Status        | Description                                                                         |
|---------------|-------------------------------------------------------------------------------------|
| Good          | The value may be used in control.                                                   |
| Poor accuracy | The quality of the value is lower than standard, but the value may still be useful. |
| Manual/Fixed  | The value has been manually adjusted.                                               |
| Bad           | The value is not useful.                                                            |

Tab. 28: Description of limit statuses

| Status       | Description                                                   |
|--------------|---------------------------------------------------------------|
| Constant     | The value cannot be changed, no matter what the process does. |
| Low limited  | The value is below the low limit.                             |
| High limited | The value is above the high limit.                            |
| Not limited  | The value is free to change.                                  |

|   | Display parameter                                      | Description                                                          |
|---|--------------------------------------------------------|----------------------------------------------------------------------|
| Ⓜ | Mass flow data quality<br>[Mass flow data quality]     | Possible statuses: good, poor accuracy, manual/fixed, bad.           |
| Ⓜ | Mass flow limit status<br>[Mass flow limit status]     | Possible statuses: constant, low limited, high limited, not limited. |
| Ⓜ | Density data quality<br>[Density data quality]         | Possible statuses: good, poor accuracy, manual/fixed, bad.           |
| Ⓜ | Density limit status<br>[Density limit status]         | Possible statuses: constant, low limited, high limited, not limited. |
| Ⓜ | Temperature data quality<br>[Temperature data quality] | Possible statuses: good, poor accuracy, manual/fixed, bad.           |

|   | Display parameter                                                          | Description                                                          |
|---|----------------------------------------------------------------------------|----------------------------------------------------------------------|
| Ⓜ | Temperature limit status<br>[Temperature limit status]                     | Possible statuses: constant, low limited, high limited, not limited. |
| Ⓜ | Volume flow data quality<br>[Volume flow data quality]                     | Possible statuses: good, poor accuracy, manual/fixed, bad.           |
| Ⓜ | Volume flow limit status<br>[Volume flow limit status]                     | Possible statuses: constant, low limited, high limited, not limited. |
| Ⓜ | Pressure data quality<br>[Pressure data quality]                           | Possible statuses: good, poor accuracy, manual/fixed, bad.           |
| Ⓜ | Pressure limit status<br>[Pressure limit status]                           | Possible statuses: constant, low limited, high limited, not limited. |
| Ⓜ | Reference density data quality<br>[Reference density data quality]         | Possible statuses: good, poor accuracy, manual/fixed, bad.           |
| Ⓜ | Reference density limit status<br>[Reference density limit status]         | Possible statuses: constant, low limited, high limited, not limited. |
| Ⓜ | Relative density data quality<br>[Relative density data quality]           | Possible statuses: good, poor accuracy, manual/fixed, bad.           |
| Ⓜ | Relative density limit status<br>[Relative density limit status]           | Possible statuses: constant, low limited, high limited, not limited. |
| Ⓜ | Corrected volume flow data quality<br>[Corrected volume flow data quality] | Possible statuses: good, poor accuracy, manual/fixed, bad.           |
| Ⓜ | Corrected volume flow limit status<br>[Corrected volume flow limit status] | Possible statuses: constant, low limited, high limited, not limited. |
| Ⓜ | Calorific data quality<br>[Calorific data quality]                         | Possible statuses: good, poor accuracy, manual/fixed, bad.           |
| Ⓜ | Calorific limit status<br>[Calorific limit status]                         | Possible statuses: constant, low limited, high limited, not limited. |

**Totalizer status**

Ⓜ [Process variables root menu] ► [Device variables status] ►  
[Totalizer status]

The menu item *Totalizer status* displays status of Totalizer 1 – 6.

|        | Display parameter                                              | Description                                                          |
|--------|----------------------------------------------------------------|----------------------------------------------------------------------|
| Ⓜ<br>ⓔ | Totalizer 1 – 6 data quality<br>[Totalizer 1 – 6 data quality] | Possible statuses: good, poor accuracy, manual/fixed, bad.           |
| Ⓜ<br>ⓔ | Totalizer 1 – 6 limit status<br>[Totalizer 1 – 6 limit status] | Possible statuses: constant, low limited, high limited, not limited. |
| Ⓜ<br>ⓔ | Batch data quality<br>[Batch data quality]                     | Possible statuses: good, poor accuracy, manual/fixed, bad.           |
| Ⓜ<br>ⓔ | Batch limit status<br>[Batch limit status]                     | Possible statuses: constant, low limited, high limited, not limited. |

**Menu additional function**

Ⓜ [Process variables root menu] ► [Device variables status] ►  
[Menu additional function]

The menu item *Menu additional function* displays the statuses of the concentration and related values.

|        | Display parameter                                                          | Description                                                          |
|--------|----------------------------------------------------------------------------|----------------------------------------------------------------------|
| Ⓜ<br>ⓔ | Concentration data quality<br>[Concentration data quality]                 | Possible statuses: good, poor accuracy, manual/fixed, bad.           |
| Ⓜ<br>ⓔ | Concentration limit status<br>[Concentration limit status]                 | Possible statuses: constant, low limited, high limited, not limited. |
| Ⓜ<br>ⓔ | Net mass flow 1 – 2 data quality<br>[Net mass flow 1 – 2 data quality]     | Possible statuses: good, poor accuracy, manual/fixed, bad.           |
| Ⓜ<br>ⓔ | Net mass flow 1 – 2 limit status<br>[Net mass flow 1 – 2 limit status]     | Possible statuses: constant, low limited, high limited, not limited. |
| Ⓜ<br>ⓔ | Net volume flow 1 – 2 data quality<br>[Net volume flow 1 – 2 data quality] | Possible statuses: good, poor accuracy, manual/fixed, bad.           |

|        | Display parameter                                                                         | Description                                                          |
|--------|-------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
| Ⓜ<br>ⓔ | <b>Net volume flow 1 – 2 limit status</b><br>[Net volume flow 1 – 2 limit status]         | Possible statuses: constant, low limited, high limited, not limited. |
| Ⓜ<br>ⓔ | <b>Net corrected volume flow data quality</b><br>[Net corrected volume flow data quality] | Possible statuses: good, poor accuracy, manual/fixed, bad.           |
| Ⓜ<br>ⓔ | <b>Net corrected volume flow limit status</b><br>[Net corrected volume flow limit status] | Possible statuses: constant, low limited, high limited, not limited. |
| Ⓜ<br>ⓔ | <b>Viscosity data quality</b><br>[Viscosity data quality]                                 | Possible statuses: good, poor accuracy, manual/fixed, bad.           |
| Ⓜ<br>ⓔ | <b>Viscosity limit status</b><br>[Viscosity limit status]                                 | Possible statuses: constant, low limited, high limited, not limited. |



5.3.5 View outputs

View outputs

 [Process variables] ► [View out]

 [Process variables root menu] ► [View outputs]

The menu item *View outputs* displays the status of the output signal.

|   | Display parameter                                                  | Description                                            |
|---|--------------------------------------------------------------------|--------------------------------------------------------|
| – | Analog output per-<br>cent<br>[AO %]<br>[Analog output<br>percent] | Percentage value of output signal at Analog output.    |
| – | Analog output current<br>[AO curr]<br>[Analog output<br>current]   | Current value of output signal at Analog output in mA. |

5.3.6 View inputs

View inputs

 [Process variables] ► [View in]

 [Process variables root menu] ► [View inputs]

The menu item *View inputs* displays the status of the input signal.

|   | Display parameter                                              | Description                                       |
|---|----------------------------------------------------------------|---------------------------------------------------|
| – | Analog input percent<br>[AI %]<br>[Analog input<br>percent]    | Percentage value of input signal at analog input. |
| – | Analog input current<br>[AI curr]<br>[Analog input<br>current] | Current value of input signal at analog input.    |

## 5.3.7 Sensor and transmitter

## Sensor and transmitter

Ⓐ [Process variables] ► [Snsr/Trsmtr]

Ⓜ [Process variables root menu] ► [Sensor and transmitter]

The menu item *Sensor and transmitter* displays the status of the sensor or transmitter.

|   | Display parameter                                                                 | Description                                                                    |
|---|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| – | Resonance frequency<br>[Freq]<br>[Resonance frequency]                            | Measured resonance frequency of the sensor in Hz.                              |
| – | Phase difference<br>[Phase diff]<br>[Phase difference]                            | Measured phase difference of the sensor signals in mrad.                       |
| – | Drive gain<br>[Drv gain]<br>[Drive gain]                                          | Gain from pick-off signal to drive current.<br>Range of values is 0.0 to 10.0. |
| – | Drive current<br>[Drv curr]<br>[Drive current]                                    | Drive current of sensor in mA.                                                 |
| – | Transmitter temperature<br>[Trsmtr temp]<br>[Transmitter temperature]             | Measured temperature of transmitter (temperature of main circuit board).       |
| – | Max transmitter temperature<br>[Trsmtr max temp]<br>[Max transmitter temperature] | Maximum measured transmitter temperature since the last reset.                 |
| – | Sensor max temperature<br>[Snsr max temp]<br>[Sensor max temperature]             | Maximum measured fluid temperature since the last reset.                       |

## 5.4 Diag/Service

The following overview shows the selectable menu items within the submenu *Diag/Service*. In case of Modbus via DTM on FieldMate, the *Diag/Service* menu is displayed as *Diagnostics root menu* and *Maintenance root menu*.

The following menus/settings are available:

|   | Full name                     | Display name         | [Modbus] name                   | Page    |
|---|-------------------------------|----------------------|---------------------------------|---------|
| – | Status/Self test              | [Sts/Self test]      | [Status/Self test]              | [▶ 119] |
| – | Time stamp                    | [Time stamp]         | [Time stamp]                    | [▶ 146] |
| – | Output test                   | [Out test]           | [Output test]                   | [▶ 146] |
| – | Display indication            | [Display ind]        | [Display indication]            | [▶ 149] |
| – | Autozero                      | [AZ]                 | [Autozero]                      | [▶ 150] |
| – | Analog output/input trim      | [AO/AI trim]         | [Analog output/input trim]      | [▶ 152] |
| Ⓜ | Total & Batch start/stop      |                      | [Total & Batch start/stop]      | [▶ 156] |
| – | High/Low alarm configuration  | [H/L alm cfg]        | [High/Low alarm configuration]  | [▶ 159] |
| – | Simulation                    | [Sim]                | [Simulation]                    | [▶ 183] |
| – | Alarm/Event behavior settings | [Alm/Evt bhvr set]   | [Alarm/Event behavior settings] | [▶ 190] |
| – | Standard diagnostics          | [Std diag]           | [Standard diagnostics]          | [▶ 234] |
| Ⓜ | Total health check            | [Ttl health chk]     | [Total health check]            | [▶ 240] |
| – | Data logging                  | [Data log]           | [Data logging]                  | [▶ 258] |
| Ⓜ | Parameter backup/restore      | [Param bkup/restore] | [Parameter backup/restore]      | [▶ 265] |
| – | Calibration date              | [Calib date]         | [Calibration date]              | [▶ 268] |
| – | Last calibration information  | [Last calib info]    | [Last calibration information]  | [▶ 268] |

### 5.4.1 Status/Self test

The following menus/settings are available:

|   | Full name                 | Display name      | [Modbus] name               | Page    |
|---|---------------------------|-------------------|-----------------------------|---------|
| – | Event acknowledge         | [Evt Ack]         | [Events/Alarms acknowledge] | [▶ 120] |
| – | Alarm/Event device status | [Alm/Evt dev sts] | [Alarm/Event device status] | [▶ 120] |
| Ⓜ | NE 107 map                |                   | [NE107 map]                 | [▶ 124] |
| – | Detailed device status    | [Detail dev sts]  | [Detailed device status]    | [▶ 132] |
| – | Event history             | [Evt hist]        | [Event history]             | [▶ 139] |
| Ⓜ | Device reset              |                   | [Device reset]              | [▶ 145] |
| – | Burnout                   | [Burn out]        | [Burnout]                   | [▶ 145] |

Event  
acknowledge

Ⓐ [Diag/Service] ► [Sts/Self test] ► [Evt Ack]

Ⓜ [Diagnostic root menu] ► [Status/Self test] ► [Events/Alarms  
acknowledge]

If accessed via Modbus communication, each item that is set to gather information is set and controlled via an interactive user interface called Method.

This parameter can be set in the following menu/menus:

- *Parameter description* [► 106]
- *Basic setup* [► 363]

If *Acknowledge* or *Monitor + acknowledge* is selected in the event setting parameters, it is necessary to acknowledge the event to reset the event status. For additional information, see chapter *Event setting* [► 55].

|   | Value                                         | Description                                                                                                                                         |
|---|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Acknowledged<br>[Ack]<br>[Acknowledged]       | Status when the generated event has been acknowledged. After the event is acknowledged, its status automatically reverts to <i>Unacknowledged</i> . |
| – | Unacknowledged<br>[Unack]<br>[Unacknowledged] | An event was not generated, or if it was, it was not acknowledged.                                                                                  |

Alarm/Event device status

Alarm/Event  
device status

Ⓐ [Diag/Service] ► [Sts/Self test] ► [Alm/Evt dev sts]

Ⓜ [Diagnostic root menu] ► [Status/Self test] ► [Alarm/Event device  
status]

This parameter can be set in the following menu/menus:

*Basic setup* [► 361]

The menu item *Alarm/Event device status* displays device statuses. For additional information, see the following chapters:

- *Possible events and related settings and behavior* [► 64]
- *Troubleshooting* [► 605]



An Alarm or Warning for the Batch function might be displayed in the product, but the Batch function cannot be used.

|  | Display parameter                                        | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--|----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Status group 0<br>– <b>[status0]</b><br>[Status group 0] | Status of the following events: <ul style="list-style-type: none"> <li>▪ 101: Resonance frequency failure</li> <li>▪ 102: Signal failure</li> <li>▪ 103 – 104: Pick off 1 failure</li> <li>▪ 105 – 106: Pick off 2 failure</li> <li>▪ 107 – 108: Temperature failure</li> </ul>                                                                                                                                                                                                              |
|  | Status group 1<br>– <b>[status1]</b><br>[Status group 1] | Status of the following events: <ul style="list-style-type: none"> <li>▪ 121 – 122: Main board failure</li> </ul>                                                                                                                                                                                                                                                                                                                                                                            |
|  | Status group 2<br>– <b>[status2]</b><br>[Status group 2] | Status of the following events: <ul style="list-style-type: none"> <li>▪ 123: Parameter restore incomplete</li> <li>▪ 124 – 125: Sensor board failure</li> <li>▪ 126: Sensor communication error</li> <li>▪ 127 – 129: Option board failure</li> <li>▪ 130 – 132: Indicator board failure</li> <li>▪ 133: Indicator board mismatch</li> <li>▪ 134: Indicator communication error</li> <li>▪ 135: microSD failure</li> </ul>                                                                  |
|  | Status group 3<br>– <b>[status3]</b><br>[Status group 3] | Status of the following events: <ul style="list-style-type: none"> <li>▪ 201: Slug detection</li> <li>▪ 202: Empty pipe detection</li> <li>▪ 203: Corrosion detection</li> <li>▪ 204 – 206: Autozero failure</li> <li>▪ 207 – 209: Batch failure</li> <li>▪ 210 – 212: NOC failure</li> </ul>                                                                                                                                                                                                |
|  | Status group 4<br>– <b>[status4]</b><br>[Status group 4] | Status of the following events: <ul style="list-style-type: none"> <li>▪ 221: Analog input failure</li> <li>▪ 222: Mass flow high high low low alarm</li> <li>▪ 223: Density high high low low alarm</li> <li>▪ 224: Temperature high high low low alarm</li> <li>▪ 225: Pressure high high low low alarm</li> <li>▪ 226: Volume flow high high low low alarm</li> <li>▪ 227: Corrected volume flow high high low low alarm</li> <li>▪ 228: Concentration high high low low alarm</li> </ul> |

|  | Display parameter                                    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--|------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Status group 5<br>– [Status5]<br>[Status group 5]    | Status of the following events: <ul style="list-style-type: none"> <li>▪ 229: Net mass flow 1 high high low low alarm</li> <li>▪ 230: Net mass flow 2 high high low low alarm</li> <li>▪ 231: Net volume flow 1 high high low low alarm</li> <li>▪ 232: Net volume flow 2 high high low low alarm</li> <li>▪ 233: Corrected Net Volume Flow high high low low Alarm.</li> <li>▪ 234: Relative density high high low low alarm</li> <li>▪ 235: Reference density high high low low alarm</li> <li>▪ 236: Viscosity high high low low alarm</li> </ul> |
|  | Status group 14<br>– [Status14]<br>[Status group 14] | Status of the following events: <ul style="list-style-type: none"> <li>▪ 241: Totalizer 1 threshold exceeded</li> <li>▪ 242: Totalizer 2 threshold exceeded</li> <li>▪ 243: Totalizer 3 threshold exceeded</li> <li>▪ 244: Totalizer 4 threshold exceeded</li> <li>▪ 245: Totalizer 5 threshold exceeded</li> <li>▪ 246: Totalizer 6 threshold exceeded</li> </ul>                                                                                                                                                                                   |
|  | Status group 15<br>– [Status15]<br>[Status group 15] | Status of the following events: <ul style="list-style-type: none"> <li>▪ 301 – 320: Process variables configuration error</li> <li>▪ 322: Analog output configuration error</li> <li>▪ 323 – 325: Pulse/Status output 1 configuration error</li> <li>▪ 326 – 329: Pulse/Status output 2 configuration error</li> <li>▪ 330: Double pulse output configuration error</li> </ul>                                                                                                                                                                       |
|  | Status group 16<br>– [Status16]<br>[Status group 16] | Status of the following events: <ul style="list-style-type: none"> <li>▪ 333: Analog input configuration error</li> <li>▪ 335 – 340: Totalizer configuration error</li> <li>▪ 341: Batch configuration error</li> <li>▪ 342: Data logging not started</li> <li>▪ 343: Option function mismatch</li> </ul>                                                                                                                                                                                                                                            |
|  | Status group 17<br>– [Status17]<br>[Status group 17] | Status of the following events: <ul style="list-style-type: none"> <li>▪ 702: Analog output fixed</li> <li>▪ 703: Density fixed</li> <li>▪ 704: Temperature fixed</li> <li>▪ 705: Pressure fixed</li> <li>▪ 706: Reference density fixed</li> <li>▪ 707: Calorific value fixed</li> <li>▪ 708: Process variable simulation</li> </ul>                                                                                                                                                                                                                |
|  | Status group 18<br>– [Status18]<br>[Status group 18] | Status of the following events: <ul style="list-style-type: none"> <li>▪ 709: Analog output simulation</li> <li>▪ 710: Pulse output simulation</li> <li>▪ 711: Status output simulation</li> <li>▪ 715: Process variable trimming</li> </ul>                                                                                                                                                                                                                                                                                                         |

|   | Display parameter                                  | Description                                                                                                                                                                                                                                                                                                                                                                                                |
|---|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Status group 19<br>[Status19]<br>[Status group 19] | Status of the following events: <ul style="list-style-type: none"> <li>▪ 717: Analog output saturated</li> <li>▪ 718: Pulse output 1 saturated</li> <li>▪ 719: Pulse output 2 saturated</li> <li>▪ 720: Double pulse output saturated</li> <li>▪ 721: Autozero running</li> <li>▪ 722: Tube health check execution error</li> <li>▪ 723: Date/Time not set</li> <li>▪ 724: Display over warning</li> </ul> |
| – | Status group 20<br>[Status20]<br>[Status group 20] | Status of the following events: <ul style="list-style-type: none"> <li>▪ 725: microSD card size warning</li> <li>▪ 726: microSD card mismatch</li> <li>▪ 728: microSD card removal procedure error</li> <li>▪ 729: Parameter backup incomplete</li> <li>▪ 730: Parameter restore running</li> <li>▪ 732: Batch progress indication</li> </ul>                                                              |
| – | Status group 21<br>[Status21]<br>[Status group 21] | Status of the following event: <ul style="list-style-type: none"> <li>▪ 733, 734: Viscosity warning</li> <li>▪ 735: Autozero warning</li> </ul>                                                                                                                                                                                                                                                            |
| – | Status group 22<br>[Status22]<br>[Status group 22] | Status of the following events: <ul style="list-style-type: none"> <li>▪ 901: Device configuration locked</li> <li>▪ 902: Device configuration not locked</li> <li>▪ 903: Parameter backup running</li> <li>▪ 904: Data logging running</li> <li>▪ 905: Tube health check running</li> <li>▪ 906: Batch running</li> <li>▪ 907: Batch hold</li> </ul>                                                      |
| – | Status group 23<br>[Status23]<br>[Status group 23] | Status of the following event: <ul style="list-style-type: none"> <li>▪ 909: Maintenance mode running</li> </ul>                                                                                                                                                                                                                                                                                           |

**NE 107 map**

The following overview shows the selectable settings within the submenu *NE 107 map*.



An Alarm or Warning for the Batch function might be displayed in the product, but the Batch function cannot be used.

|   | Full name        | Display name | [Modbus] name      | Page    |
|---|------------------|--------------|--------------------|---------|
| Ⓜ | Status group 0   |              | [Status group 0]   | [▶ 125] |
| Ⓜ | Status group 1   |              | [Status group 1]   | [▶ 125] |
| Ⓜ | Status group 2   |              | [Status group 2]   | [▶ 125] |
| Ⓜ | Status group 3   |              | [Status group 3]   | [▶ 126] |
| Ⓜ | Status group 4   |              | [Status group 4]   | [▶ 126] |
| Ⓜ | Status group 5   |              | [Status group 5]   | [▶ 127] |
| Ⓜ | Status group 14  |              | [Status group 14]  | [▶ 127] |
| Ⓜ | Status group 15  |              | [Status group 15]  | [▶ 128] |
| Ⓜ | Status group 16  |              | [Status group 16]  | [▶ 128] |
| Ⓜ | Status group 17  |              | [Status group 17]  | [▶ 128] |
| Ⓜ | Status group 18  |              | [Status group 18]  | [▶ 129] |
| Ⓜ | Status group 19  |              | [Status group 19]  | [▶ 129] |
| Ⓜ | Status group 20  |              | [Status group 20]  | [▶ 130] |
| Ⓜ | Status group 21  |              | [Status group 21]  | [▶ 130] |
| Ⓜ | Status group 22  |              | [Status group 22]  | [▶ 130] |
| Ⓜ | Status group 23  |              | [Status group 23]  | [▶ 131] |
| Ⓜ | Reset NE 107 map |              | [Reset NE 107 map] | [▶ 131] |

Configuration of NAMUR NE107 classification for each status parameter. Event classification according to NAMUR NE107 can be changed by selecting the following statuses:

Tab. 29: Explanation of statuses

| Status | Explanation          |
|--------|----------------------|
| N      | No effect            |
| M      | Maintenance required |
| F      | Failure              |
| S      | Out of specification |
| C      | Function check       |



**Status group 0**

Ⓜ [Diagnostic root menu] ► [Status/Self test] ► [NE 107 map] ► [Status group 0]

Configuration of NE107 classification in the menu *Status group 0*.

|   | Parameter                                                                              | Default status |
|---|----------------------------------------------------------------------------------------|----------------|
| Ⓜ | [NE 107] 101:Resonance frequency failure<br>[NE 107] [101:Resonance frequency failure] | F              |
| Ⓜ | [NE 107] 102:Signal failure<br>[NE 107] [102:Signal failure]                           | F              |
| Ⓜ | [NE 107] 103 – 104:Pick off 1 failure<br>[NE 107] [103...104:Pick off 1 failure]       | F              |
| Ⓜ | [NE 107] 105 – 106:Pick off 2 failure<br>[NE 107] [105 – 106:Pick off 2 failure]       | F              |
| Ⓜ | [NE 107] 107 – 108:Temperature failure<br>[NE 107] [107 – 108:Temperature failure]     | F              |

**Status group 1**

Ⓜ [Diagnostic root menu] ► [Status/Self test] ► [NE 107 map] ► [Status group 1]

Configuration of NE 107 classification in the menu *Status group 1*.

|   | Parameter                                                                        | Default status |
|---|----------------------------------------------------------------------------------|----------------|
| Ⓜ | [NE 107] 121 – 122:Main board failure<br>[NE 107] [121 – 122:Main board failure] | F              |

**Status group 2**

Ⓜ [Diagnostic root menu] ► [Status/Self test] ► [NE 107 map] ► [Status group 2]

Configuration of NE 107 classification in the menu *Status group 2*.

|   | Parameter                                                                                  | Default status |
|---|--------------------------------------------------------------------------------------------|----------------|
| Ⓜ | [NE 107] 123:Parameter restore incomplete<br>[NE 107] [123:Parameter restore incomplete]   | F              |
| Ⓜ | [NE 107] 124 – 125:Sensor board failure<br>[NE 107] [124 – 125:Sensor board failure]       | F              |
| Ⓜ | [NE 107] 126:Sensor communication error<br>[NE 107] [126:Sensor communication error]       | F              |
| Ⓜ | [NE 107] 127 – 129:Option board failure<br>[NE 107] [127 – 129:Option board failure]       | F              |
| Ⓜ | [NE 107] 130 – 132:Indicator board failure<br>[NE 107] [130 – 132:Indicator board failure] | F              |
| Ⓜ | [NE 107] 133:Indicator board mismatch<br>[NE 107] [133:Indicator board mismatch]           | F              |
| Ⓜ | [NE 107] 134:Indicator communication error<br>[NE 107] [134:Indicator communication error] | F              |
| Ⓜ | [NE 107] 135:microSD failure<br>[NE 107] [135:microSD failure]                             | F              |

**Status group 3**

④ [Diagnostic root menu] ► [Status/Self test] ► [NE 107 map] ► [Status group 3]

Configuration of NE 107 classification in the menu *Status group 3*.

|        | Parameter                                                                           | Default status |
|--------|-------------------------------------------------------------------------------------|----------------|
| ④      | [NE 107] <b>201:Slug detection</b><br>[NE 107] [201:Slug detection]                 | M              |
| ④      | [NE 107] <b>202:Empty pipe detection</b><br>[NE 107] [202:Empty pipe detection]     | M              |
| ④      | [NE 107] <b>203:Corrosion detection</b><br>[NE 107] [203:Corrosion detection]       | M              |
| ④      | [NE 107] <b>204 – 206:Autozero failure</b><br>[NE 107] [204 – 206:Autozero failure] | M              |
| ④<br>⑤ | [NE 107] <b>207 – 209:Batch failure</b><br>[NE 107] [207 – 209:Batch failure]       | M              |
| ④      | [NE 107] <b>210 – 212: NOC failure</b><br>[NE 107] [210 – 212: NOC failure]         | S              |

**Status group 4**

④ [Diagnostic root menu] ► [Status/Self test] ► [NE 107 map] ► [Status group 4]

Configuration of NE 107 classification in the menu *Status group 4*.

|        | Parameter                                                                                                                         | Default status |
|--------|-----------------------------------------------------------------------------------------------------------------------------------|----------------|
| ④      | [NE 107] <b>221:Analog input failure</b><br>[NE 107] [221:Analog input failure]                                                   | N              |
| ④      | [NE 107] <b>222:Mass flow high high low low alarm</b><br>[NE 107] [222:Mass flow high high low low alarm]                         | N              |
| ④      | [NE 107] <b>223:Density high high low low alarm</b><br>[NE 107] [223:Density high high low low alarm]                             | N              |
| ④      | [NE 107] <b>224:Temperature high high low low alarm</b><br>[NE 107] [224:Temperature high high low low alarm]                     | N              |
| ④      | [NE 107] <b>225:Pressure high high low low alarm</b><br>[NE 107] [225:Pressure high high low low alarm]                           | N              |
| ④      | [NE 107] <b>226:Volume flow high high low low alarm</b><br>[NE 107] [226:Volume flow high high low low alarm]                     | N              |
| ④      | [NE 107] <b>227:Corrected volume flow high high low low alarm</b><br>[NE 107] [227:Corrected volume flow high high low low alarm] | N              |
| ④<br>⑤ | [NE 107] <b>228:Concentration high high low low alarm</b><br>[NE 107] [228:Concentration high high low low alarm]                 | N              |

**Status group 5**

Ⓜ [Diagnostic root menu] ► [Status/Self test] ► [NE 107 map] ► [Status group 5]

Configuration of NE 107 classification in the menu *Status group 5*.

|        | Parameter                                                                                                                          | Default status |
|--------|------------------------------------------------------------------------------------------------------------------------------------|----------------|
| Ⓜ<br>Ⓜ | [NE 107] 229:Net mass flow 1 high high low low alarm<br>[NE 107] [229:Net mass flow 1 high high low low alarm]                     | N              |
| Ⓜ<br>Ⓜ | [NE 107] 230:Net mass flow 2 high high low low alarm<br>[NE 107] [230:Net mass flow 2 high high low low alarm]                     | N              |
| Ⓜ<br>Ⓜ | [NE 107] 231:Net volume flow 1 high high low low alarm<br>[NE 107] [231:Net volume flow 1 high high low low alarm]                 | N              |
| Ⓜ<br>Ⓜ | [NE 107] 232:Net volume flow 2 high high low low alarm<br>[NE 107] [232:Net volume flow 2 high high low low alarm]                 | N              |
| Ⓜ<br>Ⓜ | [NE 107] 233:Net Corrected volume flow high high low low alarm<br>[NE 107] [233:Corrected net volume flow high high low low alarm] | N              |
| Ⓜ      | [NE 107] 234:Relative density high high low low alarm<br>[NE 107] [234:Relative density high high low low alarm]                   | N              |
| Ⓜ      | [NE 107] 235:Reference density high high low low alarm<br>[NE 107] [235:Reference density high high low low alarm]                 | N              |
| Ⓜ<br>Ⓜ | [NE 107] 236:Viscosity high high low low alarm<br>[NE 107] [236:Viscosity high high low low alarm]                                 | N              |

**Status group 14**

Ⓜ [Diagnostic root menu] ► [Status/Self test] ► [NE 107 map] ► [Status group 14]

Configuration of NE 107 classification in the menu *Status group 14*.

|   | Parameter                                                                                    | Default status |
|---|----------------------------------------------------------------------------------------------|----------------|
| Ⓜ | [NE 107] 241:Totalizer 1 threshold exceeded<br>[NE 107] [241:Totalizer 1 threshold exceeded] | N              |
| Ⓜ | [NE 107] 242:Totalizer 2 threshold exceeded<br>[NE 107] [242:Totalizer 2 threshold exceeded] | N              |
| Ⓜ | [NE 107] 243:Totalizer 3 threshold exceeded<br>[NE 107] [243:Totalizer 3 threshold exceeded] | N              |
| Ⓜ | [NE 107] 244:Totalizer 4 threshold exceeded<br>[NE 107] [244:Totalizer 4 threshold exceeded] | N              |
| Ⓜ | [NE 107] 245:Totalizer 5 threshold exceeded<br>[NE 107] [245:Totalizer 5 threshold exceeded] | N              |
| Ⓜ | [NE 107] 246:Totalizer 6 threshold exceeded<br>[NE 107] [246:Totalizer 6 threshold exceeded] | N              |

**Status group 15**

④ [Diagnostic root menu] ► [Status/Self test] ► [NE 107 map] ► [Status group 15]

Configuration of NE 107 classification in the menu *Status group 15*.

|   | Parameter                                                                                                                      | Default status |
|---|--------------------------------------------------------------------------------------------------------------------------------|----------------|
| ④ | [NE 107] 301 – 320:Process variable configuration error<br>[NE 107] [301 – 3209:Process variable configuration error]          | C              |
| ④ | [NE 107] 322:Analog output configuration error<br>[NE 107] [322:Analog output configuration error]                             | C              |
| ④ | [NE 107] 323 – 325:Pulse/Status output 1 configuration error<br>[NE 107] [323 – 325:Pulse/Status output 1 configuration error] | C              |
| ④ | [NE 107] 326 – 329:Pulse/Status output 2 configuration error<br>[NE 107] [326 – 329:Pulse/Status output 2 configuration error] | C              |
| ④ | [NE 107] 330:Double pulse output configuration error<br>[NE 107] [330:Double pulse output configuration error]                 | C              |

**Status group 16**

④ [Diagnostic root menu] ► [Status/Self test] ► [NE 107 map] ► [Status group 16]

Configuration of NE 107 classification in the menu *Status group 16*.

|        | Parameter                                                                                              | Default value |
|--------|--------------------------------------------------------------------------------------------------------|---------------|
| ④      | [NE 107] 333:Analog input configuration error<br>[NE 107] [333:Analog input configuration error]       | C             |
| ④      | [NE 107] 335 – 340:Totalizer configuration error<br>[NE 107] [335 – 340:Totalizer configuration error] | C             |
| ④<br>⑤ | [NE 107] 341:Batch configuration error<br>[NE 107] [341:Batch configuration error]                     | C             |
| ④      | [NE 107] 342:Data logging not started<br>[NE 107] [342:Data logging not started]                       | C             |
| ④      | [NE 107] 343:Option function mismatch<br>[NE 107] [343:Option function mismatch]                       | C             |

**Status group 17**

④ [Diagnostic root menu] ► [Status/Self test] ► [NE 107 map] ► [Status group 17]

Configuration of NE 107 classification in the menu *Status group 17*.

|   | Parameter                                                              | Default status |
|---|------------------------------------------------------------------------|----------------|
| ④ | [NE 107] 702:Analog output fixed<br>[NE 107] [702:Analog output fixed] | C              |
| ④ | [NE 107] 703:Density fixed<br>[NE 107] [703:Density fixed]             | C              |
| ④ | [NE 107] 704:Temperature fixed<br>[NE 107] [704:Temperature fixed]     | C              |

|   | Parameter                                                                                     | Default status |
|---|-----------------------------------------------------------------------------------------------|----------------|
| Ⓜ | [NE 107] <b>705:Pressure fixed</b><br>[NE 107] [705:Pressure fixed]                           | C              |
| Ⓜ | [NE 107] <b>706:Reference density fixed</b><br>[NE 107] [706:Reference density fixed]         | C              |
| Ⓜ | [NE 107] <b>707:Calorific value fixed</b><br>[NE 107] [707:Calorific value fixed]             | C              |
| Ⓜ | [NE 107] <b>708:Process variable simulation</b><br>[NE 107] [708:Process variable simulation] | C              |

**Status group 18**

Ⓜ [Diagnostic root menu] ► [Status/Self test] ► [NE 107 map] ► [Status group 18]

Configuration of NE 107 classification in the menu *Status group 18*.

|   | Parameter                                                                                 | Default status |
|---|-------------------------------------------------------------------------------------------|----------------|
| Ⓜ | [NE 107] <b>709:Analog output simulation</b><br>[NE 107] [709:Analog output simulation]   | C              |
| Ⓜ | [NE 107] <b>710:Pulse output simulation</b><br>[NE 107] [710:Pulse output simulation]     | C              |
| Ⓜ | [NE 107] <b>711:Status output simulation</b><br>[NE 107] [711:Status output simulation]   | C              |
| Ⓜ | [NE 107] <b>715:Process variable trimming</b><br>[NE 107] [715:Process variable trimming] | C              |

**Status group 19**

Ⓜ [Diagnostic root menu] ► [Status/Self test] ► [NE 107 map] ► [Status group 19]

Configuration of NE 107 classification in the menu *Status group 19*.

|        | Parameter                                                                                                 | Default status |
|--------|-----------------------------------------------------------------------------------------------------------|----------------|
| Ⓜ      | [NE 107] <b>717:Analog output saturated</b><br>[NE 107] [717:Analog output saturated]                     | S              |
| Ⓜ      | [NE 107] <b>718:Pulse output 1 saturated</b><br>[NE 107] [718:Pulse output 1 saturated]                   | S              |
| Ⓜ      | [NE 107] <b>719:Pulse output 2 saturated</b><br>[NE 107] [719:Pulse output 2 saturated]                   | S              |
| Ⓜ      | [NE 107] <b>720:Double pulse output saturated</b><br>[NE 107] [720:Double pulse output saturated]         | S              |
| Ⓜ      | [NE 107] <b>721:Autozero running</b><br>[NE 107] [721:Autozero running]                                   | C              |
| Ⓜ<br>Ⓜ | [NE 107] <b>722:Tube health check execution error</b><br>[NE 107] [722:Tube Health Check execution error] | N              |
| Ⓜ      | [NE 107] <b>723:Date/Time not set</b><br>[NE 107] [723:Date/Time not set]                                 | N              |
| Ⓜ      | [NE 107] <b>724:Display over warning</b><br>[NE 107] [724:Display over warning]                           | N              |

**Status group 20**

④ [Diagnostic root menu] ► [Status/Self test] ► [NE 107 map] ► [Status group 20]

Configuration of NE 107 classification in the menu *Status group 20*.

|        | Parameter                                                                                                | Default status |
|--------|----------------------------------------------------------------------------------------------------------|----------------|
| ④      | [NE 107] 725:microSD card size warning<br>[NE 107] [725:microSD card size warning]                       | N              |
| ④      | [NE 107] 726:microSD card mismatch<br>[NE 107] [726:microSD card mismatch]                               | S              |
| ④      | [NE 107] 728:microSD card removal procedure error<br>[NE 107] [728:microSD card removal procedure error] | M              |
| ④      | [NE 107] 729:Parameter backup incomplete<br>[NE 107] [729:Parameter backup incomplete]                   | M              |
| ④      | [NE 107] 730:Parameter restore running<br>[NE 107] [730:Parameter restore running]                       | C              |
| ④<br>⑤ | [NE 107] 732:Batch progress indication<br>[NE 107] [732:Batch progress indication]                       | N              |

**Status group 21**

④ [Diagnostic root menu] ► [Status/Self test] ► [NE 107 map] ► [Status group 21]

Configuration of NE 107 classification in the menu *Status group 21*.

|        | Parameter                                                                | Default status |
|--------|--------------------------------------------------------------------------|----------------|
| ④<br>⑤ | [NE 107] 733 – 734:Viscosity warning<br>[NE 107] [735:Viscosity warning] | M              |
| ④      | [NE 107] 735:Autozero warning<br>[NE 107] [735:Autozero warning]         | M              |

**Status group 22**

④ [Diagnostic root menu] ► [Status/Self test] ► [NE 107 map] ► [Status group 22]

Configuration of NE 107 classification in the menu *Status group 22*.

|        | Parameter                                                                                      | Default status |
|--------|------------------------------------------------------------------------------------------------|----------------|
| ④      | [NE 107] 901:Device configuration locked<br>[NE 107] [901:Device configuration locked]         | N              |
| ④      | [NE 107] 902:Device configuration not locked<br>[NE 107] [902:Device configuration not locked] | N              |
| ④      | [NE 107] 903:Parameter backup running<br>[NE 107] [903:Parameter backup running]               | N              |
| ④      | [NE 107] 904:Data logging running<br>[NE 107] [904:Data logging running]                       | N              |
| ④<br>⑤ | [NE 107] 905:Tube health check running<br>[NE 107] [905:Tube Health Check running]             | N              |
| ④<br>⑤ | [NE 107] 906:Batch running<br>[NE 107] [906:Batch running]                                     | N              |
| ④<br>⑤ | [NE 107] 907:Batch hold<br>[NE 107] [907:Batch hold]                                           | N              |

Status group 23

Ⓜ [Diagnostic root menu] ► [Status/Self test] ► [NE 107 map] ► [Status group 23]

Configuration of NE 107 classification in the menu *Status group 23*.

|   | Parameter                               | Default status |
|---|-----------------------------------------|----------------|
| Ⓜ | [NE 107] 909:Maintenance mode running   | C              |
|   | [NE 107] [909:Maintenance mode running] |                |

Reset NE 107 map

Ⓜ [Diagnostic root menu] ► [Status/Self test] ► [NE 107 map] ► [Reset NE 107 map]

An executable command, that resets the configuration of NE 107 map parameters.  
If accessed via Modbus communication, each item that is set to gather information is set and controlled via an interactive user interface called Method.

**Detailed device status**

The following overview shows the selectable settings within the submenu *Detailed device status*.



An Alarm or Warning for the Batch function might be displayed in the product, but the Batch function cannot be used.

|   | Full name                         | Display name  | [Modbus] name                       | Page    |
|---|-----------------------------------|---------------|-------------------------------------|---------|
| Ⓜ | Alarm/Event additional parameters | –             | [Alarm/Event additional parameters] | [▶ 132] |
| – | System alarm status               | [Sys alm sts] | [System alarm status]               | [▶ 132] |
| – | Process alarm status              | [Pro alm sts] | [Process alarm status]              | [▶ 134] |
| – | Setting alarm status              | [Set alm sts] | [Setting alarm status]              | [▶ 135] |
| – | Warning status                    | [Warn sts]    | [Warning status]                    | [▶ 136] |
| – | Information status                | [Info sts]    | [Information status]                | [▶ 138] |

**Alarm/Event additional parameters**

⌚ [Diag/Service] ▶ [Sts/Self test] ▶ [Detail dev sts] ▶ [Alm/Evt add]

This parameter can be set in the following menu/menus:

*Alarm/Event behavior settings* [▶ 190]

The parameter *Alarm/Event additional parameters* enables or disables menu items in the submenu *Alarm/Event behavior settings*.

|   | Value                                   | Description                                                                                    |
|---|-----------------------------------------|------------------------------------------------------------------------------------------------|
| – | Not apply<br>[Not apply]<br>[Not apply] | Menu items in the submenu <i>Alarm/Event behavior settings</i> are disabled.<br>Default value. |
| – | Apply<br>[Apply]<br>[Apply]             | Menu items in the submenu <i>Alarm/Event behavior settings</i> are enabled.                    |

**System alarm status**

⌚ [Diag/Service] ▶ [Sts/Self test] ▶ [Detail dev sts] ▶ [Sys alm sts]

Ⓜ [Diagnostic root menu] ▶ [Status/Self test] ▶ [Detailed device status] ▶ [System alarm status]

The menu item *System alarm status* displays the status of system alarms. For additional information, see the following chapters:

- *Possible events and related settings and behavior* [▶ 64]
- *Troubleshooting* [▶ 605]



| Display parameter                                                | Description                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| System alarm status 0<br>– [Sys alm0]<br>[System alarm status 0] | Alarm statuses: <ul style="list-style-type: none"> <li>▪ 101:Frequency failure</li> <li>▪ 102:Signal failure</li> <li>▪ 103:Pick off 1 failure</li> <li>▪ 104:Pick off 1 failure</li> <li>▪ 105:Pick off 2 failure</li> <li>▪ 106:Pick off 2 failure</li> <li>▪ 107:Temperature range violation</li> <li>▪ 108:Temperature sensor failure</li> </ul>                                  |
| System alarm status 1<br>– [Sys alm1]<br>[System alarm status 1] | Alarm status:                                                                                                                                                                                                                                                                                                                                                                         |
| System alarm status 2<br>– [Sys alm2]<br>[System alarm status 2] | Alarm statuses: <ul style="list-style-type: none"> <li>▪ 121:Main board CPU failure</li> <li>▪ 122:Main board EEPROM failure</li> <li>▪ 123:Parameter restore incomplete</li> <li>▪ 124:Sensor board failure</li> <li>▪ 125:Sensor board mismatch</li> <li>▪ 126:Sensor communication error</li> <li>▪ 127:Option board failure</li> <li>▪ 128:Option board EEPROM failure</li> </ul> |
| System alarm status 3<br>– [Sys alm3]<br>[System alarm status 3] | Alarm statuses: <ul style="list-style-type: none"> <li>▪ 129:Option board mismatch</li> <li>▪ 130:Indicator board failure</li> <li>▪ 131:Indicator board EEPROM failure</li> <li>▪ 132:LCD driver failure</li> <li>▪ 133:Indicator board mismatch</li> <li>▪ 134:Indicator communication error</li> <li>▪ 135:microSD card failure</li> </ul>                                         |

**Process alarm status**

Ⓐ [Diag/Service] ► [Sts/Self test] ► [Detail dev sts] ► [Pro alm sts]

Ⓜ [Diagnostic root menu] ► [Status/Self test] ► [Detailed device status] ► [Process alarm status]

The menu item *Process alarm status* displays the status of process alarms. For additional information, see the following chapters:

- *Possible events and related settings and behavior* [► 64]
- *Troubleshooting* [► 605]

|   | Display parameter                                                | Description                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---|------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Process alarm status 0<br>[Pro alm0]<br>[Process alarm status 0] | Alarm statuses: <ul style="list-style-type: none"> <li>▪ 201:Slug detection</li> <li>▪ 202:Empty pipe detection</li> <li>▪ 203:Corrosion detection</li> <li>▪ 204:Autozero judgment multiphase</li> <li>▪ 205:Autozero judgment flow</li> <li>▪ 206:Autozero judgment temperature</li> </ul>                                                                                                                                |
| – | Process alarm status 1<br>[Pro alm1]<br>[Process alarm status 1] | Alarm statuses: <ul style="list-style-type: none"> <li>▪ 207:Batch time exceeded</li> <li>▪ 208:Batch overrun/underrun</li> <li>▪ 209:Max flow while batching</li> <li>▪ 210:Oil density calculation failure</li> <li>▪ 211:Water density calculation failure failure</li> <li>▪ 212:NOC calculation</li> </ul>                                                                                                             |
| – | Process alarm status 2<br>[Pro alm2]<br>[Process alarm status 2] | Alarm statuses: <ul style="list-style-type: none"> <li>▪ 221:Analog input failure</li> <li>▪ 222:Mass flow HH/LL alarm</li> <li>▪ 223:Density HH/LL alarm</li> <li>▪ 224:Temperature HH/LL alarm</li> <li>▪ 225:Pressure HH/LL alarm</li> <li>▪ 226:Volume flow HH/LL alarm</li> <li>▪ 227:Corrected volume flow HH/LL alarm</li> <li>▪ 228:Concentration HH/LL alarm</li> </ul>                                            |
| – | Process alarm status 3<br>[Pro alm3]<br>[Process alarm status 3] | Alarm statuses: <ul style="list-style-type: none"> <li>▪ 229:Net mass flow 1 HH/LL alarm</li> <li>▪ 230:Net mass flow 2 HH/LL alarm</li> <li>▪ 231:Net volume flow 1 HH/LL alarm</li> <li>▪ 232:Net volume flow 2 HH/LL alarm</li> <li>▪ 233:Net corrected volume flow HH/LL alarm</li> <li>▪ 234:Relative density HH/LL alarm</li> <li>▪ 235:Reference density HH/LL alarm</li> <li>▪ 236:Viscosity HH/LL alarm</li> </ul> |

| Display parameter                                                  | Description                                                                                                                                                                                                                                                                                                                                  |
|--------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Process alarm status 4<br>– [Pro alm4]<br>[Process alarm status 4] | Alarm statuses: <ul style="list-style-type: none"> <li>▪ 241:Totalizer 1 threshold exceeded</li> <li>▪ 242:Totalizer 2 threshold exceeded</li> <li>▪ 243:Totalizer 3 threshold exceeded</li> <li>▪ 244:Totalizer 4 threshold exceeded</li> <li>▪ 245:Totalizer 5 threshold exceeded</li> <li>▪ 246:Totalizer 6 threshold exceeded</li> </ul> |

### Setting alarm status

① [Diag/Service] ► [Sts/Self test] ► [Detail dev sts] ► [Set alm sts]

② [Diagnostic root menu] ► [Status/Self test] ► [Detailed device status] ► [Setting alarm status]

The menu item *Setting alarm status* displays the status when setting alarms. For additional information, see the following chapters:

- *Possible events and related settings and behavior* [▶ 64]
- *Troubleshooting* [▶ 605]

| Display parameter                                                  | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Setting alarm status 0<br>– [Set alm0]<br>[Setting alarm status 0] | Alarm statuses: <ul style="list-style-type: none"> <li>▪ 301:Mass flow configuration error</li> <li>▪ 302:Density configuration error</li> <li>▪ 303:Temperature configuration error</li> <li>▪ 304:Analog input temperature configuration error</li> <li>▪ 305:Pressure configuration error</li> <li>▪ 306:Analog input pressure configuration error</li> <li>▪ 307:Volume flow configuration error</li> <li>▪ 308:Reference density configuration error</li> </ul>                                 |
| Setting alarm status 1<br>– [Set alm1]<br>[Setting alarm status 1] | Alarm statuses: <ul style="list-style-type: none"> <li>▪ 309:Relative density configuration error</li> <li>▪ 310:Corrected volume flow configuration error</li> <li>▪ 311:Calorific value configuration error</li> <li>▪ 312:Analog input calorific value configuration error</li> <li>▪ 313:Concentration configuration error</li> <li>▪ 314:Net mass flow 1 configuration error</li> <li>▪ 315:Net mass flow 2 configuration error</li> <li>▪ 316:Net volume flow 1 configuration error</li> </ul> |
| Setting alarm status 2<br>– [Set alm2]<br>[Setting alarm status 2] | Alarm statuses: <ul style="list-style-type: none"> <li>▪ 317:Net volume flow 2 configuration error</li> <li>▪ 318:Net corrected volume flow configuration error</li> <li>▪ 319:Velocity configuration error</li> <li>▪ 320:Viscosity configuration error</li> </ul>                                                                                                                                                                                                                                  |

|  | Display parameter                                                  | Description                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--|--------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Setting alarm status 3<br>– [Set alm3]<br>[Setting alarm status 3] | Alarm statuses: <ul style="list-style-type: none"> <li>▪ 322:Analog output configuration error</li> <li>▪ 323:Pulse output 1 configuration error</li> <li>▪ 324:Frequency output 1 configuration error</li> <li>▪ 325:Status output 1 configuration error</li> <li>▪ 326:Pulse output 2 configuration error</li> <li>▪ 327:Frequency output 2 configuration error</li> <li>▪ 328:Status output 2 configuration error</li> </ul>     |
|  | Setting alarm status 4<br>– [Set alm4]<br>[Setting alarm status 4] | Alarm statuses: <ul style="list-style-type: none"> <li>▪ 329:Pulse/Status output 2 mode configuration error</li> <li>▪ 330:Double pulse output configuration error</li> <li>▪ 333:Analog input configuration error</li> </ul>                                                                                                                                                                                                       |
|  | Setting alarm status 5<br>– [Set alm5]<br>[Setting alarm status 5] | Alarm statuses: <ul style="list-style-type: none"> <li>▪ 335:Totalizer 1 configuration error</li> <li>▪ 336:Totalizer 2 configuration error</li> <li>▪ 337:Totalizer 3 configuration error</li> <li>▪ 338:Totalizer 4 configuration error</li> <li>▪ 339:Totalizer 5 configuration error</li> <li>▪ 340:Totalizer 6 configuration error</li> <li>▪ 341:Batch configuration error</li> <li>▪ 342:Data logging not started</li> </ul> |
|  | Setting alarm status 6<br>– [Set alm6]<br>[Setting alarm status 6] | Alarm status:<br>343:Option function mismatch                                                                                                                                                                                                                                                                                                                                                                                       |

## Warning status

Ⓛ [Diag/Service] ► [Sts/Self test] ► [Detail dev sts] ► [Warn sts]

Ⓜ [Diagnostic root menu] ► [Status/Self test] ► [Detailed device status] ► [Warning status]

The menu item *Warning status* displays the status of warnings. For additional information, see the following chapters:

- *Possible events and related settings and behavior* [► 64]
- *Troubleshooting* [► 605]

|  | Display parameter                                       | Description                                                                                                                                                                                                                                                                                                      |
|--|---------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Warning status 0<br>– [Warn sts0]<br>[Warning status 0] | Warning statuses: <ul style="list-style-type: none"> <li>▪ 702:Analog output fixed</li> <li>▪ 703:Density fixed</li> <li>▪ 704:Temperature fixed</li> <li>▪ 705:Pressure fixed</li> <li>▪ 706:Reference density fixed</li> <li>▪ 707:Calorific value fixed</li> <li>▪ 708:Process variable simulation</li> </ul> |

|   | Display parameter                                     | Description                                                                                                                                                                                                                                                                                                                                                                          |
|---|-------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Warning status 1<br>[Warn sts1]<br>[Warning status 1] | Warning statuses: <ul style="list-style-type: none"> <li>▪ 709:Analog output simulation</li> <li>▪ 710:Pulse output simulation</li> <li>▪ 711:Status output simulation</li> <li>▪ 715:Process variable trimming</li> </ul>                                                                                                                                                           |
| – | Warning status 2<br>[Warn sts2]<br>[Warning status 2] | Warning statuses: <ul style="list-style-type: none"> <li>▪ 717:Analog output saturated</li> <li>▪ 718:Pulse output 1 saturated</li> <li>▪ 719:Pulse output 2 saturated</li> <li>▪ 720:Double pulse output saturated</li> <li>▪ 721:Autozero running</li> <li>▪ 722:Tube health check execution error</li> <li>▪ 723:Date/Time not set</li> <li>▪ 724:Display over warning</li> </ul> |
| – | Warning status 3<br>[Warn sts3]<br>[Warning status 3] | Warning statuses: <ul style="list-style-type: none"> <li>▪ 725:microSD card size warning</li> <li>▪ 726:microSD card mismatch</li> <li>▪ 728:microSD card removal procedure error</li> <li>▪ 729:Parameter backup incomplete</li> <li>▪ 730:Parameter restore running</li> <li>▪ 732:Batch progress indication</li> </ul>                                                            |
| – | Warning status 4<br>[Warn sts4]<br>[Warning status 4] | Warning status: <ul style="list-style-type: none"> <li>▪ 733:Viscosity not calculated</li> <li>▪ 734:Viscosity not reliable</li> <li>▪ 735:Autozero warning</li> </ul>                                                                                                                                                                                                               |

Information status

⌚ [Diag/Service] ► [Sts/Self test] ► [Detail dev sts] ► [Info sts]

Ⓜ [Diagnostic root menu] ► [Status/Self test] ► [Detailed device status] ► [Information status]

The menu item *Information status* displays the status of information. For additional information, see the following chapters:

- *Possible events and related settings and behavior* [► 64]
- *Troubleshooting* [► 605]

|   | Display parameter                                             | Description                                                                                                                                                                                                                                                                                                                  |
|---|---------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Information status 0<br>[Info sts0]<br>[Information status 0] | Information statuses: <ul style="list-style-type: none"><li>▪ 901:Device configuration locked</li><li>▪ 902:Device configuration not locked</li><li>▪ 903:Parameter backup running</li><li>▪ 904:Data logging running</li><li>▪ 905:Tube health check running</li><li>▪ 906:Batch running</li><li>▪ 907:Batch hold</li></ul> |
| – | Information status 1<br>[Info sts1]<br>[Information status 1] | Information status:<br>909:Maintenance mode running                                                                                                                                                                                                                                                                          |

**Event history**

The following menus/settings are available:

|   | Full name                                 | Display name     | [Modbus] name                               | Page    |
|---|-------------------------------------------|------------------|---------------------------------------------|---------|
| – | Event file name                           | [Evt file]       | [Event file name]                           | [▶ 139] |
| – | Monitor file name                         | [Mon file]       | [Monitor file name]                         | [▶ 139] |
| Ⓜ | Alarm/Event history additional parameters | –                | [Alarm/Event history additional parameters] | [▶ 140] |
| – | Event history 1 – 10                      | [Evt hist1 – 10] | [Event history 1 – 10]                      | [▶ 140] |
| Ⓜ | Monitoring history 1 – 4                  | –                | [Monitoring history 1 – 4]                  | [▶ 141] |
| – | Clear Event history                       | [Clr Evt hist]   | [Clear Event history]                       | [▶ 145] |

**Event file name**

⌚ [Diag/Service] ▶ [Sts/Self test] ▶ [Evt hist] ▶ [Evt file]

Ⓜ [Diagnostic root menu] ▶ [Status/Self test] ▶ [Event history] ▶ [Event file name]

Shows the file name of the file on the microSD card that contains the event history.

|   | Value            | Description                                                                                                                                                                                            |
|---|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | ASCII characters | File name of the file on the microSD card that contains the event history.<br>Maximum length is 8 characters.<br>The following are invalid characters: space, ", *, +, ,, /, :, ;, <, =, >, ?, [, \, ] |

**Monitor file name**

⌚ [Diag/Service] ▶ [Sts/Self test] ▶ [Evt hist] ▶ [Mon file]

Ⓜ [Diagnostic root menu] ▶ [Status/Self test] ▶ [Event history] ▶ [Monitor file name]

Shows the file name of the file on the microSD card that contains monitoring data.

|   | Value            | Description                                                                                                                                                                                          |
|---|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | ASCII characters | File name of the file on the microSD card that contains monitoring data.<br>Maximum length is 8 characters.<br>The following are invalid characters: space, ", *, +, ,, /, :, ;, <, =, >, ?, [, \, ] |

**Alarm/Event history additional parameters**

Ⓜ [Diagnostic root menu] ► [Status/Self test] ► [Event history] ► [Alarm/Event history additional parameters]

Enables or disables access to additional parameters in *Event history 1 – 10* for the event history.

|   | Value                                   | Description                                                                                                      |
|---|-----------------------------------------|------------------------------------------------------------------------------------------------------------------|
| – | Not apply<br>[Not apply]<br>[Not apply] | Disables access to additional parameters in <i>Event history 1 – 10</i> for the event history.<br>Default value. |
| – | Apply<br>[Apply]<br>[Apply]             | Enables access to additional parameters in <i>Event history 1 – 10</i> for the event history.                    |

**Event history 1 – 10**

Ⓛ [Diag/Service] ► [Sts/Self test] ► [Evt hist] ► [Evt hist1 – 10]

Ⓜ [Diagnostic root menu] ► [Status/Self test] ► [Event history] ► [Event history 1 – 10]

The menu *Event history 1 – 10* show the corresponding parameters of each logged event.

|   | Display parameter                                                                | Description                                                                                                                                          |
|---|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Event No 1 – 10<br>[Evt No 1 – 10]<br>[Event no 1 – 10]                          | Shows event ID number of event 1 – 10.                                                                                                               |
| – | Event contents 1 – 10<br>[Contents1 – 10]<br>[Event contents 1 – 10]             | Shows event name of event 1 – 10.<br>(Event set, Event clear or Acknowledge as event name)                                                           |
| – | Event 1 – 10 date<br>[Date1 – 10]<br>[Event 1 – 10 date]                         | Shows date of occurrence of event 1 – 10.<br>It shows the actual date of the event, if date was set correctly when the device started running.       |
| – | Event 1 – 10 time<br>[Time 1 – 10]<br>[Event 1 – 10 time]                        | Shows time of occurrence of event 1 – 10.<br>It shows the actual time of the event, if the time was set correctly when the device started running.   |
| – | Event 1 – 10 operation time<br>[Op time 1 – 10]<br>[Event 1 – 10 operation time] | Shows operating time of occurrence of event 1 – 10.<br>It shows cumulative operating time since the device started running until the event occurred. |



Monitoring history  
1 – 4

Ⓜ [Diagnostic root menu] ▶ [Status/Self test] ▶ [Event history] ▶  
[Event history 1 – 10] ▶ [Monitoring history 1 – 4]

The menu item *Monitoring history 1 – 4* shows parameters for monitoring values in the menu *Event history 1 – 10* when *Monitor* or *Acknowledge + monitor* is specified in the event setting parameter. Monitoring values are available on the last 4 of 10 event histories. There are 3 samples of monitoring variables before and after the event, a total of 6 values are stored. The sampling interval is 1 second.

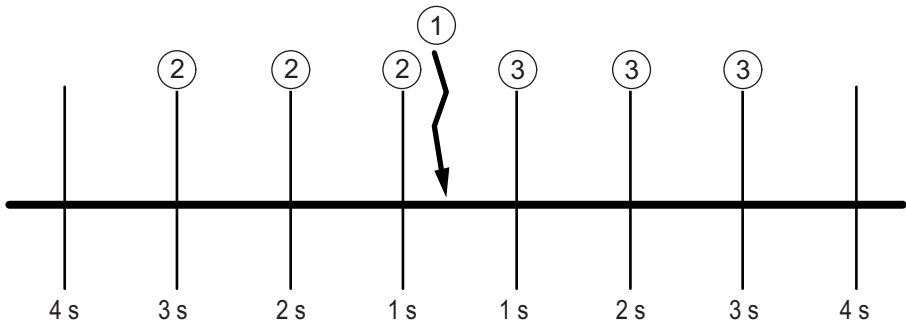


Fig. 19: Monitoring variables before and after an event

- 1 Event occurrence
- 2 Stored values before the occurrence of the event
- 3 Stored values after the occurrence of the event

|   | Display parameter                                                                            | Description                                                                                                                                                                                                                                                                                                                                      |
|---|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓜ | Event 1 – 4 mass flow last 3 – 1<br>[Event 1 – 4 mass flow last 3 – 1]                       | Shows mass flow values before the Event 1 – 4.<br>Event 1 – 4 mass flow last 1 is the mass flow value that is closest to the event.<br>Event 1 – 4 mass flow last 2 is the mass flow value 1 second before Event 1 – 4 mass flow last 1.<br>Event 1 – 4 mass flow last 3 is the mass flow value 2 seconds before Event 1 – 4 mass flow last 1.   |
| Ⓜ | Event 1 – 4 mass flow after 1 – 3<br>[Event 1 – 4 mass flow after 1 – 3]                     | Shows mass flow values after the Event 1 – 4.<br>Event 1 – 4 mass flow after 1 is the mass flow value that is closest to the event.<br>Event 1 – 4 mass flow after 2 is the mass flow value 1 second after Event 1 – 4 mass flow after 1.<br>Event 1 – 4 mass flow after 3 is the mass flow value 2 seconds after Event 1 – 4 mass flow after 1. |
| Ⓜ | Event 1 – 4 resonance frequency last 3 – 1<br>[Event 1 – 4 resonance frequency last 3 – 1]   | Shows resonance frequency of sensor before the Event 1 – 4.<br>For temporal relationships of the 3 values, see Event 1 – 4 mass flow last 3 – 1.                                                                                                                                                                                                 |
| Ⓜ | Event 1 – 4 resonance frequency after 1 – 3<br>[Event 1 – 4 resonance frequency after 1 – 3] | Shows resonance frequency of sensor after the Event 1 – 4.<br>For temporal relationships of the 3 values, see Event 1 – 4 mass flow after 1 – 3.                                                                                                                                                                                                 |

|        | Display parameter                                                                        | Description                                                                                                                                                                                                                                                |
|--------|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓜ<br>ⓔ | Event 1 – 4 temperature last 3 – 1<br>[Event 1 – 4 temperature last 3 – 1]               | Shows temperature of medium before the Event 1 – 4.<br>For temporal relationships of the 3 values, see Event 1 – 4 mass flow last 3 – 1.                                                                                                                   |
| Ⓜ<br>ⓔ | Event 1 – 4 temperature after 1 – 3<br>[Event 1 – 4 temperature after 1 – 3]             | Shows temperature of medium after the Event 1 – 4<br>For temporal relationships of the 3 values, see Event 1 – 4 mass flow after 1 – 3.                                                                                                                    |
| Ⓜ<br>ⓔ | Event 1 – 4 pressure last 3 – 1<br>[Event 1 – 4 pressure last 3 – 1]                     | Shows pressure value before the Event 1 – 4.<br>For temporal relationships of the 3 values, see Event 1 – 4 mass flow last 3 – 1.<br>The pressure value can be obtained from the pressure sensor which is connected to the Analog-in, or be a fixed value. |
| Ⓜ<br>ⓔ | Event 1 – 4 pressure after 1 – 3<br>[Event 1 – 4 pressure after 1 – 3]                   | Shows pressure value after the Event 1 – 4.<br>For temporal relationships of the 3 values, see Event 1 – 4 mass flow after 1 – 3.<br>The pressure value can be obtained from the pressure sensor which is connected to the Analog-in, or be a fixed value. |
| Ⓜ<br>ⓔ | Event 1 – 4 net mass flow 1 last 3 – 1<br>[Event 1 – 4 net mass flow 1 last 3 – 1]       | Shows net mass flow 1 values before the Event 1 – 4.<br>For temporal relationships of the 3 values, see Event 1 – 4 mass flow last 3 – 1.                                                                                                                  |
| Ⓜ<br>ⓔ | Event 1 – 4 net mass flow 1 after 1 – 3<br>[Event 1 – 4 net mass flow 1 after 1 – 3]     | Shows net mass flow 1 values after the Event 1 – 4.<br>For temporal relationships of the 3 values, see Event 1 – 4 mass flow after 1 – 3.                                                                                                                  |
| Ⓜ<br>ⓔ | Event 1 – 4 net volume flow 1 last 3 – 1<br>[Event 1 – 4 net volume flow 1 last 3 – 1]   | Shows net volume flow 1 values before the Event 1 – 4.<br>For temporal relationships of the 3 values, see Event 1 – 4 mass flow last 3 – 1.                                                                                                                |
| Ⓜ<br>ⓔ | Event 1 – 4 net volume flow 1 after 1 – 3<br>[Event 1 – 4 net volume flow 1 after 1 – 3] | Shows net volume flow 1 values after the Event 1 – 4.<br>For temporal relationships of the 3 values, see Event 1 – 4 mass flow after 1 – 3.                                                                                                                |
| Ⓜ<br>ⓔ | Event 1 – 4 concentration last 3 – 1<br>[Event 1 – 4 concentration last 3 – 1]           | Shows concentration values before the Event 1 – 4.<br>For temporal relationships of the 3 values, see Event 1 – 4 mass flow last 3 – 1.                                                                                                                    |
| Ⓜ<br>ⓔ | Event 1 – 4 concentration after 1 – 3<br>[Event 1 – 4 concentration after 1 – 3]         | Shows concentration values after the Event 1 – 4.<br>For temporal relationships of the 3 values, see Event 1 – 4 mass flow after 1 – 3.                                                                                                                    |

|   | Display parameter                                                                                    | Description                                                                                                                                                                           |
|---|------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓜ | Event 1 – 4 phase difference last 3 – 1<br>[Event 1 – 4 phase difference last 3 – 1]                 | Shows phase difference of signals between 2 pick-offs of measuring tubes before the event 1 – 4.<br>For temporal relationships of the 3 values, see Event 1 – 4 mass flow last 3 – 1. |
| Ⓜ | Event 1 – 4 phase difference after 1 – 3<br>[Event 1 – 4 phase difference after 1 – 3]               | Shows phase difference of signals between 2 pick-offs of measuring tubes after the event 1 – 4.<br>For temporal relationships of the 3 values, see Event 1 – 4 mass flow after 1 – 3. |
| Ⓜ | Event 1 – 4 drive gain last 3 – 1<br>[Event 1 – 4 drive gain last 3 – 1]                             | Shows drive gain of sensor driver before the event 1 – 4.<br>For temporal relationships of the 3 values, see Event 1 – 4 mass flow last 3 – 1.                                        |
| Ⓜ | Event 1 – 4 drive gain after 1 – 3<br>[Event 1 – 4 drive gain after 1 – 3]                           | Shows drive gain of sensor driver after the event 1 – 4.<br>For temporal relationships of the 3 values, see Event 1 – 4 mass flow after 1 – 3.                                        |
| Ⓜ | Event 1 – 4 drive current last 3 – 1<br>[Event 1 – 4 drive current last 3 – 1]                       | Shows drive current of sensor driver before the event 1 – 4.<br>For temporal relationships of the 3 values, see Event 1 – 4 mass flow last 3 – 1.                                     |
| Ⓜ | Event 1 – 4 drive current after 1 – 3<br>[Event 1 – 4 drive current after 1 – 3]                     | Shows drive current of sensor driver after the event 1 – 4.<br>For temporal relationships of the 3 values, see Event 1 – 4 mass flow after 1 – 3.                                     |
| Ⓜ | Event 1 – 4 density last 3 – 1<br>[Event 1 – 4 density last 3 – 1]                                   | Shows density values before the event 1 – 4.<br>For temporal relationships of the 3 values, see Event 1 – 0 mass flow last 3 – 1.                                                     |
| Ⓜ | Event 1 – 4 density after 1 – 3<br>[Event 1 – 4 density after 1 – 3]                                 | Shows density values after the event 1 – 4.<br>For temporal relationships of the 3 values, see Event 1 – 4 mass flow after 1 – 3.                                                     |
| Ⓜ | Event 1 – 4 transmitter temperature last 3 – 1<br>[Event 1 – 4 transmitter temperature last 3 – 1]   | Shows temperature on main circuit board inside transmitter before the event 1 – 4.<br>For temporal relationships of the 3 values, see Event 1 – 4 mass flow last 3 – 1.               |
| Ⓜ | Event 1 – 4 transmitter temperature after 1 – 3<br>[Event 1 – 4 transmitter temperature after 1 – 3] | Shows temperature on main circuit board inside transmitter after the event 1 – 4.<br>For temporal relationships of the 3 values, see Event 1 – 4 mass flow after 1 – 3.               |

|   | Display parameter                                                            | Description                                                                                                                                                                                            |
|---|------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ④ | Autozero value 1 – 10<br>[Autozero value 1 – 10]                             | Shows autozero value during the event 1 – 4.                                                                                                                                                           |
| ④ | Autozero standard deviation 1 – 10<br>[Autozero standard deviation 1 – 10]   | Shows standard deviation of autozero value during the event 1 – 4.                                                                                                                                     |
| ④ | Autozero density 1 – 10<br>[Autozero density 1 – 10]                         | Shows density value at last autozero execution during the event 1 – 4.                                                                                                                                 |
| ④ | Autozero temperature 1 – 10<br>[Autozero temperature 1 – 10]                 | Shows temperature at last autozero execution during the event 1 – 4.                                                                                                                                   |
| ④ | Autozero drive current 1 – 10<br>[Autozero drive current 1 – 10]             | Shows drive current value at last autozero execution during the event 1 – 4.                                                                                                                           |
| ④ | Autozero resonance frequency 1 – 10<br>[Autozero resonance frequency 1 – 10] | Shows resonance frequency of sensor at last autozero execution during the event 1 – 4.                                                                                                                 |
| ④ | Autozero pressure 1 – 10<br>[Autozero pressure 1 – 10]                       | Shows pressure value at last autozero execution during the event 1 – 4.<br><br>The pressure value can be obtained from the pressure pick-off which is connected to the Analog-in, or be a fixed value. |
| ④ | Sensor max temperature 1 – 10<br>[Sensor max temperature 1 – 10]             | Shows sensor maximum temperature at last autozero execution during the event 1 – 4.                                                                                                                    |

Clear event history

⌚ [Diag/Service] ► [Sts/Self test] ► [Evt hist] ► [Clr Evt hist]

Ⓜ [Diagnostic root menu] ► [Status/Self test] ► [Event history] ► [Clear event history]

Clears the entire event history.

If accessed via Modbus communication, each item that is set to gather information is set and controlled via an interactive user interface called Method.

|   | Value                                     | Description                                                                                                                                               |
|---|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Not execute<br>[Not exe]<br>[Not execute] | Default value.                                                                                                                                            |
| – | Execute<br>[Exe]<br>[Execute]             | <i>Execute</i> has to be selected and set to clear the event history. After the event history has been cleared, the value returns to <i>Not execute</i> . |

Device reset

Device reset

Ⓜ [Diagnostic root menu] ► [Status/Self test] ► [Device reset]

Resets the device. Additional information is defined in the Modbus communication specification.

If accessed via Modbus communication, each item that is set to gather information is set and controlled via an interactive user interface called Method.

Burn out

Burn out

⌚ [Diag/Service] ► [Sts/Self test] ► [Burn out]

Ⓜ [Diagnostic root menu] ► [Status/Self test] ► [Burn out]

Shows the status of burn out when a fatal error occurs.

|   | Value                | Description                                                                                                            |
|---|----------------------|------------------------------------------------------------------------------------------------------------------------|
| – | High<br>[Hi]<br>[Hi] | Output moves to the maximum current state when a fatal error occurs and the transmitter moves into the burn out state. |
| – | Low<br>[Lo]<br>[Lo]  | Output moves to the minimum current state when fatal error occurs and transmitter moves into the burn out state.       |

## 5.4.2 Time stamp

## Time stamp

Ⓐ [Diag/Service] ► [Time stamp]

Ⓜ [Maintenance root menu] ► [Time stamp]

Shows parameters for time information.

|   | Display parameter                               | Description                                                                                                                                                                                                                                                                                                         |
|---|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Current Date<br>[Date]<br>[Current Date]        | Shows actual current date, if the date was set correctly when the device started running.<br><br>This parameter is also available in additional menus. The values can be shown in each of these menus: <ul style="list-style-type: none"> <li>▪ Easy setup wizard [▶ 309]</li> <li>▪ Basic setup [▶ 359]</li> </ul> |
| – | Current Time<br>[Time]<br>[Current Time]        | Shows actual current time, if the time was set correctly when the device started running.<br><br>This parameter is also available in additional menus. The values can be shown in each of these menus: <ul style="list-style-type: none"> <li>▪ Easy setup wizard [▶ 309]</li> <li>▪ Basic setup [▶ 359]</li> </ul> |
| – | Operation time<br>[Op time]<br>[Operation time] | Shows accumulated operating time of the device since it started running.                                                                                                                                                                                                                                            |

## 5.4.3 Output test

The output test sets output levels to fixed values for outputs IO1 to IO2. This can be done to test the reaction of connected equipment, or to check the functionality of the output itself with a multimeter, for example. The test mode can be started by setting the parameter test mode to on; and it lasts for the duration specified in *Auto rel time* [▶ 148], after which normal operation is resumed automatically. Similar functionality is provided by the simulation menu, which provides for the simulation of measured parameters; this can affect the output as well, albeit indirectly.

The following menus/settings are available:

|   | Full name                   | Display name    | [Modbus] name                 | Page    |
|---|-----------------------------|-----------------|-------------------------------|---------|
| – | Test mode                   | [Test mode]     | [Test mode]                   | [▶ 147] |
| Ⓐ | Analog output test          | [AO test]       |                               | [▶ 147] |
| – | Frequency output 1 – 2 test | [Freq1 test]    | [Frequency output 1 – 2 test] | [▶ 147] |
| – | Double pulse output test    | [Dbl pls test]  | [Double pulse output test]    | [▶ 147] |
| – | Status output 1 – 2 test    | [Sts1 test]     | [Status output 1 – 2 test]    | [▶ 148] |
| – | Test auto release time      | [Auto rel time] | [Test auto release time]      | [▶ 148] |

**Test mode**

① [Diag/Service] ► [Out test] ► [Test mode]

Ⓜ [Maintenance root menu] ► [Output test] ► [Test mode]

Enables or disables output testing of IO signals, loop test.

|   | Value                 | Description                                                                                                                                                                                                                       |
|---|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | On<br>[on]<br>[On]    | Enables output test mode. For the duration of the test mode, output signals are output from IO terminals of the device according to the parameter value to Analog output test. The measured value is not output during test mode. |
| – | Off<br>[off]<br>[Off] | Default value. Disables output test mode. If the time specified in Test auto release time has elapsed, test mode is disabled automatically and the parameter value returns to off.                                                |

**Analog output test**

① [Diag/Service] ► [Out test] ► [AO test]

Sets the test output value of analog output.

|   | Value          | Description                                                                                                      |
|---|----------------|------------------------------------------------------------------------------------------------------------------|
| ① | Numeric digits | Setting range: 0, 2.4 – 21.6 mA.<br>Default value is 0.<br>This test can be cancelled by setting the value to 0. |

**Frequency output  
1 – 2 test**

① [Diag/Service] ► [Out test] ► [Freq1 – 2 test]

Ⓜ [Maintenance root menu] ► [Output test] ► [Frequency output 1 – 2 test]

Sets the test output value of Frequency outputs 1 and 2.

|   | Value          | Description                                                                                                           |
|---|----------------|-----------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | Setting range : 0, 0.001 – 15,000 Hz.<br>Default value is 0.<br>This test can be cancelled by setting the value to 0. |

**Double pulse  
output test**

① [Diag/Service] ► [Out test] ► [Db1 pls test]

Ⓜ [Maintenance root menu] ► [Output test] ► [Double pulse output test]

Sets the test output value of the double pulse output.

|   | Value          | Description                                                                                                           |
|---|----------------|-----------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | Setting range : 0, 0.001 – 15,000 Hz.<br>Default value is 0.<br>This test can be cancelled by setting the value to 0. |

**Status output 1 – 2  
test**

Ⓐ [Diag/Service] ► [Out test] ► [Sts1 test]

Ⓜ [Maintenance root menu] ► [Output test] ► [Status output 1 – 2 test]

Sets the test status of Status output 1 – 2.

|               | Value        | Description                           |
|---------------|--------------|---------------------------------------|
| On            |              |                                       |
| – [On]        |              | Output switch is electrically closed. |
|               | [Closed(On)] |                                       |
| Off           |              |                                       |
| – [off]       |              | Output switch is electrically open.   |
|               | [Open(Off)]  |                                       |
| Test exit     |              |                                       |
| – [Test exit] |              | Default value.                        |
|               | [Test exit]  | Single test not active.               |

**Test auto release  
time**

Ⓐ [Diag/Service] ► [Out test] ► [Auto rel time]

Ⓜ [Maintenance root menu] ► [Output test] ► [Test auto release time]

Sets a time period for ending the test mode automatically.

|           | Value    | Description              |
|-----------|----------|--------------------------|
| 10 min    |          |                          |
| – [10min] |          |                          |
|           | [10min]  |                          |
| 30 min    |          |                          |
| – [30min] |          |                          |
|           | [30min]  |                          |
| 60 min    |          |                          |
| – [60min] |          |                          |
|           | [60min]  |                          |
| 3 hours   |          |                          |
| – [3h]    |          | Adjustable time periods. |
|           | [3hour]  | Default value is 10 min. |
| 6 hours   |          |                          |
| – [6h]    |          |                          |
|           | [6hour]  |                          |
| 12 hours  |          |                          |
| – [12h]   |          |                          |
|           | [12hour] |                          |



## 5.4.4 Display indication

## LCD test

⌚ [Diag/Service] ► [Display ind] ► [LCD test]

⌚ [Maintenance root menu] ► [Display indication] ► [LCD test]

Executes display tests.

The test is continued unless "Not Execute" is set in this parameter. Set "Not Execute" in this parameter to abort the test.

|   | Value                                            | Description                                                                                                                      |
|---|--------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| – | Not Execute<br>[Not exe]<br>[Not execute]        | The test is not executed or cancelled. If selected and set during testing, the test is immediately terminated.<br>Default value. |
| – | Execute all<br>[Exe]<br>[Execute]                | Shows all test patterns from 1 to 4.                                                                                             |
| – | Show pattern 1<br>[Pattern1]<br>[Show pattern 1] | All pixels turned on.                                                                                                            |
| – | Show pattern 2<br>[Pattern2]<br>[Show pattern 2] | All dots turned off.                                                                                                             |
| – | Show pattern 3<br>[Pattern3]<br>[Show pattern 3] | Small hound's tooth check.                                                                                                       |
| – | Show pattern 4<br>[Pattern4]<br>[Show pattern 4] | Big hound's tooth check.                                                                                                         |

## Squawk

⌚ [Diag/Service] ► [Display ind] ► [Squawk]

⌚ [Maintenance root menu] ► [Display indication] ► [Squawk]

Sets a flashing back light on the display.

If accessed via Modbus communication, each item that is set to gather information is set and controlled via an interactive user interface called Method.

|   | Value                                         | Description                               |
|---|-----------------------------------------------|-------------------------------------------|
| – | Off<br>[off]<br>[Off]                         | No flashing back light.<br>Default value. |
| – | On<br>[on]<br>[On]                            | Permanent flashing back light.            |
| – | Squawk once<br>[Squawk once]<br>[Squawk Once] | One-time flashing back light.             |

### 5.4.5 Autozero

Allows the zeroing of the device to remove the zero missetting. It should usually be performed immediately after the device is installed.

For more detailed information about the autozero setup, see the general instruction manual.

The following menus/settings are available:

|   | Full name                   | Display name  | [Modbus] name                 | Page    |
|---|-----------------------------|---------------|-------------------------------|---------|
| – | Autozero execute            | [Exe]         | [Autozero execute]            | [▶ 150] |
| – | Autozero time               | [Time]        | [Autozero time]               | [▶ 150] |
| – | Autozero value              | [Val]         | [Autozero value]              | [▶ 151] |
| – | Autozero standard deviation | [Std devi]    | [Autozero standard deviation] | [▶ 151] |
| – | Clear autozero failure      | [Clr AZ fail] | [Clear autozero failure]      | [▶ 151] |
| – | Clear autozero              | [Clr AZ]      | [Clear autozero]              | [▶ 151] |
| – | Autozero failure detection  | [AZalm]       | [Autozero failure detection]  | [▶ 152] |

#### Autozero execute

⌚ [Diag/Service] ▶ [AZ] ▶ [Exe]

Ⓜ [Maintenance root menu] ▶ [Autozero] ▶ [Autozero execute]

If accessed via Modbus communication, each item that is set to gather information is set and controlled via an interactive user interface called Method.

|   | Value                                     | Description                                                                                            |
|---|-------------------------------------------|--------------------------------------------------------------------------------------------------------|
| – | Not execute<br>[Not exe]<br>[Not execute] | Autozero will not be executed. This value will be displayed, if the zero point alignment does not run. |
| – | Execute<br>[Exe]<br>[Execute]             | Autozero will be executed. This value will be displayed, if the zero point alignment runs.             |

#### Autozero time

⌚ [Diag/Service] ▶ [AZ] ▶ [Time]

Ⓜ [Maintenance root menu] ▶ [Autozero] ▶ [Autozero time]

Sets the execution time for autozero.

|   | Value          | Description                                                                                              |
|---|----------------|----------------------------------------------------------------------------------------------------------|
| – | Numeric digits | Default value is 180 s (Recommended).<br>Setting range: 10 – 400 s.<br>The input value is rounded to 10. |

**Autozero value**

① [Diag/Service] ► [AZ] ► [Val]

Ⓜ [Maintenance root menu] ► [Autozero] ► [Autozero value]

Shows the autozero value as a result of autozero.

|   | Value          | Description                             |
|---|----------------|-----------------------------------------|
| – | Numeric digits | Autozero value as a result of autozero. |

**Autozero standard deviation**

① [Diag/Service] ► [AZ] ► [Std devi]

Ⓜ [Maintenance root menu] ► [Autozero] ► [Autozero standard deviation]

Shows the standard deviation of the mass flow value during autozero execution.

|   | Value          | Description                                                      |
|---|----------------|------------------------------------------------------------------|
| – | Numeric digits | Standard deviation of mass flow value during autozero execution. |

**Clear autozero failure**

① [Diag/Service] ► [AZ] ► [Clr AZ fail]

Ⓜ [Maintenance root menu] ► [Autozero] ► [Clear autozero failure]

If *Clear autozero failure* is performed with *Execute*, the value automatically returns to *Not execute*.

If accessed via Modbus communication, each item that is set to gather information is set and controlled via an interactive user interface called Method.

|   | Value                                     | Description                    |
|---|-------------------------------------------|--------------------------------|
| – | Not execute<br>[Not exe]<br>[Not execute] | Default value.                 |
| – | Execute<br>[Exe]<br>[Execute]             | Clears autozero failure alarm. |

**Clear autozero**

① [Diag/Service] ► [AZ] ► [Clr AZ]

Ⓜ [Maintenance root menu] ► [Autozero] ► [Clear autozero]

If *Clear autozero* is performed with *Execute*, the value automatically returns to *Not execute*.

If accessed via Modbus communication, each item that is set to gather information is set and controlled via an interactive user interface called Method.

|   | Value                                     | Description    |
|---|-------------------------------------------|----------------|
| – | Not execute<br>[Not exe]<br>[Not execute] | Default value. |

|   | Value                         | Description                                                         |
|---|-------------------------------|---------------------------------------------------------------------|
| – | Execute<br>[Exe]<br>[Execute] | Clears autozero value and resets autozero value to factory default. |

### Autozero failure detection

Ⓐ [Diag/Service] ► [AZ] ► [AZalm]

Ⓜ [Maintenance root menu] ► [Autozero] ► [Autozero failure]

If *Autozero failure detection* is set to *Off*, autozero can be performed without checking process condition. Basically this function should be set to *On* to avoid to perform Autozero with bad process condition, but it can be performed by setting to *Off* if bad process condition can be allowed by customer.

|   | Value                 | Description                                                               |
|---|-----------------------|---------------------------------------------------------------------------|
| – | Off<br>[off]<br>[Off] | Process condition is not checked when Autozero is performed.              |
| – | On<br>[on]<br>[On]    | Process condition is checked when Autozero is performed<br>Default value. |

### 5.4.6 Analog output/input trim

Allows the correction of the input and output currents of the Rotamass Total Insight transmitter. These are trimmed at the factory. Therefore an adjustment usually is not necessary.

The following menus/settings are available:

|   | Full name        | Display name | [Modbus] name      | Page    |
|---|------------------|--------------|--------------------|---------|
| Ⓐ | Output trim      | [Out trim]   | [Output trim]      | [▶ 152] |
| – | Input trim       | [In trim]    | [Input trim]       | [▶ 153] |
| – | Trim information | [Trim info]  | [Trim information] | [▶ 155] |

#### Output trim

The following overview shows the selectable menu items within the submenu *Analog output trim*.

|   | Full name      | Display name   | [Modbus] name    | Page    |
|---|----------------|----------------|------------------|---------|
| Ⓐ | AO trim 4 mA   | [AO trim 4mA]  |                  | [▶ 152] |
| Ⓐ | AO trim 20 mA  | [AO trim 20mA] |                  | [▶ 153] |
| Ⓜ | AO trim        |                | [AO Trim]        | [▶ 153] |
| – | Clear D/A trim | [Clr D/A trim] | [Clear D/A trim] | [▶ 153] |

#### AO trim 4 mA

Ⓐ [Diag/Service] ► [AO/AI trim] ► [Out trim] ► [AO trim 4mA]

Enter the value of the connected reference meter to trim the 4 mA point.

|   | Value          | Description                   |
|---|----------------|-------------------------------|
| Ⓐ | Numeric digits | Setting range: 2.4 – 21.6 mA. |

AO trim 20 mA

[Diag/Service] ► [AO/AI trim] ► [Out trim] ► [AO trim 20mA]

Enter the value of the connected reference meter to trim the 20 mA point.

|   | Value          | Description                   |
|---|----------------|-------------------------------|
| ⌚ | Numeric digits | Setting range: 2.4 – 21.6 mA. |

AO trim

[Maintenance root menu] ► [Analog output/input trim] ► [Analog output trim] ► [AO Trim]

AO Trim sets the output trim of analog output.

If accessed via Modbus communication, each item that is set to gather information is set and controlled via an interactive user interface called Method.

|   | Value          | Description                   |
|---|----------------|-------------------------------|
| ⌚ | Numeric digits | Setting range: 2.4 – 21.6 mA. |

Clear D/A trim

[Diag/Service] ► [AO/AI trim] ► [Out trim] ► [Clr D/A trim]

[Maintenance root menu] ► [Analog output/input trim] ► [Output trim] ► [Clear D/A trim]

Clear D/A trim clears the output trim of analog output.

If accessed via Modbus communication, each item that is set to gather information is set and controlled via an interactive user interface called Method.

|   | Value                                     | Description                          |
|---|-------------------------------------------|--------------------------------------|
| – | Not execute<br>[Not exe]<br>[Not execute] | Default value.                       |
| – | Execute<br>[Exe]<br>[Execute]             | Clears output trim of analog output. |

Input trim

The following overview shows the selectable menu items within the submenu *Analog input trim*.

|   | Full name     | Display name   | [Modbus] name   | Page    |
|---|---------------|----------------|-----------------|---------|
| ⌚ | AI trim 4 mA  | [AI trim 4mA]  | –               | [► 154] |
| ⌚ | AI trim 20 mA | [AI trim 20mA] | –               | [► 154] |
| ⊕ | AI trim       | –              | [AI trim]       | [► 154] |
| – | Clear AI trim | [Clr AI trim]  | [Clear AI trim] | [► 154] |

It is recommended that the input trim be configured through Modbus communication (by using Method), but it can also be configured by operating display keys.

Here is an example of the procedure for configuring the input trim by operating display keys.

1. Output 4 mA from the other device that is connected to Analog input.
2. Display AI curr *View inputs* [► 117] on the LCD display.
3. Wait until the value becomes stable.

4. Record the value.
5. Display AI trim 4mA.
6. Set it to the recorded value.
7. Output 20 mA from the other device that is connected to Analog input.
8. Display AI curr *View inputs* [▶ 117] on the LCD display.
9. Wait until the value becomes stable.
10. Record the value.
11. Display AI trim 20mA.
12. Set it to the recorded value.
13. Display AI curr *View inputs* [▶ 117] on the LCD display.
14. Change the output current of the connected device, for example, 4 mA (0%), 12 mA (50%) and 20 mA (100%).
15. Confirm that the displayed value is correct at each current.
16. If necessary, repeat these steps.

**AI trim 4 mA**

Ⓐ [Diag/Service] ▶ [AO/AI trim] ▶ [In trim] ▶ [AI trim 4mA]

*AI trim 4 mA* sets the input trim of analog input.

|   | Value          | Description                                             |
|---|----------------|---------------------------------------------------------|
| Ⓐ | Numeric digits | Setting range: 2.4 – 21.6 mA.<br>Default value is 4 mA. |

**AI trim 20 mA**

Ⓐ [Diag/Service] ▶ [AO/AI trim] ▶ [In trim] ▶ [AI trim 20mA]

*AI trim 20 mA* sets the input trim of analog input.

|   | Value          | Description                                              |
|---|----------------|----------------------------------------------------------|
| Ⓐ | Numeric digits | Setting range: 2.4 – 21.6 mA.<br>Default value is 20 mA. |

**AI trim**

Ⓜ [Maintenance root menu] ▶ [Analog output/input trim] ▶ [Input trim] ▶ [AI trim]

*AI trim* sets the input trim of the analog input.

If accessed via Modbus communication, each item that is set to gather information is set and controlled via an interactive user interface called Method.

|   | Value          | Description                   |
|---|----------------|-------------------------------|
| Ⓜ | Numeric digits | Setting range: 2.4 – 21.6 mA. |

**Clear AI trim**

Ⓐ [Diag/Service] ▶ [AO/AI trim] ▶ [In trim] ▶ [Restore AI trim]

Ⓜ [Maintenance root menu] ▶ [Analog output/input trim] ▶ [Input trim] ▶ [Clear AI trim]

*Clear AI trim* clears the input trim of the analog input.

If accessed via Modbus communication, each item that is set to gather information is set and controlled via an interactive user interface called Method.

|   | Value                                     | Description                            |
|---|-------------------------------------------|----------------------------------------|
| – | Not execute<br>[Not exe]<br>[Not execute] | Default value.                         |
| – | Execute<br>[Exe]<br>[Execute]             | Clears input trim of the analog input. |

### Trim information

Since setting an incorrect trim on the Rotamass Total Insight transmitter can seriously degrade the performance of the device, we recommend that the service person in charge records his changes using the parameters provided in this menu to allow for traceability.

The following overview shows the selectable settings within the submenu *trim information*.

|   | Full name        | Display name  | [Modbus] name      | Page    |
|---|------------------|---------------|--------------------|---------|
| – | Trim who         | [Trim who]    | [Trim who]         | [▶ 155] |
| – | Trim date        | [Trim date]   | [Trim date]        | [▶ 155] |
| – | Trim location    | [Trim locate] | [Trim location]    | [▶ 156] |
| – | Trim description | [Trim desc]   | [Trim description] | [▶ 156] |

### Trim who

① [Diag/Service] ▶ [AO/AI trim] ▶ [Trim info] ▶ [Trim who]

Ⓜ [Maintenance root menu] ▶ [Analog output/input trim] ▶ [Trim information] ▶ [Trim who]

*Trim who* sets the name of the person who set the trim for the analog output.

|   | Value            | Description                                                |
|---|------------------|------------------------------------------------------------|
| – | ASCII characters | Maximum length is 8 characters.<br>Default value is space. |

### Trim date

① [Diag/Service] ▶ [AO/AI trim] ▶ [Trim info] ▶ [Trim date]

Ⓜ [Maintenance root menu] ▶ [Analog output/input trim] ▶ [Trim information] ▶ [Trim date]

*Trim date* sets the date when the trim was set for the analog output.

|   | Value           | Description                                                |
|---|-----------------|------------------------------------------------------------|
| – | Numeric digits. | Date format is DD/MM/YYYY.<br>Default value is 01/01/2015. |

## Trim location

Ⓛ [Diag/Service] ► [AO/AI trim] ► [Trim info] ► [Trim locate]

Ⓜ [Maintenance root menu] ► [Analog output/input trim] ► [Trim information] ► [Trim location]

*Trim location* sets the location where the trim was set for the analog output.

|   | Value            | Description                                                |
|---|------------------|------------------------------------------------------------|
| – | ASCII characters | Maximum length is 8 characters.<br>Default value is space. |

## Trim description

Ⓛ [Diag/Service] ► [AO/AI trim] ► [Trim info] ► [Trim desc]

Ⓜ [Maintenance root menu] ► [Analog output/input trim] ► [Trim information] ► [Trim description]

*Trim description* sets a note for the trim set for the analog output.

|   | Value            | Description                                                 |
|---|------------------|-------------------------------------------------------------|
| – | ASCII characters | Maximum length is 16 characters.<br>Default value is space. |

## 5.4.7 Total &amp; Batch start/stop

The following menus/settings are available:

|        | Full name                | Display name | [Modbus] name                  | Page    |
|--------|--------------------------|--------------|--------------------------------|---------|
| Ⓜ      | Total 1 – 6 start/stop   | –            | [Total 1 – 6 start/stop]       | [▶ 156] |
| Ⓜ      | Total 1 – 6 reset/preset | –            | [Total 1 – 6 reset/<br>preset] | [▶ 157] |
| Ⓜ      | Total 1 – 6 preset value | –            | [Total 1 – 6 preset<br>value]  | [▶ 157] |
| Ⓜ<br>Ⓛ | Batch start/stop         | –            | [Batch start/stop]             | [▶ 157] |
| Ⓜ      | Batch reset              | –            | [Batch reset]                  | [▶ 158] |

Total 1 – 6  
start/stop

Ⓜ [Maintenance root menu] ► [Total & Batch start/stop] ► [Total 1 – 6 start/stop] ► [Total 1 – 6 start/stop]

This parameter can be set in the following menu/menus:

- *Detailed setup* [▶ 506]

*Total 1 – 6 start/stop* starts or stops Totalizer 1 – 6.

|   | Value            | Description                                                                                           |
|---|------------------|-------------------------------------------------------------------------------------------------------|
| Ⓜ | Stop<br>[Stop]   | Stops totalizer. Last value when totalizer stopped is retained.<br>Default value.                     |
| Ⓜ | Start<br>[Start] | Starts totalizer. Count starts from the current value, which is the value when the totalizer stopped. |



**Total 1 – 6  
reset/preset**

Ⓜ [Maintenance root menu] ► [Total & Batch start/stop] ► [Total 1 – 6 start/stop] ► [Total 1 – 6 reset/preset]

This parameter can be set in the following menu/menus:

- *Detailed setup* [► 507]

Resets or presets Totalizer.

If accessed via Modbus communication, each item that is set to gather information is set and controlled via an interactive user interface called Method.

|   | Value                        | Description                                                                                                                                                                                |
|---|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓜ | Not execute<br>[Not execute] | Default value.                                                                                                                                                                             |
| Ⓜ | Reset<br>[Reset]             | Resets the value of the totalizer to 0. The value returns automatically to <i>Not execute</i> after each operation.                                                                        |
| Ⓜ | Preset<br>[Preset]           | Sets the value of the totalizer to the value defined in the parameter <i>Total 1 – 6 preset value</i> [► 507]. The value returns automatically to <i>Not execute</i> after each operation. |

**Total 1 – 6  
preset value**

Ⓜ [Maintenance root menu] ► [Total & Batch start/stop] ► [Total 1 – 6 start/stop] ► [Total 1 – 6 preset value]

This parameter can be set in the following menu/menus:

- *Detailed setup* [► 507]

Sets the value of the totalizer when preset has been selected and set in Total 1 – 6 reset/preset.

|   | Value          | Description           |
|---|----------------|-----------------------|
| Ⓜ | Numeric digits | Default value is 0.0. |

**Batch start/stop**

Ⓜ [Maintenance root menu] ► [Total & Batch start/stop] ► [Batch start/stop] ► [Batch start/stop]

This parameter can be set in the following menu/menus:

- *Basic setup* [► 365]
- *Detailed setup* [► 506]

Sets batch operation in Start, Stop, Hold or Resume.

|        | Value              | Description                                                                                                    |
|--------|--------------------|----------------------------------------------------------------------------------------------------------------|
| Ⓜ<br>Ⓜ | Start<br>[Start]   | Starts batch. Count starts from the current value, which is the value when the batch stopped. Valve is opened. |
| Ⓜ<br>Ⓜ | Stop<br>[Stop]     | Stops batch. Last value when batch stopped is retained. Default value. Valve is closed.                        |
| Ⓜ<br>Ⓜ | Hold<br>[Hold]     | Hold batch. Last value when batch stopped is retained. Default value. Valve is closed.                         |
| Ⓜ<br>Ⓜ | Resume<br>[Resume] | Resumes batch. Valve is opened.                                                                                |

Batch reset

Ⓜ [Maintenance root menu] ► [Total & Batch start/stop] ► [Batch start/stop] ► [Batch reset]

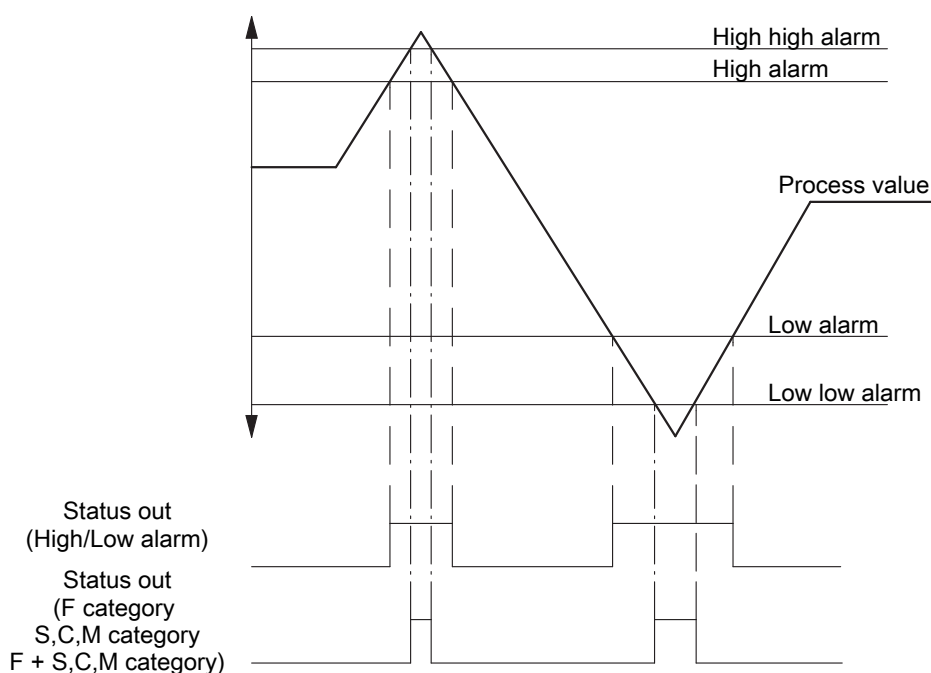
Sets batch operation in Start, Stop, Hold or Resume.

|   | Value            | Description              |
|---|------------------|--------------------------|
| – | No<br>[No]       | The default value is No. |
| – | Reset<br>[Reset] |                          |

### 5.4.8 High/Low alarm configuration

The Rotamass Total Insight transmitter provides for limit alarms on all measured quantities. This is generally in the form of a high-limit intended to be used as a warning level and a high-high-limit intended to be used when a safety-related level is exceeded so that an alarm can be sounded or an equipment shutdown can be initiated. The same applies conversely for the low and low-low alarms.

The high/low alarm can be assigned to output to the Status output. Refer to the Status output 1 – 2 functions in the *easy* [ 297], *basic* [ 346], and *detailed setup* [ 488]. There is no further indication on LCD display or other effect of a high/low alarm. The high high low low alarm cannot be directly assigned to Status output, but can be assigned as an event by categorizing it as one of the NE 107 categories (S, C, F, M). For the NE 107 categorization of high high low low alarms, refer to the Status group 4 – 5 *NE 107 map* [ 126], *NE 107 map* [ 127], and Status output 1 – 2 functions in the *easy* [ 297], *basic* [ 346], and *detailed setup* [ 488]. There is an indication on LCD display of a high high / low low alarm.



The following overview shows the selectable menu items within the submenu *High/Low alarm configuration*.

|   | Full name                   | Display name     | [Modbus] name                 | Page   |
|---|-----------------------------|------------------|-------------------------------|--------|
| – | Mass flow alarm             | [Mass]           | [Mass flow alarm]             | [ 160] |
| – | Density alarm               | [Dens]           | [Density alarm]               | [ 161] |
| – | Temperature alarm           | [Temp]           | [Temperature alarm]           | [ 163] |
| – | Volume flow alarm           | [Vol]            | [Volume flow alarm]           | [ 165] |
| – | Pressure alarm              | [Pres]           | [Pressure alarm]              | [ 166] |
| – | Reference density alarm     | [Ref dens]       | [Reference density alarm]     | [ 168] |
| – | Relative density alarm      | [Rel dens]       | [Relative density alarm]      | [ 169] |
| – | Corrected volume flow alarm | [Corr vol]       | [Corrected volume flow alarm] | [ 171] |
| – | Concentration alarm         | [Conc]           | [Concentration alarm]         | [ 173] |
| – | Net mass flow 1 – 2 alarm   | [Net mass 1 – 2] | [Net mass flow 1 – 2 alarm]   | [ 175] |

|   |                                 |                         |                                   |         |
|---|---------------------------------|-------------------------|-----------------------------------|---------|
| – | Net volume flow 1 – 2 alarm     | [Net volume flow 1 – 2] | [Net volume flow 1 – 2 alarm]     | [▶ 177] |
| – | Net corrected volume flow alarm | [Net corr vol]          | [Net corrected volume flow alarm] | [▶ 178] |
| Ⓢ | Viscosity alarm                 | [Visc]                  | [Viscosity alarm]                 | [▶ 181] |
| – | Alarm hysteresis                | [Alam hys]              | [Alarm hysteresis]                | [▶ 182] |

### Mass flow alarm

The following menus/settings are available:

|   | Full name                 | Display name | [Modbus] name               | Page    |
|---|---------------------------|--------------|-----------------------------|---------|
| – | Mass flow low alarm       | [L alm]      | [Mass flow low alarm]       | [▶ 160] |
| – | Mass flow low low alarm   | [LL alm]     | [Mass flow low low alarm]   | [▶ 160] |
| – | Mass flow high alarm      | [H alm]      | [Mass flow high alarm]      | [▶ 161] |
| – | Mass flow high high alarm | [HH alm]     | [Mass flow high high alarm] | [▶ 161] |

#### Mass flow low alarm

Ⓛ [Diag/Service] ▶ [H/L alm cfg] ▶ [Mass] ▶ [L alm]

Ⓜ [Maintenance root menu] ▶ [High/Low alarm configuration] ▶ [Mass flow alarm] ▶ [Mass flow low alarm]

*Mass flow low alarm* sets the mass flow low limit alarm value. The optional status output can be set to react when this threshold is crossed. There is no further indication or other effect of a mass flow low alarm.

|   | Value          | Description                                                                                                                                                                                                                                                   |
|---|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | Value in the selected mass flow unit.<br>Can be set in the range of mass flow LRV to mass flow URV.<br>Settings must satisfy the following condition: (Mass flow high alarm - Mass flow low alarm) /  Mass flow URV - Mass flow LRV  * 100 > Alarm hysteresis |

#### Mass flow low low alarm

Ⓛ [Diag/Service] ▶ [H/L alm cfg] ▶ [Mass] ▶ [LL alm]

Ⓜ [Maintenance root menu] ▶ [High/Low alarm configuration] ▶ [Mass flow alarm] ▶ [Mass flow low low alarm]

*Mass flow low low alarm* sets the mass flow low low limit alarm value. When this limit is crossed, a Mass flow high high / low low alarm event is generated.

|   | Value          | Description                                                                                                                                                                                                                                                            |
|---|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | Value in the selected mass flow unit.<br>Can be set in the range of mass flow LRV to mass flow URV.<br>Settings must satisfy the following condition: (Mass flow high high alarm - Mass flow low low alarm) /  Mass flow URV - Mass flow LRV  * 100 > Alarm hysteresis |

**Mass flow high alarm**

① [Diag/Service] ► [H/L alm cfg] ► [Mass] ► [H alm]

② [Maintenance root menu] ► [High/Low alarm configuration] ► [Mass flow alarm] ► [Mass flow high alarm]

*Mass flow high alarm* sets the mass flow high limit alarm value. The optional status output can be set to react when this threshold is crossed. There is no further indication or other effect of a Mass flow high alarm.

|   | Value          | Description                                                                                                                                                                                                                                                                                                                                            |
|---|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | Value in the selected mass flow unit.<br>Can be set in the range of mass flow LRV to mass flow URV.<br>Value must be greater than mass flow low alarm.<br>Settings must satisfy the following conditions: $(\text{Mass flow high alarm} - \text{Mass flow low alarm}) /  \text{Mass flow URV} - \text{Mass flow LRV}  * 100 > \text{Alarm hysteresis}$ |

**Mass flow high high alarm**

① [Diag/Service] ► [H/L alm cfg] ► [Mass] ► [HH alm]

② [Maintenance root menu] ► [High/Low alarm configuration] ► [Mass flow alarm] ► [Mass flow high high alarm]

*Mass flow high high alarm* sets the mass flow high high limit alarm value. When this limit is crossed, a Mass flow high high / low low alarm event is generated.

|   | Value          | Description                                                                                                                                                                                                                                                                                                                                                         |
|---|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | Value in the selected mass flow unit.<br>Can be set in the range of mass flow LRV to mass flow URV.<br>Value must be greater than mass flow low low alarm.<br>Settings must satisfy the following conditions: $(\text{Mass flow high high alarm} - \text{Mass flow low low alarm}) /  \text{Mass flow URV} - \text{Mass flow LRV}  * 100 > \text{Alarm hysteresis}$ |

**Density alarm**

The following menus/settings are available:

|   | Full name               | Display name | [Modbus] name             | Page    |
|---|-------------------------|--------------|---------------------------|---------|
| – | Density low alarm       | [L alm]      | [Density low alarm]       | [▶ 162] |
| – | Density low low alarm   | [LL alm]     | [Density low low alarm]   | [▶ 162] |
| – | Density high alarm      | [H alm]      | [Density high alarm]      | [▶ 162] |
| – | Density high high alarm | [HH alm]     | [Density high high alarm] | [▶ 163] |

**Density low alarm**

Ⓐ [Diag/Service] ► [H/L alm cfg] ► [Dens] ► [L alm]

Ⓜ [Maintenance root menu] ► [High/Low alarm configuration] ► [Density alarm] ► [Density low alarm]

*Density low alarm* sets the density low limit alarm value.

|   | Value          | Description                                                                                                                                                                                                                                                                          |
|---|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | Value in the selected density unit.<br>Can be set in the range of density LRV to density URV.<br>Settings must satisfy the following condition: $(\text{Density high alarm} - \text{Density low alarm}) /  \text{Density URV} - \text{Density LRV}  * 100 > \text{Alarm hysteresis}$ |

**Density low low alarm**

Ⓐ [Diag/Service] ► [H/L alm cfg] ► [Dens] ► [LL alm]

Ⓜ [Maintenance root menu] ► [High/Low alarm configuration] ► [Density alarm] ► [Density low low alarm]

*Density low low alarm* sets the density low low limit alarm value. When this limit is crossed, a Density high high / low low alarm event is generated.

|   | Value          | Description                                                                                                                                                                                                                                                                                   |
|---|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | Value in the selected density unit.<br>Can be set in the range of density LRV to density URV.<br>Settings must satisfy the following condition: $(\text{Density high high alarm} - \text{Density low low alarm}) /  \text{Density URV} - \text{Density LRV}  * 100 > \text{Alarm hysteresis}$ |

**Density high alarm**

Ⓐ [Diag/Service] ► [H/L alm cfg] ► [Dens] ► [H alm]

Ⓜ [Maintenance root menu] ► [High/Low alarm configuration] ► [Density alarm] ► [Density high alarm]

*Density high alarm* sets the density high limit alarm value. The optional status output can be set to react when this threshold is crossed. There is no further indication or other effect of a Density high alarm.

|   | Value          | Description                                                                                                                                                                                                                                                                                                                           |
|---|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | Value in the selected density unit.<br>Can be set in the range of density LRV to density URV.<br>Value must be greater than density low alarm.<br>Settings must satisfy the following condition: $(\text{Density high alarm} - \text{Density low alarm}) /  \text{Density URV} - \text{Density LRV}  * 100 > \text{Alarm hysteresis}$ |

**Density high high alarm**

① [Diag/Service] ► [H/L alm cfg] ► [Dens] ► [HH alm]

Ⓜ [Maintenance root menu] ► [High/Low alarm configuration] ► [Density alarm] ► [Density high high alarm]

*Density high high alarm* sets the density high high limit alarm value. When this limit is crossed, a Density high high / low low alarm event is generated.

|   | Value          | Description                                                                                                                                                                                                                                                                                               |
|---|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | Value in the selected density unit.<br>Can be set in the range of density LRV to density URV.<br>Value must be greater than density low alarm.<br>Settings must satisfy the following condition: (Density high high alarm - Density low low alarm) /  Density URV - Density LRV  * 100 > Alarm hysteresis |

**Temperature alarm**

The following menus/settings are available:

|   | Full name                   | Display name | [Modbus] name                 | Page    |
|---|-----------------------------|--------------|-------------------------------|---------|
| – | Temperature low alarm       | [L alm]      | [Temperature low alarm]       | [▶ 163] |
| – | Temperature low low alarm   | [LL alm]     | [Temperature low low alarm]   | [▶ 164] |
| – | Temperature high alarm      | [H alm]      | [Temperature high alarm]      | [▶ 164] |
| – | Temperature high high alarm | [HH alm]     | [Temperature high high alarm] | [▶ 164] |

**Temperature low alarm**

① [Diag/Service] ► [H/L alm cfg] ► [Temp] ► [L alm]

Ⓜ [Maintenance root menu] ► [High/Low alarm configuration] ► [Temperature alarm] ► [Temperature low alarm]

*Temperature low alarm* sets the temperature low limit alarm value.

|   | Value          | Description                                                                                                                                                                                                                                                                 |
|---|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | Value in the selected temperature unit.<br>Can be set in the range of temperature LRV to temperature URV.<br>Settings must satisfy the following condition: (Temperature high alarm - Temperature low alarm) /  Temperature URV - Temperature LRV  * 100 > Alarm hysteresis |

**Temperature low low alarm**

Ⓐ [Diag/Service] ► [H/L alm cfg] ► [Temp] ► [LL alm]

Ⓜ [Maintenance root menu] ► [High/Low alarm configuration] ►  
[Temperature alarm] ► [Temperature low low alarm]

*Temperature low low alarm* sets the temperature low low limit alarm value. When this limit is crossed, a Temperature high high / low low alarm event is generated.

|   | Value          | Description                                                                                                                                                                                                                                                                          |
|---|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | Value in the selected temperature unit.<br>Can be set in the range of temperature LRV to temperature URV.<br>Settings must satisfy the following condition: (Temperature high high alarm - Temperature low low alarm) /  Temperature URV - Temperature LRV  * 100 > Alarm hysteresis |

**Temperature high alarm**

Ⓐ [Diag/Service] ► [H/L alm cfg] ► [Temp] ► [H alm]

Ⓜ [Maintenance root menu] ► [High/Low alarm configuration] ►  
[Temperature alarm] ► [Temperature high alarm]

*Temperature high alarm* sets the temperature high limit alarm value. The optional status output can be set to react when this threshold is crossed. There is no further indication or other effect of a Temperature high alarm.

|   | Value          | Description                                                                                                                                                                                                                                                                                                                              |
|---|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | Value in the selected temperature unit.<br>Can be set in the range of temperature LRV to temperature URV.<br>Value must be greater than the temperature low low alarm.<br>Settings must satisfy the following condition: (Temperature high alarm - Temperature low alarm) /  Temperature URV - Temperature LRV  * 100 > Alarm hysteresis |

**Temperature high high alarm**

Ⓐ [Diag/Service] ► [H/L alm cfg] ► [Temp] ► [HH alm]

Ⓜ [Maintenance root menu] ► [High/Low alarm configuration] ►  
[Temperature alarm] ► [Temperature high high alarm]

*Temperature high high alarm* sets the temperature high high limit alarm value. When this limit is crossed, a Temperature high high / low low alarm event is generated.

|   | Value          | Description                                                                                                                                                                                                                                                                                                                                   |
|---|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | Value in the selected temperature unit.<br>Can be set in the range of temperature LRV to temperature URV.<br>Value must be greater than temperature low low alarm.<br>Settings must satisfy the following condition: (Temperature high high alarm - Temperature low low alarm) /  Temperature URV - Temperature LRV  * 100 > Alarm hysteresis |



**Volume flow alarm**

The following menus/settings are available:

|   | Full name                   | Display name | [Modbus] name                 | Page    |
|---|-----------------------------|--------------|-------------------------------|---------|
| – | Volume flow low alarm       | [L alm]      | [Volume flow low alarm]       | [▶ 165] |
| – | Volume flow low low alarm   | [LL alm]     | [Volume flow low low alarm]   | [▶ 165] |
| – | Volume flow high alarm      | [H alm]      | [Volume flow high alarm]      | [▶ 165] |
| – | Volume flow high high alarm | [HH alm]     | [Volume flow high high alarm] | [▶ 166] |

**Volume flow low alarm**

① [Diag/Service] ▶ [H/L alm cfg] ▶ [Vol] ▶ [L alm]

② [Maintenance root menu] ▶ [High/Low alarm configuration] ▶ [Volume flow alarm] ▶ [Volume flow low alarm]

*Volume flow low alarm* sets the volume flow low limit alarm value.

|   | Value          | Description                                                                                                                                                                                                                                                                                                      |
|---|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | Value in the selected volume flow unit.<br>Can be set in the range of volume flow LRV to volume flow URV.<br>Settings must satisfy the following condition: $(\text{Volume flow high alarm} - \text{Volume flow low alarm}) /  \text{Volume flow URV} - \text{Volume flow LRV}  * 100 > \text{Alarm hysteresis}$ |

**Volume flow low low alarm**

① [Diag/Service] ▶ [H/L alm cfg] ▶ [Vol] ▶ [LL alm]

② [Maintenance root menu] ▶ [High/Low alarm configuration] ▶ [Volume flow alarm] ▶ [Volume flow low low alarm]

*Volume flow low low alarm* sets the volume flow low low limit alarm value. When this limit is crossed, a Volume flow high high / low low alarm event is generated.

|   | Value          | Description                                                                                                                                                                                                                                                                                                               |
|---|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | Value in the selected volume flow unit.<br>Can be set in the range of volume flow LRV to Volume flow URV.<br>Settings must satisfy the following condition: $(\text{Volume flow high high alarm} - \text{Volume flow low low alarm}) /  \text{Volume flow URV} - \text{Volume flow LRV}  * 100 > \text{Alarm hysteresis}$ |

**Volume flow high alarm**

① [Diag/Service] ▶ [H/L alm cfg] ▶ [Vol] ▶ [H alm]

② [Maintenance root menu] ▶ [High/Low alarm configuration] ▶ [Volume flow alarm] ▶ [Volume flow high alarm]

*Volume flow high alarm* sets the volume flow high limit alarm value. The optional status output can be set to react when this threshold is crossed. There is no further indication or other effect of a Volume flow high alarm.

|   | Value          | Description                                                                                                                                                                                                                                                                                                                                                                                            |
|---|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | <p>Value in the selected volume flow unit.</p> <p>Can be set in the range of volume flow LRV to volume flow URV.</p> <p>Value must be greater than volume flow low alarm.</p> <p>Settings must satisfy the following condition: <math>(\text{Volume flow high alarm} - \text{Volume flow low alarm}) /  \text{Volume flow URV} - \text{Volume flow LRV}  * 100 &gt; \text{Alarm hysteresis}</math></p> |

### Volume flow high high alarm

Ⓐ [Diag/Service] ► [H/L alm cfg] ► [Vol] ► [HH alm]

Ⓜ [Maintenance root menu] ► [High/Low alarm configuration] ► [Volume flow alarm] ► [Volume flow high high alarm]

*Volume flow high high alarm* sets volume flow high high limit alarm value. When this limit is crossed, a Volume flow high high / low low alarm event is generated.

|   | Value          | Description                                                                                                                                                                                                                                                                                                                                                                                                         |
|---|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | <p>Value in the selected volume flow unit.</p> <p>Can be set in the range of volume flow LRV to volume flow URV.</p> <p>Value must be greater than volume flow low low alarm.</p> <p>Settings must satisfy the following condition: <math>(\text{Volume flow high high alarm} - \text{Volume flow low low alarm}) /  \text{Volume flow URV} - \text{Volume flow LRV}  * 100 &gt; \text{Alarm hysteresis}</math></p> |

### Pressure alarm

The following menus/settings are available:

|   | Full name                | Display name | [Modbus] name              | Page    |
|---|--------------------------|--------------|----------------------------|---------|
| – | Pressure low alarm       | [L alm]      | [Pressure low alarm]       | [▶ 166] |
| – | Pressure low low alarm   | [LL alm]     | [Pressure low low alarm]   | [▶ 167] |
| – | Pressure high alarm      | [H alm]      | [Pressure high alarm]      | [▶ 167] |
| – | Pressure high high alarm | [HH alm]     | [Pressure high high alarm] | [▶ 167] |

### Pressure low alarm

Ⓐ [Diag/Service] ► [H/L alm cfg] ► [Pres] ► [L alm]

Ⓜ [Maintenance root menu] ► [High/Low alarm configuration] ► [Pressure alarm] ► [Pressure low alarm]

*Pressure low alarm* sets the pressure low limit alarm value.

|   | Value          | Description                                                                                                                                                                                                                                                                                                              |
|---|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | <p>Value in the selected pressure unit.</p> <p>Can be set in the range of pressure LRV to pressure URV.</p> <p>Settings must satisfy the following condition: <math>(\text{Pressure high alarm} - \text{Pressure low alarm}) /  \text{Pressure URV} - \text{Pressure LRV}  * 100 &gt; \text{Alarm hysteresis}</math></p> |

**Pressure low low alarm**

① [Diag/Service] ► [H/L alm cfg] ► [Pres] ► [LL alm]

② [Maintenance root menu] ► [High/Low alarm configuration] ► [Pressure alarm] ► [Pressure low low alarm]

*Pressure low low alarm* sets the pressure low low limit alarm value. When this limit is crossed, a Pressure high high / low low alarm event is generated.

|   | Value          | Description                                                                                                                                                                                                                                                                                          |
|---|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | Value in the selected pressure unit.<br>Can be set in the range of pressure LRV to pressure URV.<br>Settings must satisfy the following condition: $(\text{Pressure high high alarm} - \text{Pressure low low alarm}) /  \text{Pressure URV} - \text{Pressure LRV}  * 100 > \text{Alarm hysteresis}$ |

**Pressure high alarm**

① [Diag/Service] ► [H/L alm cfg] ► [Pres] ► [H alm]

② [Maintenance root menu] ► [High/Low alarm configuration] ► [Pressure alarm] ► [Pressure high alarm]

*Pressure high alarm* sets the pressure high limit alarm value. The optional status output can be set to react when this threshold is crossed. There is no further indication or other effect of a Pressure high alarm.

|   | Value          | Description                                                                                                                                                                                                                                                                                                                                   |
|---|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | Value in the selected pressure unit.<br>Can be set in the range of pressure LRV to pressure URV.<br>Value must be greater than pressure low alarm.<br>Settings must satisfy the following condition: $(\text{Pressure high alarm} - \text{Pressure low alarm}) /  \text{Pressure URV} - \text{Pressure LRV}  * 100 > \text{Alarm hysteresis}$ |

**Pressure high high alarm**

① [Diag/Service] ► [H/L alm cfg] ► [Pres] ► [HH alm]

② [Maintenance root menu] ► [High/Low alarm configuration] ► [Pressure alarm] ► [Pressure high high alarm]

*Pressure high high alarm* sets the pressure high high limit alarm value. When this limit is crossed, a Pressure high high / low low alarm event is generated.

|   | Value          | Description                                                                                                                                                                                                                                                                                                                                                |
|---|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | Value in the selected pressure unit.<br>Can be set in the range of pressure LRV to pressure URV.<br>Value must be greater than pressure low low alarm.<br>Settings must satisfy the following condition: $(\text{Pressure high high alarm} - \text{Pressure low low alarm}) /  \text{Pressure URV} - \text{Pressure LRV}  * 100 > \text{Alarm hysteresis}$ |

**Reference density alarm**

The following menus/settings are available:

|   | Full name                         | Display name | [Modbus] name                       | Page    |
|---|-----------------------------------|--------------|-------------------------------------|---------|
| – | Reference density low alarm       | [L alm]      | [Reference density low alarm]       | [▶ 168] |
| – | Reference density low low alarm   | [LL alm]     | [Reference density low low alarm]   | [▶ 168] |
| – | Reference density high alarm      | [H alm]      | [Reference density high alarm]      | [▶ 169] |
| – | Reference density high high alarm | [HH alm]     | [Reference density high high alarm] | [▶ 169] |

**Reference density low alarm**

Ⓐ [Diag/Service] ▶ [H/L alm cfg] ▶ [Ref dens] ▶ [L alm]

Ⓜ [Maintenance root menu] ▶ [High/Low alarm configuration] ▶ [Reference density alarm] ▶ [Reference density low alarm]

*Reference density low alarm* sets the reference density low limit alarm value.

|   | Value          | Description                                                                                                                                                                                                                                                                                                                                                                             |
|---|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | <p>Value in the selected reference density unit.</p> <p>Can be set in the range of reference density LRV to reference density URV.</p> <p>Settings must satisfy the following condition: <math>(\text{Reference density high alarm} - \text{Reference density low alarm}) /  \text{Reference density URV} - \text{Reference density LRV}  * 100 &gt; \text{Alarm hysteresis}</math></p> |

**Reference density low low alarm**

Ⓐ [Diag/Service] ▶ [H/L alm cfg] ▶ [Ref dens] ▶ [LL alm]

Ⓜ [Maintenance root menu] ▶ [High/Low alarm configuration] ▶ [Reference density alarm] ▶ [Reference density low low alarm]

*Reference density low low alarm* sets the reference density low low limit alarm value. When this limit is crossed, a Reference density high high / low low alarm event is generated.

|   | Value          | Description                                                                                                                                                                                                                                                                                                                                                                                      |
|---|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | <p>Value in the selected reference density unit.</p> <p>Can be set in the range of reference density LRV to reference density URV.</p> <p>Settings must satisfy the following condition: <math>(\text{Reference density high high alarm} - \text{Reference density low low alarm}) /  \text{Reference density URV} - \text{Reference density LRV}  * 100 &gt; \text{Alarm hysteresis}</math></p> |

**Reference density high alarm**

① [Diag/Service] ► [H/L alm cfg] ► [Ref dens] ► [H alm]

② [Maintenance root menu] ► [High/Low alarm configuration] ► [Reference density alarm] ► [Reference density high alarm]

*Reference density high alarm* sets the reference density high limit alarm value. The optional status output can be set to react when this threshold is crossed. There is no further indication or other effect of a Reference density high alarm.

|   | Value          | Description                                                                                                                                                                                                                                                                                                                                                                                             |
|---|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | <p>Value in the selected reference density unit.</p> <p>Can be set in the range of reference density LRV to reference density URV.</p> <p>Value must be greater than reference density low alarm.</p> <p>Settings must satisfy the following condition: (Reference density high alarm - Reference density low alarm) /   Reference density URV - Reference density LRV  * 100 &gt; Alarm hysteresis</p> |

**Reference density high high alarm**

① [Diag/Service] ► [H/L alm cfg] ► [Ref dens] ► [HH alm]

② [Maintenance root menu] ► [High/Low alarm configuration] ► [Reference density alarm] ► [Reference density high high alarm]

*Reference density high high alarm* sets the reference density high high limit alarm value. When this limit is crossed, a Reference density high high / low low alarm event is generated.

|   | Value          | Description                                                                                                                                                                                                                                                                                                                                                                                                          |
|---|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | <p>Value in the selected reference density unit.</p> <p>Can be set in the range of reference density LRV to reference density URV.</p> <p>Value must be greater than reference density low low alarm.</p> <p>Settings must satisfy the following condition: (Reference density high high alarm - Reference density low low alarm) /   Reference density URV - Reference density LRV  * 100 &gt; Alarm hysteresis</p> |

**Relative density alarm**

The following menus/settings are available:

|   | Full name                        | Display name | [Modbus] name                      | Page    |
|---|----------------------------------|--------------|------------------------------------|---------|
| – | Relative density low alarm       | [L alm]      | [Relative density low alarm]       | [▶ 170] |
| – | Relative density low low alarm   | [LL alm]     | [Relative density low low alarm]   | [▶ 170] |
| – | Relative density high alarm      | [H alm]      | [Relative density high alarm]      | [▶ 170] |
| – | Relative density high high alarm | [HH alm]     | [Relative density high high alarm] | [▶ 171] |

**Relative density low alarm**

① [Diag/Service] ► [H/L alm cfg] ► [Rel dens] ► [L alm]

② [Maintenance root menu] ► [High/Low alarm configuration] ► [Relative density alarm] ► [Relative density low alarm]

*Relative density low alarm* sets the relative density low limit alarm value.

|   | Value          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | <p>Value in the selected relative density unit.</p> <p>Can be set in the range of relative density LRV to relative density URV.</p> <p>Value must be lower than relative density high alarm.</p> <p>Settings must satisfy the following condition: <math>(\text{Relative density high alarm} - \text{Relative density low alarm}) /  \text{Relative density URV} - \text{Relative density LRV}  * 100 &gt; \text{Alarm hysteresis}</math></p> |

**Relative density low low alarm**

① [Diag/Service] ► [H/L alm cfg] ► [Rel dens] ► [LL alm]

② [Maintenance root menu] ► [High/Low alarm configuration] ► [Relative density alarm] ► [Relative density low low alarm]

*Relative density low low alarm* sets the relative density low low limit alarm value. When this limit is crossed, a Relative density high high / low low alarm event is generated.

|   | Value          | Description                                                                                                                                                                                                                                                                                                                                                                               |
|---|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | <p>Value in the selected relative density unit.</p> <p>Can be set in the range of relative density LRV to relative density URV.</p> <p>Settings must satisfy the following condition: <math>(\text{Relative density high high alarm} - \text{Relative density low low alarm}) /  \text{Relative density URV} - \text{Relative density LRV}  * 100 &gt; \text{Alarm hysteresis}</math></p> |

**Relative density high alarm**

① [Diag/Service] ► [H/L alm cfg] ► [Rel dens] ► [H alm]

② [Maintenance root menu] ► [High/Low alarm configuration] ► [Relative density alarm] ► [Relative density high alarm]

*Relative density high alarm* sets the relative density high limit alarm value. The optional status output can be set to react when this threshold is crossed. There is no further indication or other effect of a Relative density high alarm.

|   | Value          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | <p>Value in the selected relative density unit.</p> <p>Can be set in the range of relative density LRV to relative density URV.</p> <p>Value must be greater than relative density low alarm.</p> <p>Settings must satisfy the following condition: <math>(\text{Relative density high alarm} - \text{Relative density low alarm}) /  \text{Relative density URV} - \text{Relative density LRV}  * 100 &gt; \text{Alarm hysteresis}</math></p> |

**Relative density high high alarm**

① [Diag/Service] ► [H/L alm cfg] ► [Rel dens] ► [HH alm]

② [Maintenance root menu] ► [High/Low alarm configuration] ► [Relative density alarm] ► [Relative density high high alarm]

*Relative density high high alarm* sets the relative density high high limit alarm value. When this limit is crossed, a Relative density high high / low low alarm event is generated.

|   | Value          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | <p>Value in the selected relative density unit.</p> <p>Can be set in the range of relative density LRV to relative density URV.</p> <p>Value must be greater than relative density low low alarm.</p> <p>Settings must satisfy the following condition: <math>(\text{Relative density high high alarm} - \text{Relative density low low alarm}) /  \text{Relative density URV} - \text{Relative density LRV}  * 100 &gt; \text{Alarm hysteresis}</math></p> |

**Corrected volume flow alarm**

The following menus/settings are available:

|   | Full name                             | Display name | [Modbus] name                           | Page    |
|---|---------------------------------------|--------------|-----------------------------------------|---------|
| – | Corrected volume flow low alarm       | [L alm]      | [Corrected volume flow low alarm]       | [▶ 171] |
| – | Corrected volume flow low low alarm   | [LL alm]     | [Corrected volume flow low low alarm]   | [▶ 172] |
| – | Corrected volume flow high alarm      | [H alm]      | [Corrected volume flow high alarm]      | [▶ 172] |
| – | Corrected volume flow high high alarm | [HH alm]     | [Corrected volume flow high high alarm] | [▶ 172] |

**Corrected volume flow low alarm**

① [Diag/Service] ► [H/L alm cfg] ► [Corr vol] ► [L alm]

② [Maintenance root menu] ► [High/Low alarm configuration] ► [Corrected volume flow alarm] ► [Corrected volume flow low alarm]

*Corrected volume flow low alarm* sets the corrected volume flow low limit alarm value.

|   | Value          | Description                                                                                                                                                                                                                                                                                                                                                                                                         |
|---|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | <p>Value in the selected corrected volume flow unit.</p> <p>Can be set in the range of corrected volume flow LRV to corrected volume flow URV.</p> <p>Settings must satisfy the following condition: <math>(\text{Corrected volume flow high alarm} - \text{Corrected volume flow low alarm}) /  \text{Corrected volume flow URV} - \text{Corrected volume flow LRV}  * 100 &gt; \text{Alarm hysteresis}</math></p> |

**Corrected volume flow low low alarm**

Ⓐ [Diag/Service] ► [H/L alm cfg] ► [Corr vol] ► [LL alm]

Ⓜ [Maintenance root menu] ► [High/Low alarm configuration] ► [Corrected volume flow alarm] ► [Corrected volume flow low low alarm]

*Corrected volume flow low low alarm* sets the corrected volume flow low low limit alarm value. When this limit is crossed, a Corrected volume high high / low low alarm event is generated.

|   | Value          | Description                                                                                                                                                                                                                                                                                                                                                |
|---|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | Value in the selected corrected volume flow unit.<br>Can be set in the range of corrected volume flow LRV to corrected volume flow URV.<br>Settings must satisfy the following condition: (Corrected volume flow high high alarm - Corrected volume flow low low alarm) /  Corrected volume flow URV - Corrected volume flow LRV  * 100 > Alarm hysteresis |

**Corrected volume flow high alarm**

Ⓐ [Diag/Service] ► [H/L alm cfg] ► [Corr vol] ► [H alm]

Ⓜ [Maintenance root menu] ► [High/Low alarm configuration] ► [Corrected volume flow alarm] ► [Corrected volume flow high alarm]

*Corrected volume flow high alarm* sets the corrected volume flow high limit alarm value. The optional status output can be set to react when this threshold is crossed. There is no further indication or other effect of a Corrected volume flow high alarm.

|   | Value          | Description                                                                                                                                                                                                                                                                                                                                                                                                       |
|---|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | Value in the selected corrected volume flow unit.<br>Can be set in the range of corrected volume flow LRV to corrected volume flow URV.<br>Value must be greater than corrected volume flow low alarm.<br>Settings must satisfy the following conditions: (Corrected volume flow high alarm - Corrected volume flow low alarm) /  Corrected volume flow URV - Corrected volume flow LRV  * 100 > Alarm hysteresis |

**Corrected volume flow high high alarm**

Ⓐ [Diag/Service] ► [H/L alm cfg] ► [Corr vol] ► [HH alm]

Ⓜ [Maintenance root menu] ► [High/Low alarm configuration] ► [Corrected volume flow alarm] ► [Corrected volume flow high high alarm]

*Corrected volume flow high high alarm* sets the corrected volume flow high high limit alarm value. When this limit is crossed, a Corrected volume flow high high / low low alarm event is generated.



|   | Value          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | <p>Value in the selected corrected volume flow unit.</p> <p>Can be set in the range of corrected volume flow LRV to corrected volume flow URV.</p> <p>Value must be greater than corrected volume flow low low alarm.</p> <p>Settings must satisfy the following condition: (Corrected volume flow high high alarm - Corrected volume flow low low alarm) /  Corrected volume flow URV - Corrected volume flow LRV  * 100 &gt; Alarm hysteresis</p> |

### Concentration alarm

The following menus/settings are available:

|   | Full name                                           | Display name | [Modbus] name                                         | Page    |
|---|-----------------------------------------------------|--------------|-------------------------------------------------------|---------|
| Ⓔ | Concentration measurement low alarm set 1 – 4       | [L alm]      | [Concentration measurement low alarm set 1 – 4]       | [▶ 173] |
| Ⓔ | Concentration measurement low low alarm set 1 – 4   | [LL alm]     | [Concentration measurement low low alarm set 1 – 4]   | [▶ 174] |
| Ⓔ | Concentration measurement high alarm set 1 – 4      | [H alm]      | [Concentration measurement high alarm set 1 – 4]      | [▶ 174] |
| Ⓔ | Concentration measurement high high alarm set 1 – 4 | [HH alm]     | [Concentration measurement high high alarm set 1 – 4] | [▶ 174] |

### Concentration measurement low alarm set 1 – 4

① [Diag/Service] ▶ [H/L alm cfg] ▶ [Conc] ▶ [Set1 – 4] ▶ [L alm]

Ⓔ [Maintenance root menu] ▶ [High/Low alarm configuration] ▶ [Concentration alarm] ▶ [Concentration measurement low alarm set 1 – 4]

*Concentration measurement low alarm 1 – 4* sets the concentration measurement low limit alarm values.

|   | Value          | Description                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓔ | Numeric digits | <p>Value in the selected concentration measurement unit.</p> <p>Can be set in the range of concentration measurement LRV to concentration measurement URV.</p> <p>Settings must satisfy the following condition: (Concentration measurement high alarm set 1 – 4 - Concentration measurement low alarm set 1 – 4) /  Concentration measurement URV set 1 – 4 - Concentration measurement LRV set 1 – 4  * 100 &gt; Alarm hysteresis</p> |

**Concentration measurement low low alarm set 1 – 4**

Ⓐ [Diag/Service] ► [H/L alm cfg] ► [Conc] ► [Set1 – 4] ► [LL alm]

Ⓜ [Maintenance root menu] ► [High/Low alarm configuration] ► [Concentration alarm] ► [Concentration measurement low low alarm set 1 – 4]

*Concentration measurement low low alarm 1 – 4* sets the concentration measurement low low limit alarm values. When this limit is crossed, a Concentration measurement high high / low low alarm event is generated.

|   | Value          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓜ | Numeric digits | <p>Value in the selected concentration measurement unit.</p> <p>Can be set in the range of concentration measurement LRV to concentration measurement URV.</p> <p>Settings must satisfy the following condition: (Concentration measurement high high alarm set 1 – 4 - Concentration measurement low low alarm set 1 – 4) /   Concentration measurement URV set 1 – 4 - Concentration measurement LRV set 1 – 4  * 100 &gt; Alarm hysteresis</p> |

**Concentration measurement high alarm set 1 – 4**

Ⓐ [Diag/Service] ► [H/L alm cfg] ► [Conc] ► [Set1 – 4] ► [H alm]

Ⓜ [Maintenance root menu] ► [High/Low alarm configuration] ► [Concentration alarm] ► [Concentration measurement high alarm set 1 – 4]

*Concentration measurement high alarm set 1 – 4* sets the concentration measurement high limit alarm values. The optional status output can be set to react when this threshold is crossed. There is no further indication or other effect of a Concentration measurement flow high alarm.

|   | Value          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓜ | Numeric digits | <p>Value in the selected concentration measurement unit.</p> <p>Can be set in the range of concentration measurement LRV to concentration measurement URV.</p> <p>Value must be greater than concentration measurement low alarm.</p> <p>Settings must satisfy the following condition: (Concentration measurement high alarm set 1 – 4 - Concentration measurement low alarm set 1 – 4) /   Concentration measurement URV set 1 – 4 - Concentration measurement LRV set 1 – 4  * 100 &gt; Alarm hysteresis</p> |

**Concentration measurement high high alarm set 1 – 4**

Ⓐ [Diag/Service] ► [H/L alm cfg] ► [Conc] ► [Set1 – 4] ► [HH alm]

Ⓜ [Maintenance root menu] ► [High/Low alarm configuration] ► [Concentration alarm] ► [Concentration measurement high high alarm set 1 – 4]

*Concentration measurement high high alarm 1 – 4* sets the concentration measurement high high limit alarm values. When this limit is crossed, a Concentration measurement high high / low low alarm event is generated.

|   | Value          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ⑥ | Numeric digits | <p>Value in the selected concentration measurement unit.</p> <p>Can be set in the range of concentration measurement LRV to Concentration measurement URV.</p> <p>Value must be greater than concentration measurement low low alarm.</p> <p>Settings must satisfy the following condition: (Concentration measurement high high alarm set 1 – 4 - Concentration measurement low low alarm set 1 – 4) /   Concentration measurement URV set 1 – 4 - Concentration measurement LRV set 1 – 4  * 100 &gt; Alarm hysteresis</p> |

### Net mass flow 1 – 2 alarm

The following menus/settings are available:

|   | Full name                           | Display name | [Modbus] name                         | Page    |
|---|-------------------------------------|--------------|---------------------------------------|---------|
| ⑥ | Net mass flow 1 – 2 low alarm       | [L alm]      | [Net mass flow 1 – 2 low alarm]       | [▶ 175] |
| ⑥ | Net mass flow 1 – 2 low low alarm   | [LL alm]     | [Net mass flow 1 – 2 low low alarm]   | [▶ 175] |
| ⑥ | Net mass flow 1 – 2 high alarm      | [H alm]      | [Net mass flow 1 – 2 high alarm]      | [▶ 176] |
| ⑥ | Net mass flow 1 – 2 high high alarm | [HH alm]     | [Net mass flow 1 – 2 high high alarm] | [▶ 176] |

### Net mass flow 1 – 2 low alarm

① [Diag/Service] ▶ [H/L alm cfg] ▶ [Net mass 1 – 2] ▶ [L alm]

⑧ [Maintenance root menu] ▶ [High/Low alarm configuration] ▶ [Net mass flow1 – 2 alarm] ▶ [Net mass flow1 – 2 low alarm]

*Net mass flow low alarm* sets the net mass flow low limit alarm values.

|   | Value          | Description                                                                                                                                                                                                                                                                                                                         |
|---|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ⑥ | Numeric digits | <p>Value in the selected net mass flow unit.</p> <p>Can be set in the range of net mass flow LRV to net mass flow URV.</p> <p>Settings must satisfy the following condition: (Net mass flow 1 – 2 high alarm – Net mass flow 1 – 2 low alarm) /  Net mass flow 1 – 2 URV - Net mass flow 1 – 2 LRV  * 100 &gt; Alarm hysteresis</p> |

### Net mass flow 1 – 2 low low alarm

① [Diag/Service] ▶ [H/L alm cfg] ▶ [Net mass 1 – 2] ▶ [LL alm]

⑧ [Maintenance root menu] ▶ [High/Low alarm configuration] ▶ [Net mass flow1 – 2 alarm] ▶ [Net mass flow 1 – 2 low low alarm]

*Net mass flow low low alarm* sets the net mass flow low low limit alarm values. When this limit is crossed, a Net mass flow high high / low low alarm event is generated.

|   | Value          | Description                                                                                                                                                                                                                                                                                                                                                                                  |
|---|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓔ | Numeric digits | <p>Value in the selected net mass flow unit.</p> <p>Can be set in the range of net mass flow LRV to net mass flow URV.</p> <p>Settings must satisfy the following condition: <math>(\text{Net mass flow 1 – 2 high high alarm} - \text{Net mass flow 1 – 2 low low alarm}) /  \text{Net mass flow 1 – 2 URV} - \text{Net mass flow 1 – 2 LRV}  * 100 &gt; \text{Alarm hysteresis}</math></p> |

### Net mass flow 1 – 2 high alarm

Ⓖ [Diag/Service] ► [H/L alm cfg] ► [Net mass 1 – 2] ► [H alm]

Ⓗ [Maintenance root menu] ► [High/Low alarm configuration] ► [Net mass flow1 – 2 alarm] ► [Net mass flow 1 – 2 high alarm]

*Net mass flow high alarm* sets the net mass flow high limit alarm values. The optional status output can be set to react when this threshold is crossed. There is no further indication or other effect of a Concentration measurement flow high alarm.

|   | Value          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓔ | Numeric digits | <p>Value in the selected net mass flow unit.</p> <p>Can be set in the range of net mass flow LRV to net mass flow URV.</p> <p>Value must be greater than net mass flow low alarm.</p> <p>Settings must satisfy the following condition: <math>(\text{Net mass flow 1 – 2 high alarm} - \text{Net mass flow 1 – 2 low alarm}) /  \text{Net mass flow 1 – 2 URV} - \text{Net mass flow 1 – 2 LRV}  * 100 &gt; \text{Alarm hysteresis}</math></p> |

### Net mass flow 1 – 2 high high alarm

Ⓖ [Diag/Service] ► [H/L alm cfg] ► [Net mass 1 – 2] ► [HH alm]

Ⓗ [Maintenance root menu] ► [High/Low alarm configuration] ► [Net mass flow1 – 2 alarm] ► [Net mass flow 1 – 2 high high alarm]

*Net mass flow high high alarm* sets net mass flow high high limit alarm values. When this limit is crossed, a Net mass flow high high / low low alarm event is generated.

|   | Value          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓔ | Numeric digits | <p>Value in the selected net mass flow unit.</p> <p>Can be set in the range of net mass flow LRV to net mass flow URV.</p> <p>Value must be greater than net mass flow low low alarm.</p> <p>Settings must satisfy the following condition: <math>(\text{Net mass flow 1 – 2 high high alarm} - \text{Net mass flow 1 – 2 low low alarm}) /  \text{Net mass flow 1 – 2 URV} - \text{Net mass flow 1 – 2 LRV}  * 100 &gt; \text{Alarm hysteresis}</math></p> |

**Net volume flow 1 – 2 alarm**

The following menus/settings are available:

|   | Full name                             | Display name | [Modbus] name                           | Page    |
|---|---------------------------------------|--------------|-----------------------------------------|---------|
| ⑥ | Net volume flow 1 – 2 low alarm       | [L alm]      | [Net volume flow 1 – 2 low alarm]       | [▶ 177] |
| ⑥ | Net volume flow 1 – 2 low low alarm   | [LL alm]     | [Net volume flow 1 – 2 low low alarm]   | [▶ 177] |
| ⑥ | Net volume flow 1 – 2 high alarm      | [H alm]      | [Net volume flow 1 – 2 high alarm]      | [▶ 178] |
| ⑥ | Net volume flow 1 – 2 high high alarm | [HH alm]     | [Net volume flow 1 – 2 high high alarm] | [▶ 178] |

**Net volume flow 1 – 2 low alarm**

① [Diag/Service] ▶ [H/L alm cfg] ▶ [Net volume flow 1 – 2] ▶ [L alm]

⑧ [Maintenance root menu] ▶ [High/Low alarm configuration] ▶ [Net volume flow 1 – 2 alarm] ▶ [Net volume flow 1 – 2 low alarm]

*Net volume flow low alarm* sets the net volume flow low limit alarm values.

|   | Value          | Description                                                                                                                                                                                                                                                                                                                                                                    |
|---|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ⑥ | Numeric digits | Value in the selected net volume flow unit.<br>Can be set in the range of net corrected volume flow LRV to net volume flow URV.<br>Settings must satisfy the following condition: $(\text{Net volume flow 1 – 2 high alarm} - \text{Net volume flow 1 – 2 low alarm}) /  \text{Net volume flow 1 – 2 URV} - \text{Net volume flow 1 – 2 LRV}  * 100 > \text{Alarm hysteresis}$ |

**Net volume flow 1 – 2 low low alarm**

① [Diag/Service] ▶ [H/L alm cfg] ▶ [Net volume flow 1 – 2] ▶ [LL alm]

⑧ [Maintenance root menu] ▶ [High/Low alarm configuration] ▶ [Net volume flow 1 – 2 alarm] ▶ [Net volume flow 1 – 2 low low alarm]

*Net volume flow low low alarm* sets the net volume flow low low limit alarm values. When this limit is crossed, a Net volume flow high high / low low alarm event is generated.

|   | Value          | Description                                                                                                                                                                                                                                                                                                                                                                   |
|---|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ⑥ | Numeric digits | Value in the selected net volume flow unit.<br>Can be set in the range of net volume flow LRV to net volume flow URV.<br>Settings must satisfy the following condition: $(\text{Net volume flow 1 – 2 high high alarm} - \text{Net volume flow 1 – 2 low low alarm}) /  \text{Net volume flow 1 – 2 URV} - \text{Net volume flow 1 – 2 LRV}  * 100 > \text{Alarm hysteresis}$ |

**Net volume flow  
1 – 2 high alarm**

① [Diag/Service] ► [H/L alm cfg] ► [Net volume flow 1 – 2] ► [H alm]

② [Maintenance root menu] ► [High/Low alarm configuration] ► [Net volume flow 1 – 2 alarm] ► [Net volume flow 1 – 2 high alarm]

*Net volume flow high alarm* sets the net volume flow high limit alarm values. The optional status output can be set to react when this threshold is crossed. There is no further indication or other effect of a Net volume flow high alarm.

|   | Value          | Description                                                                                                                                                                                                                                                                                                                                                                                                    |
|---|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ③ | Numeric digits | <p>Value in the selected net volume flow unit.</p> <p>Can be set in the range of net volume flow LRV to net volume flow URV.</p> <p>Value must be greater than net volume flow low alarm.</p> <p>Settings must satisfy the following condition: (Net volume flow 1 – 2 high alarm – Net volume flow 1 – 2 low alarm) / [Net volume flow 1 – 2 URV - Net volume flow 1 – 2 LRV] * 100 &gt; Alarm hysteresis</p> |

**Net volume flow  
1 – 2 high  
high alarm**

① [Diag/Service] ► [H/L alm cfg] ► [Net volume flow 1 – 2] ► [HH alm]

② [Maintenance root menu] ► [High/Low alarm configuration] ► [Net volume flow 1 – 2 alarm] ► [Net volume flow 1 – 2 high high alarm]

*Net volume flow high high alarm* sets net volume flow high high limit alarm values. When this limit is crossed, a Net volume flow high high / low low alarm event is generated.

|   | Value          | Description                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ③ | Numeric digits | <p>Value in the selected net volume flow unit.</p> <p>Can be set in the range of net volume flow LRV to net volume flow URV.</p> <p>Value must be greater than net volume flow low low alarm.</p> <p>Settings must satisfy the following condition: (Net volume flow 1 – 2 high high alarm – Net volume flow 1 – 2 low low alarm) / [Net volume flow 1 – 2 URV - Net volume flow 1 – 2 LRV] * 100 &gt; Alarm hysteresis</p> |

**Net corrected volume flow alarm**

The following menus/settings are available:

|   | Full name                                 | Display name | [Modbus] name                               | Page    |
|---|-------------------------------------------|--------------|---------------------------------------------|---------|
| ③ | Net corrected volume flow low alarm       | [L alm]      | [Net corrected volume flow low alarm]       | [▶ 179] |
| ③ | Net corrected volume flow low low alarm   | [LL alm]     | [Net corrected volume flow low low alarm]   | [▶ 179] |
| ③ | Net corrected volume flow high alarm      | [H alm]      | [Net corrected volume flow high alarm]      | [▶ 180] |
| ③ | Net corrected volume flow high high alarm | [HH alm]     | [Net corrected volume flow high high alarm] | [▶ 180] |

**Net corrected volume flow low alarm**

① [Diag/Service] ► [H/L alm cfg] ► [Net corr vol] ► [L alm]

② [Maintenance root menu] ► [High/Low alarm configuration] ► [Net corrected volume flow alarm] ► [Net corrected volume flow low alarm]

*Net corrected volume flow low alarm* sets the net corrected volume flow low limit alarm value.

|   | Value          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ③ | Numeric digits | <p>Value in the selected net corrected volume flow unit.</p> <p>Can be set in the range of net corrected volume flow LRV to net corrected volume flow URV.</p> <p>Settings must satisfy the following condition: <math>(\text{Net corrected volume flow high alarm} - \text{Net corrected volume flow low alarm}) /  \text{Net corrected volume flow URV} - \text{Net corrected volume flow LRV}  * 100 &gt; \text{Alarm hysteresis}</math></p> |

**Net corrected volume flow low low alarm**

① [Diag/Service] ► [H/L alm cfg] ► [Net corr vol] ► [LL alm]

② [Maintenance root menu] ► [High/Low alarm configuration] ► [Net corrected volume flow alarm] ► [Net corrected volume flow low low alarm]

*Net corrected volume flow low low alarm* sets the net corrected volume flow low low limit alarm value. When this limit is crossed, a Net corrected volume flow high high / low low alarm event is generated.

|   | Value          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ③ | Numeric digits | <p>Value in the selected net corrected volume flow unit.</p> <p>Can be set in the range of net corrected volume flow LRV to net corrected volume flow URV.</p> <p>Settings must satisfy the following condition: <math>(\text{Net corrected volume flow high high alarm} - \text{Net corrected volume flow low low alarm}) /  \text{Net corrected volume flow URV} - \text{Net corrected volume flow LRV}  * 100 &gt; \text{Alarm hysteresis}</math></p> |

**Net corrected volume flow high alarm**

① [Diag/Service] ► [H/L alm cfg] ► [Net corr vol] ► [H alm]

② [Maintenance root menu] ► [High/Low alarm configuration] ► [Net corrected volume flow alarm] ► [Net corrected volume flow high alarm]

*Net corrected volume flow high alarm* sets the net corrected volume flow high limit alarm value. The optional status output can be set to react when this threshold is crossed. There is no further indication or other effect of a Net corrected volume high alarm.

|   | Value          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ③ | Numeric digits | <p>Value in the selected net corrected volume flow unit.</p> <p>Can be set in the range of net corrected volume flow LRV to net corrected volume flow URV.</p> <p>Value must be smaller than net corrected volume flow low alarm.</p> <p>Settings must satisfy the following condition: <math>(\text{Net corrected volume flow high alarm} - \text{Net corrected volume flow low alarm}) /  \text{Net corrected volume flow URV} - \text{Net corrected volume flow LRV}  * 100 &gt; \text{Alarm hysteresis}</math></p> |

**Net corrected volume flow high high alarm**

① [Diag/Service] ► [H/L alm cfg] ► [Net corr vol] ► [HH alm]

② [Maintenance root menu] ► [High/Low alarm configuration] ► [Net corrected volume flow alarm] ► [Net corrected volume flow high high alarm]

*Net corrected volume flow high high alarm* sets the net corrected volume flow high high limit alarm value. When this limit is crossed, a Net corrected volume flow high / high low low alarm event is generated.

|   | Value          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ③ | Numeric digits | <p>Value in the selected net corrected volume flow unit.</p> <p>Can be set in the range of net corrected volume flow LRV to net corrected volume flow URV.</p> <p>Value must be smaller than net corrected volume flow low alarm.</p> <p>Settings must satisfy the following condition: <math>(\text{Net corrected volume flow high high alarm} - \text{Net corrected volume flow low low alarm}) /  \text{Net corrected volume flow URV} - \text{Net corrected volume flow LRV}  * 100 &gt; \text{Alarm hysteresis}</math></p> |



**Viscosity alarm**

The following menus/settings are available:

|   | Full name                 | Display name | [Modbus] name               | Page    |
|---|---------------------------|--------------|-----------------------------|---------|
| ⑥ | Viscosity low alarm       | [L alm]      | [Viscosity low alarm]       | [▶ 181] |
| ⑥ | Viscosity low low alarm   | [LL alm]     | [Viscosity low low alarm]   | [▶ 181] |
| ⑥ | Viscosity high alarm      | [H alm]      | [Viscosity high alarm]      | [▶ 181] |
| ⑥ | Viscosity high high alarm | [HH alm]     | [Viscosity high high alarm] | [▶ 182] |

**Viscosity low alarm**

① [Diag/Service] ▶ [H/L alm cfg] ▶ [Visc] ▶ [L alm]

⑧ [Maintenance root menu] ▶ [High/Low alarm configuration] ▶ [Viscosity alarm] ▶ [Viscosity low alarm]

*Viscosity low alarm* sets the net corrected volume flow low limit alarm value.

|   | Value          | Description                                                                                                                                                                                                                                                                                        |
|---|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ⑥ | Numeric digits | Value in the selected Viscosity unit.<br>Can be set in the range of Viscosity LRV to Viscosity URV.<br>Settings must satisfy the following condition: $(\text{Viscosity high alarm} - \text{Viscosity low alarm}) /  \text{Viscosity URV} - \text{Viscosity LRV}  * 100 > \text{Alarm hysteresis}$ |

**Viscosity low low alarm**

① [Diag/Service] ▶ [H/L alm cfg] ▶ [Visc] ▶ [LL alm]

⑧ [Maintenance root menu] ▶ [High/Low alarm configuration] ▶ [Viscosity alarm] ▶ [Viscosity low low alarm]

*Viscosity low low alarm* sets the Viscosity low low limit alarm value. When this limit is crossed, a Viscosity high high / low low alarm event is generated.

|   | Value          | Description                                                                                                                                                                                                                                                                                                 |
|---|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ⑥ | Numeric digits | Value in the selected Viscosity unit.<br>Can be set in the range of Viscosity LRV to Viscosity URV.<br>Settings must satisfy the following condition: $(\text{Viscosity high high alarm} - \text{Viscosity low low alarm}) /  \text{Viscosity URV} - \text{Viscosity LRV}  * 100 > \text{Alarm hysteresis}$ |

**Viscosity high alarm**

① [Diag/Service] ▶ [H/L alm cfg] ▶ [Visc] ▶ [H alm]

⑧ [Maintenance root menu] ▶ [High/Low alarm configuration] ▶ [Viscosity alarm] ▶ [Viscosity high alarm]

*Viscosity high alarm* sets the Viscosity high limit alarm value. The optional status output can be set to react when this threshold is crossed. There is no further indication or other effect of a Viscosity high alarm.

|   | Value          | Description                                                                                                                                                                                                                                                                                                                                           |
|---|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓔ | Numeric digits | Value in the selected Viscosity unit.<br>Can be set in the range of Viscosity LRV to Viscosity URV.<br>Value must be smaller than Viscosity low alarm.<br>Settings must satisfy the following condition: $(\text{Viscosity high alarm} - \text{Viscosity low alarm}) /  \text{Viscosity URV} - \text{Viscosity LRV}  * 100 > \text{Alarm hysteresis}$ |

### Viscosity high high alarm

Ⓔ [Diag/Service] ► [H/L alm cfg] ► [Visc] ► [HH alm]

Ⓔ [Maintenance root menu] ► [High/Low alarm configuration] ► [Viscosity alarm] ► [Viscosity high high alarm]

*Viscosity high high alarm* sets the Viscosity high high limit alarm value. When this limit is crossed, a Viscosity high / high low low alarm event is generated.

|   | Value          | Description                                                                                                                                                                                                                                                                                                                                                    |
|---|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓔ | Numeric digits | Value in the selected Viscosity unit.<br>Can be set in the range of Viscosity LRV to Viscosity URV.<br>Value must be smaller than Viscosity low alarm.<br>Settings must satisfy the following condition: $(\text{Viscosity high high alarm} - \text{Viscosity low low alarm}) /  \text{Viscosity URV} - \text{Viscosity LRV}  * 100 > \text{Alarm hysteresis}$ |

### Alarm hysteresis

It prevents the alarms from activating/deactivating in rapid succession when the level is fluctuating around the alarm level.

### Alarm hysteresis

Ⓔ [Diag/Service] ► [H/L alm cfg] ► [Alam hys]

Ⓔ [Maintenance root menu] ► [High/Low alarm configuration] ► [Alarm hysteresis]

*Alarm hysteresis* sets the hysteresis of alarm levels on process variables.

|   | Value                                                | Description                                                                                                                                                                                                  |
|---|------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Alarm hysteresis<br>[Alam hys]<br>[Alarm hysteresis] | The hysteresis value is applied to high and low alarms for all process variables. The value is set in % of $ \text{URV} - \text{LRV} $ . The default value is 3.0 %. The range of the value is 0.0 – 10.0 %. |

### 5.4.9 Simulation

Allows the simulation of fixed values for quantities measured by the Rotamass system. This can be done to test the reaction of connected equipment. The test mode can be started by setting the process variable simulation select value to True for the given process variable. The simulation lasts for the duration set in *Auto rel time* [▶ 148], after which normal operation is resumed automatically. Similar functionality is provided by the *output test menu* [▶ 146], which provides for the direct testing of outputs IO1 to IO2.

The following menus/settings are available:

|   | Full name                  | Display name  | [Modbus] name                | Page    |
|---|----------------------------|---------------|------------------------------|---------|
| – | Standard process variables | [Std pro var] | [Standard process variables] | [▶ 183] |
| Ⓢ | Optional process variables | [Opt pro var] | [Optional process variables] | [▶ 187] |

#### Standard process variables

The following menus/settings are available:

|   | Full name                              | Display name  | [Modbus] name                            | Page    |
|---|----------------------------------------|---------------|------------------------------------------|---------|
| – | Process variables simulation select 1  | [PV sim sel1] | [Process variables simulation select 1]  | [▶ 183] |
| – | Mass flow simulation value             | [Mass]        | [Mass flow simulation value]             | [▶ 184] |
| – | Density simulation value               | [Dens]        | [Density simulation value]               | [▶ 185] |
| – | Temperature simulation value           | [Temp]        | [Temperature simulation value]           | [▶ 185] |
| – | Volume flow simulation value           | [Vol]         | [Volume flow simulation value]           | [▶ 185] |
| – | Pressure simulation value              | [Pres]        | [Pressure simulation value]              | [▶ 185] |
| – | Reference density simulation value     | [Ref dens]    | [Reference density simulation value]     | [▶ 186] |
| – | Relative density simulation value      | [Rel dens]    | [Relative density simulation value]      | [▶ 186] |
| – | Corrected volume flow simulation value | [Corr vol]    | [Corrected volume flow simulation value] | [▶ 186] |
| – | Calorific simulation value             | [Cal]         | [Calorific simulation value]             | [▶ 186] |

#### Process variables simulation select 1

⌚ [Diag/Service] ▶ [Sim] ▶ [Std pro var] ▶ [PV sim sel1]

Ⓢ [Maintenance root menu] ▶ [Simulation] ▶ [Standard process variables] ▶ [Process variables simulation select 1]

Enables simulation mode for standard process variables.

|   | Value                                        | Description                                                                                                                                                                                                                                                                                                                                                              |
|---|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   | Mass flow                                    | <p>Via <b>[Modbus]</b> communication, simulation is enabled by setting the bit in the appropriate process variable. Via LCD display, the corresponding variables must be selected.</p> <p>Simulation is disabled by setting bits to off. Simulation is automatically disabled after the time defined in the parameter <i>Test auto release time</i> [▶ 148] elapses.</p> |
| – | <b>[Mass]</b><br>[Mass flow]                 |                                                                                                                                                                                                                                                                                                                                                                          |
|   | Density                                      |                                                                                                                                                                                                                                                                                                                                                                          |
| – | <b>[Dens]</b><br>[Density]                   |                                                                                                                                                                                                                                                                                                                                                                          |
|   | Temperature                                  |                                                                                                                                                                                                                                                                                                                                                                          |
| – | <b>[Temp]</b><br>[Temperature]               |                                                                                                                                                                                                                                                                                                                                                                          |
|   | Pressure                                     |                                                                                                                                                                                                                                                                                                                                                                          |
| – | <b>[Pres]</b><br>[Pressure]                  |                                                                                                                                                                                                                                                                                                                                                                          |
|   | Calorific value                              |                                                                                                                                                                                                                                                                                                                                                                          |
| – | <b>[Cal]</b><br>[Calorific Value]            |                                                                                                                                                                                                                                                                                                                                                                          |
|   | Volume flow                                  |                                                                                                                                                                                                                                                                                                                                                                          |
| – | <b>[Vol]</b><br>[Volume flow]                |                                                                                                                                                                                                                                                                                                                                                                          |
|   | Reference density                            |                                                                                                                                                                                                                                                                                                                                                                          |
| – | <b>[Ref dens]</b><br>[Reference density]     |                                                                                                                                                                                                                                                                                                                                                                          |
|   | Relative density                             |                                                                                                                                                                                                                                                                                                                                                                          |
| – | <b>[Rel dens]</b><br>[Relative density]      |                                                                                                                                                                                                                                                                                                                                                                          |
|   | Corrected volume flow                        |                                                                                                                                                                                                                                                                                                                                                                          |
| – | <b>[Corr vol]</b><br>[Corrected volume flow] |                                                                                                                                                                                                                                                                                                                                                                          |

### Mass flow simulation value

⌚ [Diag/Service] ▶ [Sim] ▶ [Std pro var] ▶ [Mass]

Ⓜ [Maintenance root menu] ▶ [Simulation] ▶ [Standard process variables]  
▶ [Mass flow simulation value]

*Mass flow simulation value* sets the simulated value for mass flow functions.

|   | Value          | Description                                                                                                                                             |
|---|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | The value becomes the mass flow value when simulation is enabled. The mass flow value returns to the actual measured value when simulation is disabled. |

**Density simulation value**

① [Diag/Service] ► [Sim] ► [Std pro var] ► [Dens]

② [Maintenance root menu] ► [Simulation] ► [Standard process variables] ► [Density simulation value]

*Density simulation value* sets the simulated value for density.

|   | Value          | Description                                                                                                                                         |
|---|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | The value becomes the density value when simulation is enabled. The density value returns to the actual measured value when simulation is disabled. |

**Temperature simulation value**

① [Diag/Service] ► [Sim] ► [Std pro var] ► [Temp]

② [Maintenance root menu] ► [Simulation] ► [Standard process variables] ► [Temperature simulation value]

*Temperature simulation value* sets the simulated value for temperature.

|   | Value          | Description                                                                                                                                                 |
|---|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | The value becomes the temperature value when simulation is enabled. The temperature value returns to the actual measured value when simulation is disabled. |

**Volume flow simulation value**

① [Diag/Service] ► [Sim] ► [Std pro var] ► [Vol]

② [Maintenance root menu] ► [Simulation] ► [Standard process variables] ► [Volume flow simulation value]

*Volume flow simulation value* sets the simulated value for volume flow.

|   | Value          | Description                                                                                                                                                 |
|---|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | The value becomes the volume flow value when simulation is enabled. The volume flow value returns to the actual measured value when simulation is disabled. |

**Pressure simulation value**

① [Diag/Service] ► [Sim] ► [Std pro var] ► [Pres]

② [Maintenance root menu] ► [Simulation] ► [Standard process variables] ► [Pressure simulation value]

*Pressure simulation value* sets the simulated value for pressure.

|   | Value          | Description                                                                                                                                           |
|---|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | The value becomes the pressure value when simulation is enabled. The pressure value returns to the actual measured value when simulation is disabled. |

**Reference density simulation value**

⌚ [Diag/Service] ► [Sim] ► [Std pro var] ► [Ref dens]

Ⓜ [Maintenance root menu] ► [Simulation] ► [Standard process variables] ► [Reference density simulation value]

*Reference density simulation value* sets the simulated value for reference density.

|   | Value          | Description                                                                                                                                                             |
|---|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | The value becomes the reference density value when simulation is enabled. The reference density value returns to the actual measured value when simulation is disabled. |

**Relative density simulation value**

⌚ [Diag/Service] ► [Sim] ► [Std pro var] ► [Rel dens]

Ⓜ [Maintenance root menu] ► [Simulation] ► [Standard process variables] ► [Relative density simulation value]

*Relative density simulation value* sets the simulated value for relative density.

|   | Value          | Description                                                                                                                                                           |
|---|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | The value becomes the relative density value when simulation is enabled. The relative density value returns to the actual measured value when simulation is disabled. |

**Corrected volume flow simulation value**

⌚ [Diag/Service] ► [Sim] ► [Std pro var] ► [Corr vol]

Ⓜ [Maintenance root menu] ► [Simulation] ► [Standard process variables] ► [Corrected volume flow simulation value]

*Corrected volume flow simulation value* sets the simulated value for corrected volume flow.

|   | Value          | Description                                                                                                                                                                     |
|---|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | The value becomes the corrected volume flow value when simulation is enabled. The corrected volume flow value returns to the actual measured value when simulation is disabled. |

**Calorific simulation value**

⌚ [Diag/Service] ► [Sim] ► [Std pro var] ► [Cal]

Ⓜ [Maintenance root menu] ► [Simulation] ► [Standard process variables] ► [Calorific simulation value]

*Calorific simulation value* sets the simulated value for calorific value.

|   | Value          | Description                                                                                                                                             |
|---|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | The value becomes the calorific value when simulation is enabled. The calorific value returns to the actual measured value when simulation is disabled. |

**Optional process variables**

The following menus/settings are available:

|   | Full name                                  | Display name            | [Modbus] name                                | Page    |
|---|--------------------------------------------|-------------------------|----------------------------------------------|---------|
| Ⓢ | Process variables simulation select 2      | [PV sim sel2]           | [Process variables simulation select 2]      | [▶ 187] |
| Ⓢ | Concentration simulation value             | [Conc]                  | [Concentration simulation value]             | [▶ 188] |
| Ⓢ | Net mass flow 1 – 2 simulation value       | [Net mass 1 – 2]        | [Net mass flow 1 – 2 simulation value]       | [▶ 188] |
| Ⓢ | Net volume flow 1 – 2 simulation value     | [Net volume flow 1 – 2] | [Net volume flow 1 – 2 simulation value]     | [▶ 188] |
| Ⓢ | Net corrected volume flow simulation value | [Net corr vol]          | [Net corrected volume flow simulation value] | [▶ 188] |
| Ⓢ | Viscosity simulation value                 | [Visc]                  | [Viscosity simulation value]                 | [▶ 189] |

**Process variables simulation select 2**

Ⓛ [Diag/Service] ▶ [Sim] ▶ [Opt pro var] ▶ [PV sim sel2]

Ⓜ [Maintenance root menu] ▶ [Simulation] ▶ [Optional process variables] ▶ [Process variables simulation select 2]

*Process variables simulation select 2* enables simulation mode for optional process variables.

|   | Value                                                                      | Description                                                                                                                                                                                                                                                                                                                                                       |
|---|----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓢ | Concentration<br>[Conc]<br>[Concentration]                                 | <p>Via [Modbus] communication, simulation is enabled by setting the bit in the appropriate process variable. Via LCD display, the corresponding variables must be selected.</p> <p>Simulation is disabled by setting bits to off. Simulation is automatically disabled after the time defined in the parameter <i>Test auto release time</i> [▶ 148] elapses.</p> |
| Ⓢ | Net mass flow 1<br>[Net mass1]<br>[Net Mass Flow 1]                        |                                                                                                                                                                                                                                                                                                                                                                   |
| Ⓢ | Net mass flow 2<br>[Net mass2]<br>[Net Mass Flow 2]                        |                                                                                                                                                                                                                                                                                                                                                                   |
| Ⓢ | Net volume flow 1<br>[Net vol1]<br>[Net Volume Flow 1]                     |                                                                                                                                                                                                                                                                                                                                                                   |
| Ⓢ | Net volume flow 2<br>[Net vol2]<br>[Net Volume Flow 2]                     |                                                                                                                                                                                                                                                                                                                                                                   |
| Ⓢ | Net corrected volume flow<br>[Net corr vol]<br>[Net corrected Volume Flow] |                                                                                                                                                                                                                                                                                                                                                                   |

|   | Value                              | Description |
|---|------------------------------------|-------------|
| ⓔ | Viscosity<br>[Visc]<br>[Viscosity] |             |

**Concentration simulation value**

Ⓛ [Diag/Service] ► [Sim] ► [Opt pro var] ► [Conc]

Ⓜ [Maintenance root menu] ► [Simulation] ► [Optional process variables]  
► [Concentration simulation value]

*Concentration simulation value* sets the simulated value for concentration.

|   | Value          | Description                                                                                                                                            |
|---|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| ⓔ | Numeric digits | The value becomes the concentration value when simulation is enabled. The concentration value returns to the actual value when simulation is disabled. |

**Net mass flow 1 – 2 simulation value**

Ⓛ [Diag/Service] ► [Sim] ► [Opt pro var] ► [Net mass 1 – 2]

Ⓜ [Maintenance root menu] ► [Simulation] ► [Optional process variables]  
► [Net mass flow 1 – 2 simulation value]

*Net mass flow 1 – 2 simulation value* sets the simulated value for net mass flow.

|   | Value          | Description                                                                                                                                                        |
|---|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ⓔ | Numeric digits | The value becomes the net mass flow value 1 – 2 when simulation is enabled. The net mass flow value 1 – 2 returns to the actual value when simulation is disabled. |

**Net volume flow 1 – 2 simulation value**

Ⓛ [Diag/Service] ► [Sim] ► [Opt pro var] ► [Net volume flow 1 – 2]

Ⓜ [Maintenance root menu] ► [Simulation] ► [Optional process variables]  
► [Net volume flow 1 – 2 simulation value]

*Net volume flow 1 – 2 simulation value* sets the simulated value for net volume flow.

|   | Value          | Description                                                                                                                                                            |
|---|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ⓔ | Numeric digits | The value becomes the net volume flow value 1 – 2 when simulation is enabled. The net volume flow value 1 – 2 returns to the actual value when simulation is disabled. |

**Net corrected volume flow simulation value**

Ⓛ [Diag/Service] ► [Sim] ► [Opt pro var] ► [Net corr vol]

Ⓜ [Maintenance root menu] ► [Simulation] ► [Optional process variables]  
► [Net corrected volume flow simulation value]

*Net corrected volume flow simulation value* sets the simulated value for net corrected volume flow.

|   | Value          | Description                                                                                                                                                                    |
|---|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ⓔ | Numeric digits | The value becomes the net corrected volume flow value when simulation is enabled. The net corrected volume flow value returns to the actual value when simulation is disabled. |



Viscosity  
simulation value

- ⌚ [Diag/Service] ▶ [Sim] ▶ [Opt pro var] ▶ [visc]
- Ⓜ [Maintenance root menu] ▶ [Simulation] ▶ [Optional process variables] ▶ [Viscosity simulation value]

*Viscosity simulation value* sets the simulated value for Viscosity.

|   | Value          | Description                                                                                                                                    |
|---|----------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓜ | Numeric digits | The value becomes the Viscosity value when simulation is enabled. The Viscosity value returns to the actual value when simulation is disabled. |

### 5.4.10 Alarm/Event behavior settings

The alarm behaviour setting is usually the second step in the three steps to set up an alarm. It selects the consequences that the occurrence of an event has. These range from ignoring the event, through the activation of an alarm/monitoring/logging, to going into the burnout state of the device. Some conditions may be so serious that the corresponding alarm behavior cannot be set to ignore.

For more detailed information, see *Event management* [▶ 55].

The following menus/settings are available:

|   | Full name                         | Display name   | [Modbus] name                       | Page    |
|---|-----------------------------------|----------------|-------------------------------------|---------|
| – | Alarm/Event additional parameters | [Alm/Evt add]  | [Alarm/Event additional parameters] | [▶ 190] |
| – | System alarms                     | [Sys alm]      | [System alarms]                     | [▶ 190] |
| – | Process alarms                    | [Pro alm]      | [Process alarms]                    | [▶ 193] |
| – | Setting alarms                    | [Set alm]      | [Setting alarms]                    | [▶ 206] |
| – | Warnings/Information              | [Warn]         | [Warnings/Information]              | [▶ 219] |
| – | Event setting lock status         | [Evt set lock] | [Event setting lock status]         | [▶ 232] |

#### Alarm/Event additional parameters

#### Alarm/Event additional parameters

Ⓐ [Diag/Service] ▶ [Alm/Evt bhvr set] ▶ [Alm/Evt add]

Ⓜ [Maintenance root menu] ▶ [Alarm/Event behavior settings] ▶ [Alarm/Event additional parameters]

The parameter *Alarm/Event additional parameters* enables or disables menu items in the submenu *Alarm/Event behavior settings*.

|   | Value                                   | Description                                                                                    |
|---|-----------------------------------------|------------------------------------------------------------------------------------------------|
| – | Not apply<br>[Not apply]<br>[Not apply] | Menu items in the submenu <i>Alarm/Event behavior settings</i> are disabled.<br>Default value. |
| – | Apply<br>[Apply]<br>[Apply]             | Menu items in the submenu <i>Alarm/Event behavior settings</i> are enabled.                    |

#### System alarms

*System alarms* defines the action when an event occurs, as well as device and acknowledge behaviors.

The following overview shows the selectable menu items within the submenu System alarms.

|   | Full name                         | Display name | [Modbus] name                       | Page    |
|---|-----------------------------------|--------------|-------------------------------------|---------|
| – | Device behavior temperature alarm | [Bhvr temp]  | [Device behavior temperature alarm] | [▶ 191] |
| – | Device behavior indicator alarm   | [Bhvr ind]   | [Device behavior indicator alarm]   | [▶ 191] |

**Device behavior temperature alarm**

① [Diag/Service] ► [Alm/Evt bhvr set] ► [Sys alm] ► [Bhvr temp]

② [Maintenance root menu] ► [Alarm/Event behavior settings] ► [System alarms] ► [Device behavior temperature alarm]

Defines the device behavior when one or more of the following alarms occur:

- 107: Temperature range violation  
107:Temp range FAIL
- 108: Temperature sensor failure  
108:Temp snsr FAIL

|   | Value                                                     | Description                                                                                      |
|---|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| – | Software burnout<br>[Soft burn out]<br>[Software burnout] | When this alarm event occurs, device outputs go into predefined error states.<br>Default value.  |
| – | Alarm output<br>[Alm out]<br>[Alm out]                    | When this alarm event occurs, device outputs go to defined outputs in each alarm output setting. |
| – | Continue<br>[Cont]<br>[Continue]                          | Operation is continued.                                                                          |

**Device behavior indicator alarm**

① [Diag/Service] ► [Alm/Evt bhvr set] ► [Sys alm] ► [Bhvr ind]

② [Maintenance root menu] ► [Alarm/Event behavior settings] ► [System alarms] ► [Device behavior indicator alarm]

*Device behavior indicator alarm* defines the device behavior when one or more of the following alarms occur:

- 130: Indicator board failure  
130:Ind bd FAIL
- 131: Indicator board EEPROM failure  
131:Ind bd EEP FAIL
- 132: LCD driver failure  
132:LCD drv FAIL
- 133: Indicator board mismatch  
133:Ind bd mismatch
- 134: Indicator communication error  
134:Ind comm ERR
- 135: microSD card failure  
135:microSD FAIL

|   | Value                                                     | Description                                                                                      |
|---|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| – | Software burnout<br>[Soft burn out]<br>[Software burnout] | When this alarm event occurs, device outputs go into predefined error states.<br>Default value.  |
| – | Alarm output<br>[Alm out]<br>[Alm out]                    | When this alarm event occurs, device outputs go to defined outputs in each alarm output setting. |

|   | Value                            | Description             |
|---|----------------------------------|-------------------------|
| – | Continue<br>[Cont]<br>[Continue] | Operation is continued. |

**Process alarms**

Sets parameters that define the device behavior when a standard diagnosis alarm or an alarm about a process value occurs.

The following menus/settings are available:

|   | Full name               | Display name | [Modbus] name             | Page    |
|---|-------------------------|--------------|---------------------------|---------|
| – | Standard diagnostics    | [Std diag]   | [Standard diagnostics]    | [▶ 193] |
| – | Input/Total             | [In/Total]   | [Input/Total]             | [▶ 199] |
| – | High High/Low Low alarm | [HH/LL alm]  | [High High/Low Low alarm] | [▶ 200] |
| – | Autozero                | [AZ]         | [Autozero]                | [▶ 202] |
| Ⓕ | Batch                   | [Batch]      | [Batch]                   | [▶ 203] |

**Standard diagnostics**

Sets parameters that define the device behavior when a standard diagnostic alarm occurs.

The following menus/settings are available:

|   | Full name                                 | Display name | [Modbus] name                               | Page    |
|---|-------------------------------------------|--------------|---------------------------------------------|---------|
| – | Device behavior slug detection            | [Bhvr slug]  | [Device behavior slug detection]            | [▶ 193] |
| – | Event setting slug detection              | [Evt slug]   | [Event setting slug detection]              | [▶ 194] |
| – | Acknowledge behavior slug detection       | [Ack slug]   | [Acknowledge behavior slug detection]       | [▶ 195] |
| – | Device behavior empty pipe detection      | [Bhvr empty] | [Device behavior empty pipe detection]      | [▶ 195] |
| – | Event setting empty pipe detection        | [Evt empty]  | [Event setting empty pipe detection]        | [▶ 196] |
| – | Acknowledge behavior empty pipe detection | [Ack empty]  | [Acknowledge behavior empty pipe detection] | [▶ 196] |
| – | Device behavior corrosion detection       | [Bhvr crrsn] | [Device behavior corrosion detection]       | [▶ 197] |
| – | Event setting corrosion detection         | [Evt crrsn]  | [Event setting corrosion detection]         | [▶ 197] |
| – | Acknowledge behavior corrosion detection  | [Ack crrsn]  | [Acknowledge behavior corrosion detection]  | [▶ 198] |

**Device behavior slug detection**

Ⓕ [Diag/Service] ▶ [Alm/Evt bhvr set] ▶ [Pro alm] ▶ [Std diag] ▶ [Bhvr slug]

Ⓕ [Maintenance root menu] ▶ [Alarm/Event behavior settings] ▶ [Process alarms] ▶ [Standard diagnostics] ▶ [Device behavior slug detection]

*Device behavior slug detection* defines the device behavior when the following alarm occurs:

201: Slug detection  
201:Slug detect

|   | Value                                                     | Description                                                                                      |
|---|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| – | Software burnout<br>[Soft burn out]<br>[Software burnout] | When this alarm event occurs, device outputs go into pre-defined error states.                   |
| – | Alarm output<br>[Alm out]<br>[Alm out]                    | When this alarm event occurs, device outputs go to defined outputs in each alarm output setting. |
| – | Continue<br>[Cont]<br>[Continue]                          | Operation is continued.<br>Default value.                                                        |

For more detailed information, see *Output signal behavior* [▶ 58].

### Event setting slug detection

Ⓐ [Diag/Service] ▶ [Alm/Evt bhvr set] ▶ [Pro alm] ▶ [Std diag] ▶ [Evt slug]

Ⓜ [Maintenance root menu] ▶ [Alarm/Event behavior settings] ▶ [Process alarms] ▶ [Standard diagnostics] ▶ [Event setting slug detection]

*Event setting slug detection* defines the event action when the following alarm occurs:

201: Slug detection

[201:Slug detect]

|   | Value                                                             | Description                                                                                                                                                              |
|---|-------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Ignore<br>[Ignore]<br>[Ignore]                                    | Event does not have any effect.<br>Default value.                                                                                                                        |
| – | History only<br>[Hist only]<br>[History only]                     | Pre-defined Event is recorded in the device history.                                                                                                                     |
| – | Generate<br>[Generate]<br>[Generate]                              | An alarm is generated by the event.                                                                                                                                      |
| – | Acknowledge<br>[Ack]<br>[Acknowledge]                             | An alarm is generated by the event that must be confirmed by the user, using the Alarm/Event acknowledge function.                                                       |
| – | Monitor<br>[Monitor]<br>[Monitor]                                 | Diagnostics data is logged when the event occurs.                                                                                                                        |
| – | Monitor + Acknowledge<br>[Monitor+ack]<br>[Monitor + Acknowledge] | An alarm is generated by the event that must be confirmed by the user, using the Alarm/Event acknowledge function, and diagnostics data is logged when the event occurs. |

**Acknowledge behavior slug detection**

① [Diag/Service] ► [Alm/Evt bhvr set] ► [Pro alm] ► [Std diag] ► [Ack slug]

② [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Process alarms] ► [Standard diagnostics] ► [Acknowledge behavior slug detection]

*Acknowledge behavior slug detection* defines the acknowledge behavior when the following alarm occurs:

201: Slug detection

201:Slug detect

|   | Value                                                     | Description                                                                                      |
|---|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| – | Software burnout<br>[Soft burn out]<br>[Software burnout] | When this alarm event occurs device, outputs go into predefined error states.                    |
| – | Alarm output<br>[Alm out]<br>[Alarm output]               | When this alarm event occurs, device outputs go to defined outputs in each alarm output setting. |
| – | Continue<br>[Cont]<br>[Continue]                          | Operation is continued.<br>Default value.                                                        |

**Device behavior empty pipe detection**

① [Diag/Service] ► [Alm/Evt bhvr set] ► [Pro alm] ► [Std diag] ► [Bhvr empty]

② [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Process alarms] ► [Standard diagnostics] ► [Device behavior empty pipe detection]

*Device behavior empty pipe detection* defines the device behavior when the following alarm occurs:

202: Empty pipe detection

202:Empty detect

|   | Value                                                     | Description                                                                   |
|---|-----------------------------------------------------------|-------------------------------------------------------------------------------|
| – | Software burnout<br>[Soft burn out]<br>[Software burnout] | When this alarm event occurs, device outputs go into predefined error states. |
| – | Alarm output<br>[Alm out]<br>[Alarm output]               | The alarm event causes the alarm to be displayed.                             |
| – | Continue<br>[Cont]<br>[Continue]                          | Operation is continued.<br>Default value.                                     |

**Event setting  
empty pipe  
detection**

① [Diag/Service] ► [Alm/Evt bhvr set] ► [Pro alm] ► [Std diag] ► [Evt empty]

② [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Process alarms] ► [Standard diagnostics] ► [Event setting empty pipe detection]

*Event setting empty pipe detection* defines the event action when the following alarm occurs:

202: Empty pipe detection

[202:Empty detect]

|   | Value                                                                | Description                                                                                                                                                              |
|---|----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Ignore<br>[Ignore]<br>[Ignore]                                       | Event does not have any effect.<br>Default value.                                                                                                                        |
| – | History only<br>[Hist only]<br>[History only]                        | Pre-defined Event is recorded in the device history.                                                                                                                     |
| – | Generate<br>[Generate]<br>[Generate]                                 | An alarm is generated by the event.                                                                                                                                      |
| – | Acknowledge<br>[Ack]<br>[Acknowledge]                                | An alarm is generated by the event that must be confirmed by the user, using the Alarm/Event acknowledge function.                                                       |
| – | Monitor<br>[Monitor]<br>[Monitor]                                    | Diagnostics data is logged when the event occurs.                                                                                                                        |
| – | Monitor + Acknowledge<br>[Monitor+ack]<br>[Monitor +<br>Acknowledge] | An alarm is generated by the event that must be confirmed by the user, using the Alarm/Event acknowledge function, and diagnostics data is logged when the event occurs. |

**Acknowledge  
behavior empty  
pipe detection**

① [Diag/Service] ► [Alm/Evt bhvr set] ► [Pro alm] ► [Std diag] ► [Ack empty]

② [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Process alarms] ► [Standard diagnostics] ► [Acknowledge behavior empty pipe detection]

*Acknowledge behavior empty pipe detection* defines the acknowledge behavior when the following alarm occurs:

202: Empty pipe detection

202:Empty detect

|   | Value                                                        | Description                                                                    |
|---|--------------------------------------------------------------|--------------------------------------------------------------------------------|
| – | Software burnout<br>[Soft burn out]<br>[Software<br>burnout] | When this alarm event occurs, device outputs go into pre-defined error states. |



|   | Value                              | Description                                                                                      |
|---|------------------------------------|--------------------------------------------------------------------------------------------------|
| – | <b>[Alm out]</b><br>[Alarm output] | When this alarm event occurs, device outputs go to defined outputs in each alarm output setting. |
| – | <b>[Cont]</b><br>[Continue]        | Operation is continued.<br>Default value.                                                        |

### Device behavior corrosion detection

① [Diag/Service] ► [Alm/Evt bhvr set] ► [Pro alm] ► [Std diag] ► [Bhvr crrsn]

② [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Process alarms] ► [Standard diagnostics] ► [Device behavior corrosion detection]

*Device behavior corrosion detection* defines the device behavior when the following alarm occurs:

203: Corrosion detection

203:Crrsn detect

|   | Value                                        | Description                                                                                      |
|---|----------------------------------------------|--------------------------------------------------------------------------------------------------|
| – | <b>[Soft burn out]</b><br>[Software burnout] | When this alarm event occurs, device outputs go into predefined error states.                    |
| – | <b>[Alm out]</b><br>[Alarm output]           | When this alarm event occurs, device outputs go to defined outputs in each alarm output setting. |
| – | <b>[Cont]</b><br>[Continue]                  | Operation is continued.<br>Default value.                                                        |

### Event setting corrosion detection

① [Diag/Service] ► [Alm/Evt bhvr set] ► [Pro alm] ► [Std diag] ► [Evt crrsn]

② [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Process alarms] ► [Standard diagnostics] ► [Event setting corrosion detection]

*Event setting corrosion detection* defines the event action when the following alarm occurs:

203: Corrosion detection

[203:Crrsn detect]

|   | Value                                | Description                                          |
|---|--------------------------------------|------------------------------------------------------|
| – | <b>[Ignore]</b><br>[Ignore]          | Event does not have any effect.<br>Default value.    |
| – | <b>[Hist only]</b><br>[History only] | Pre-defined Event is recorded in the device history. |

|   | Value                                       | Description                                                                                                                                                              |
|---|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   | Generate                                    |                                                                                                                                                                          |
| – | [Generate]<br>[Generate]                    | An alarm is generated by the event.                                                                                                                                      |
|   | Acknowledge                                 |                                                                                                                                                                          |
| – | [Ack]<br>[Acknowledge]                      | An alarm is generated by the event that must be confirmed by the user, using the Alarm/Event acknowledge function.                                                       |
|   | Monitor                                     |                                                                                                                                                                          |
| – | [Monitor]<br>[Monitor]                      | Diagnostics data is logged when the event occurs.                                                                                                                        |
|   | Monitor + Acknowledge                       |                                                                                                                                                                          |
| – | [Monitor+ack]<br>[Monitor +<br>Acknowledge] | An alarm is generated by the event that must be confirmed by the user, using the Alarm/Event acknowledge function, and diagnostics data is logged when the event occurs. |

### Acknowledge behavior corrosion detection

① [Diag/Service] ► [Alm/Evt bhvr set] ► [Pro alm] ► [Std diag] ► [Ack crrsn]

② [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Process alarms] ► [Standard diagnostics] ► [Acknowledge behavior corrosion detection]

*Acknowledge behavior corrosion detection* defines the acknowledge behavior when the following alarm occurs:

203: Corrosion detection

203:Crrsn detect

|   | Value                                    | Description                                                                                      |
|---|------------------------------------------|--------------------------------------------------------------------------------------------------|
|   | Software burnout                         |                                                                                                  |
| – | [Soft burn out]<br>[Software<br>burnout] | When this alarm event occurs, device outputs go into predefined error states.                    |
|   | Alarm output                             |                                                                                                  |
| – | [Alm out]<br>[Alarm output]              | When this alarm event occurs, device outputs go to defined outputs in each alarm output setting. |
|   | Continue                                 |                                                                                                  |
| – | [Cont]<br>[Continue]                     | Operation is continued.<br>Default value.                                                        |

**Input/Total**

*Input/Total* sets parameters that define the device behavior when an analog input alarm or a Totalizer 1 threshold alarm occur.

The following overview shows the selectable menu items within the submenu *Input/Total*.

|   | Full name                                  | Display name        | [Modbus] name                              | Page    |
|---|--------------------------------------------|---------------------|--------------------------------------------|---------|
| – | Device behavior analog input alarm         | [Bhvr AI]           | [Device behavior analog input alarm]       | [▶ 199] |
| – | Device behavior total 1 threshold exceeded | [Bhvr ttl1 thrshld] | [Device behavior total 1 threshold exceed] | [▶ 199] |

**Device behavior analog input alarm**

① [Diag/Service] ▶ [Alm/Evt bhvr set] ▶ [Pro alm] ▶ [In/Total] ▶ [Bhvr AI]

② [Maintenance root menu] ▶ [Alarm/Event behavior settings] ▶ [Process alarms] ▶ [Input/Total] ▶ [Device behavior analog input alarm]

*Device behavior analog input alarm* defines the device behavior when the following alarm occurs:

221: Analog input failure  
221:AI FAIL

|   | Value                                                     | Description                                                                                      |
|---|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| – | Software burnout<br>[Soft burn out]<br>[Software burnout] | When this alarm event occurs, device outputs go into predefined error states.                    |
| – | Alarm output<br>[Alm out]<br>[Alarm output]               | When this alarm event occurs, device outputs go to defined outputs in each alarm output setting. |
| – | Continue<br>[Cont]<br>[Continue]                          | Operation is continued.<br>Default value.                                                        |

**Device behavior total 1 threshold exceeded**

① [Diag/Service] ▶ [Alm/Evt bhvr set] ▶ [Pro alm] ▶ [In/Total] ▶ [Bhvr ttl1 thrshld]

② [Maintenance root menu] ▶ [Alarm/Event behavior settings] ▶ [Process alarms] ▶ [Input/Total] ▶ [Device behavior total 1 threshold exceed]

*Device behavior total 1 threshold exceeded* defines the device behavior when the following alarm occurs:

241: Totalizer 1 threshold exceeded  
241:Ttl1 exceed

|   | Value                                                     | Description                                                                   |
|---|-----------------------------------------------------------|-------------------------------------------------------------------------------|
| – | Software burnout<br>[Soft burn out]<br>[Software burnout] | When this alarm event occurs, device outputs go into predefined error states. |

|   | Value                                       | Description                                                                                      |
|---|---------------------------------------------|--------------------------------------------------------------------------------------------------|
| – | Alarm output<br>[Alm out]<br>[Alarm output] | When this alarm event occurs, device outputs go to defined outputs in each alarm output setting. |
| – | Continue<br>[Cont]<br>[Continue]            | Operation is continued.<br>Default value.                                                        |

### High High/Low Low alarm

*High High/Low Low alarm* sets parameters that define the device behavior when a high or low alarm occurs.

The following overview shows the selectable menu items within the submenu *High High/Low Low alarm*.

|   | Full name                                           | Display name      | [Modbus] name                                         | Page    |
|---|-----------------------------------------------------|-------------------|-------------------------------------------------------|---------|
| – | Device behavior mass flow high high low low alarm   | [Bhvr mass HH LL] | [Device behavior mass flow high high low low alarm]   | [▶ 200] |
| – | Device behavior density high high low low alarm     | [Bhvr dens HH LL] | [Device behavior density high high low low alarm]     | [▶ 201] |
| – | Device behavior temperature high high low low alarm | [Bhvr temp HH LL] | [Device behavior temperature high high low low alarm] | [▶ 201] |
| – | Device behavior pressure high high low low alarm    | [Bhvr pres HH LL] | [Device behavior pressure high high low low alarm]    | [▶ 202] |

### Device behavior mass flow high high low low alarm

Ⓐ [Diag/Service] ▶ [Alm/Evt bhvr set] ▶ [Pro alm] ▶ [HH/LL alm] ▶ [Bhvr mass HH LL]

Ⓜ [Maintenance root menu] ▶ [Alarm/Event behavior settings] ▶ [Process alarms] ▶ [High High/Low Low alarm] ▶ [Device behavior mass flow high high low low alarm]

*Device behavior mass flow high high low low alarm* defines the device behavior when the following alarm occurs:

222: Mass flow HH/LL alarm

222:Mass HH/LL

|   | Value                                                     | Description                                                                                      |
|---|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| – | Software burnout<br>[Soft burn out]<br>[Software burnout] | When this alarm event occurs, device outputs go into pre-defined error states.                   |
| – | Alarm output<br>[Alm out]<br>[Alarm output]               | When this alarm event occurs, device outputs go to defined outputs in each alarm output setting. |
| – | Continue<br>[Cont]<br>[Continue]                          | Operation is continued.<br>Default value.                                                        |

**Device behavior  
density high high  
low low alarm**

① [Diag/Service] ► [Alm/Evt bhvr set] ► [Pro alm] ► [HH/LL alm] ► [Bhvr dens HH LL]

② [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Process alarms] ► [High High/Low Low alarm] ► [Device behavior density high high low low alarm]

*Device behavior density high high low low alarm* defines the device behavior when the following alarm occurs:

223: Density HH/LL Alarm

223:Dens HH/LL

|   | Value                                                     | Description                                                                                      |
|---|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| – | Software burnout<br>[Soft burn out]<br>[Software burnout] | When this alarm event occurs, device outputs go into predefined error states.                    |
| – | Alarm output<br>[Alm out]<br>[Alarm output]               | When this alarm event occurs, device outputs go to defined outputs in each alarm output setting. |
| – | Continue<br>[Cont]<br>[Continue]                          | Operation is continued.<br>Default value.                                                        |

**Device behavior  
temperature high  
high low low alarm**

① [Diag/Service] ► [Alm/Evt bhvr set] ► [Pro alm] ► [HH/LL alm] ► [Bhvr temp HH LL]

② [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Process alarms] ► [High High/Low Low alarm] ► [Device behavior temperature high high low low alarm]

*Device behavior temperature high high low low alarm* defines the device behavior when the following alarm occurs:

224: Temperature HH/LL alarm

224:Temp HH/LL

|   | Value                                                     | Description                                                                                      |
|---|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| – | Software burnout<br>[Soft burn out]<br>[Software burnout] | When this alarm event occurs, device outputs go into predefined error states.                    |
| – | Alarm output<br>[Alm out]<br>[Alarm output]               | When this alarm event occurs, device outputs go to defined outputs in each alarm output setting. |
| – | Continue<br>[Cont]<br>[Continue]                          | Operation is continued.<br>Default value.                                                        |

**Device behavior  
pressure high high  
low low alarm**

Ⓐ [Diag/Service] ► [Alm/Evt bhvr set] ► [Pro alm] ► [HH/LL alm] ► [Bhvr pres HH LL]

Ⓜ [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Process alarms] ► [High High/Low Low alarm] ► [Device behavior pressure high high low low alarm]

*Device behavior pressure high high low low alarm* defines the device behavior when the following alarm occurs:

225: Pressure HH/LL alarm

225:Pres HH/LL

|   | Value                                                     | Description                                                                                      |
|---|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| – | Software burnout<br>[Soft burn out]<br>[Software burnout] | When this alarm event occurs, device outputs go into predefined error states.                    |
| – | Alarm output<br>[Alm out]<br>[Alarm output]               | When this alarm event occurs, device outputs go to defined outputs in each alarm output setting. |
| – | Continue<br>[Cont]<br>[Continue]                          | Operation is continued.<br>Default value.                                                        |

**Autozero**

*Autozero* sets parameters that define the device behavior when an autozero alarm occurs.

**Device behavior  
autozero alarm**

Ⓐ [Diag/Service] ► [Alm/Evt bhvr set] ► [Pro alm] ► [AZ] ► [Bhvr AZ]

Ⓜ [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Process alarms] ► [Autozero] ► [Device behavior autozero alarm]

*Device behavior autozero alarm* defines the device behavior when one or more of the following alarms occur:

- 204: Autozero judgement multiphase  
204:AZ multiphase
- 205: Autozero judgement flow  
205:AZ flow
- 206: Autozero judgement temperature  
206:AZ temp

|   | Value                                                     | Description                                                                                      |
|---|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| – | Software burnout<br>[Soft burn out]<br>[Software burnout] | When this alarm event occurs, device outputs go into predefined error states.                    |
| – | Alarm output<br>[Alm out]<br>[Alarm output]               | When this alarm event occurs, device outputs go to defined outputs in each alarm output setting. |
| – | Continue<br>[Cont]<br>[Continue]                          | Operation is continued.<br>Default value.                                                        |

### Batch

*Batch* sets parameters that define the device behavior, when a Batch relevant alarm occurs.

### Device behavior batch alarm

① [Diag/Service] ► [Alm/Evt bhvr set] ► [Pro alm] ► [Batch] ► [Bhvr batch]

② [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Process alarms] ► [Batch] ► [Device behavior batch alarm]

*Device behavior batch alarm* defines the device behavior when one or more of the following alarms occur:

- 207: Batch Time Exceeded  
207:Batch time over
- 208: Batch Overrun/Underrun  
208:Batch overrun
- 209: Max Flow While Batching  
209:Max flow batch

|   | Value                                              | Value description                                                                                |
|---|----------------------------------------------------|--------------------------------------------------------------------------------------------------|
| – | Soft burnout<br>[Soft burn out]<br>[Sorft burnout] | When this alarm event occurs, device outputs go into predefined error states.                    |
| – | Alarm output<br>[Alm out]<br>[Alarm output]        | When this alarm event occurs, device outputs go to defined outputs in each alarm output setting. |
| – | Continue<br>[Cont]<br>[Continue]                   | Operation is continued.<br>Default value.                                                        |

**Acknowledge behavior batch alarm**

Ⓐ [Diag/Service] ► [Alm/Evt bhvr set] ► [Pro alm] ► [Batch] ► [Ack batch]

Ⓜ [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Process alarms] ► [Batch] ► [Acknowledge behavior batch alarm]

*Acknowledge behavior batch alarm* defines the acknowledge behavior when one or more of the following alarms occur:

- 207: Batch Time Exceeded  
207:Batch time over
- 208: Batch Overrun/Underrun  
208:Batch overrun
- 209: Max Flow While Batching  
209:Max flow batch

|   | Value                                                     | Value description                                                                                |
|---|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| – | Software burnout<br>[Soft burn out]<br>[Software burnout] | When this alarm event occurs, device outputs go into predefined error states.                    |
| – | Alarm output<br>[Alm out]<br>[Alarm output]               | When this alarm event occurs, device outputs go to defined outputs in each alarm output setting. |
| – | Continue<br>[Cont]<br>[Continue]                          | Operation is continued.<br>Default value.                                                        |

**Event setting batch alarm**

Ⓐ [Diag/Service] ► [Alm/Evt bhvr set] ► [Pro alm] ► [Batch] ► [Evt batch]

Ⓜ [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Process alarms] ► [Batch] ► [Event setting batch alarm]

*Event setting batch alarm* defines the event action when one or more of the following alarms occur:

- 207: Batch Time Exceeded  
207:Batch time over
- 208: Batch Overrun/Underrun  
208:Batch overrun
- 209: Max Flow While Batching  
209:Max flow batch

|   | Value                                         | Value description                                   |
|---|-----------------------------------------------|-----------------------------------------------------|
| – | Ignore<br>[Ignore]<br>[Ignore]                | Event does not have any effect.<br>Default value.   |
| – | History only<br>[Hist only]<br>[History only] | Predefined Event is recorded in the device history. |
| – | Generate<br>[Generate]<br>[Generate]          | An alarm is generated by event.<br>Default value.   |



|   | Value                                                             | Value description                                                                                                                                                        |
|---|-------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Acknowledge<br>[Ack]<br>[Acknowledge]                             | An alarm is generated by the event that must be confirmed by the user, using the Alarm/Event acknowledge function.                                                       |
| – | Monitor<br>[Monitor]<br>[Monitor]                                 | Diagnostics data is logged when the event occurs.                                                                                                                        |
| – | Monitor + Acknowledge<br>[Monitor+ack]<br>[Monitor + Acknowledge] | An alarm is generated by the event that must be confirmed by the user, using the Alarm/Event acknowledge function, and diagnostics data is logged when the event occurs. |

**Setting alarms**

*Setting alarms* sets parameters that define the device behavior when an alarm is set.

The following overview shows the selectable menu items within the submenu *Setting alarms*.

|   | Full name          | Display name | [Modbus] name        | Page    |
|---|--------------------|--------------|----------------------|---------|
| – | Standard variables | [Std var]    | [Standard variables] | [▶ 206] |
| – | Optional variables | [Opt var]    | [Optional variables] | [▶ 212] |
| – | Output             | [Out]        | [Output]             | [▶ 215] |
| – | Input              | [In]         | [Input]              | [▶ 217] |
| Ⓔ | Batch              | [Batch]      | [Batch]              | [▶ 218] |

**Standard variables**

*Standard variables* sets parameters that define the device behavior when an alarm is set for standard process variables.

The following overview shows the selectable menu items within the submenu *Standard variables*.

|   | Full name                                                 | Display name        | [Modbus] name                                               | Page    |
|---|-----------------------------------------------------------|---------------------|-------------------------------------------------------------|---------|
| – | Device behavior mass flow configuration error             | [Bhvr mass cfg]     | [Device behavior mass flow configuration error]             | [▶ 207] |
| – | Device behavior density configuration error               | [Bhvr dens cfg]     | [Device behavior density configuration error]               | [▶ 207] |
| – | Device behavior temperature configuration error           | [Bhvr temp cfg]     | [Device behavior temperature configuration error]           | [▶ 208] |
| – | Device behavior volume flow configuration error           | [Bhvr vol cfg]      | [Device behavior volume flow configuration error]           | [▶ 208] |
| – | Device behavior pressure configuration error              | [Bhvr pres cfg]     | [Device behavior pressure configuration error]              | [▶ 209] |
| – | Device behavior reference density configuration error     | [Bhvr ref dens cfg] | [Device behavior reference density configuration error]     | [▶ 209] |
| – | Device behavior relative density configuration error      | [Bhvr rel dens cfg] | [Device behavior relative density configuration error]      | [▶ 210] |
| – | Device behavior corrected volume flow configuration error | [Bhvr corr vol cfg] | [Device behavior corrected volume flow configuration error] | [▶ 210] |
| – | Device behavior calorific value configuration error       | [Bhvr cal cfg]      | [Device behavior calorific value configuration error]       | [▶ 211] |
| – | Device behavior total configuration error                 | [Bhvr ttl alm]      | [Device behavior total configuration error]                 | [▶ 211] |

**Device behavior  
mass flow  
configuration error**

- ① [Diag/Service] ► [Alm/Evt bhvr set] ► [Set alm] ► [Std var] ► [Bhvr mass cfg]
- ② [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Setting alarms] ► [Standard variables] ► [Device behavior mass flow configuration error]

*Device behavior mass flow configuration error* defines the device behavior when the following alarm occurs:

301: Mass flow configuration error

301:Mass cfg ERR

|   | Value                                                     | Description                                                                                      |
|---|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| – | Software burnout<br>[Soft burn out]<br>[Software burnout] | When this alarm event occurs, device outputs go into predefined error states.                    |
| – | Alarm output<br>[Alm out]<br>[Alarm output]               | When this alarm event occurs, device outputs go to defined outputs in each alarm output setting. |
| – | Continue<br>[Cont]<br>[Continue]                          | Operation is continued.<br>Default value.                                                        |

**Device behavior  
density  
configuration error**

- ① [Diag/Service] ► [Alm/Evt bhvr set] ► [Set alm] ► [Std var] ► [Bhvr dens cfg]
- ② [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Setting alarms] ► [Standard variables] ► [Device behavior density configuration error]

*Device behavior density configuration error* defines the device behavior when the following alarm occurs:

302: Density configuration error

302:Dens cfg ERR

|   | Value                                                     | Description                                                                                      |
|---|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| – | Software burnout<br>[Soft burn out]<br>[Software burnout] | When this alarm event occurs, device outputs go into predefined error states.                    |
| – | Alarm output<br>[Alm out]<br>[Alarm output]               | When this alarm event occurs, device outputs go to defined outputs in each alarm output setting. |
| – | Continue<br>[Cont]<br>[Continue]                          | Operation is continued.<br>Default value.                                                        |

**Device behavior  
temperature  
configuration error**

① [Diag/Service] ► [Alm/Evt bhvr set] ► [Set alm] ► [Std var] ► [Bhvr temp cfg]

② [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Setting alarms] ► [Standard variables] ► [Device behavior temperature configuration error]

*Device behavior temperature configuration error* defines the device behavior when the following alarm occurs:

303: Temperature configuration error

303:Temp cfg ERR

|   | Value                                                     | Description                                                                                      |
|---|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| – | Software burnout<br>[Soft burn out]<br>[Software burnout] | When this alarm event occurs, device outputs go into predefined error states.                    |
| – | Alarm output<br>[Alm out]<br>[Alarm output]               | When this alarm event occurs, device outputs go to defined outputs in each alarm output setting. |
| – | Continue<br>[Cont]<br>[Continue]                          | Operation is continued.<br>Default value.                                                        |

**Device behavior  
volume flow  
configuration error**

① [Diag/Service] ► [Alm/Evt bhvr set] ► [Set alm] ► [Std var] ► [Bhvr vol cfg]

② [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Setting alarms] ► [Standard variables] ► [Device behavior volume flow configuration error]

*Device behavior volume flow configuration error* defines the device behavior when the following alarm occurs:

307: Volume flow configuration error

307:Vol cfg ERR

|   | Value                                                     | Description                                                                                      |
|---|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| – | Software burnout<br>[Soft burn out]<br>[Software burnout] | When this alarm event occurs, device outputs go into predefined error states.                    |
| – | Alarm output<br>[Alm out]<br>[Alarm output]               | When this alarm event occurs, device outputs go to defined outputs in each alarm output setting. |
| – | Continue<br>[Cont]<br>[Continue]                          | Operation is continued.<br>Default value.                                                        |

**Device behavior pressure configuration error**

- ① [Diag/Service] ► [Alm/Evt bhvr set] ► [Set alm] ► [Std var] ► [Bhvr pres cfg]
- ② [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Setting alarms] ► [Standard variables] ► [Device behavior pressure configuration error]

*Device behavior pressure configuration error* defines the device behavior when the following alarm occurs:

305: Pressure configuration error

305:Pres cfg ERR

|   | Value                                                     | Description                                                                                      |
|---|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| – | Software burnout<br>[Soft burn out]<br>[Software burnout] | When this alarm event occurs, device outputs go into predefined error states.                    |
| – | Alarm output<br>[Alm out]<br>[Alarm output]               | When this alarm event occurs, device outputs go to defined outputs in each alarm output setting. |
| – | Continue<br>[Cont]<br>[Continue]                          | Operation is continued.<br>Default value.                                                        |

**Device behavior reference density configuration error**

- ① [Diag/Service] ► [Alm/Evt bhvr set] ► [Set alm] ► [Std var] ► [Bhvr ref dens cfg]
- ② [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Setting alarms] ► [Standard variables] ► [Device behavior reference density configuration error]

*Device behavior reference density configuration error* defines the device behavior when the following alarm occurs:

308: Reference density configuration error

308:Ref dens ERR

|   | Value                                                     | Description                                                                                      |
|---|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| – | Software burnout<br>[Soft burn out]<br>[Software burnout] | When this alarm event occurs, device outputs go into predefined error states.                    |
| – | Alarm output<br>[Alm out]<br>[Alarm output]               | When this alarm event occurs, device outputs go to defined outputs in each alarm output setting. |
| – | Continue<br>[Cont]<br>[Continue]                          | Operation is continued.<br>Default value.                                                        |

**Device behavior  
relative density  
configuration error**

① [Diag/Service] ► [Alm/Evt bhvr set] ► [Set alm] ► [Std var] ► [Bhvr rel dens cfg]

② [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Setting alarms] ► [Standard variables] ► [Device behavior relative density configuration error]

*Device behavior relative density configuration error* defines the device behavior when the following alarm occurs:

309: Relative density configuration error

309:Rel dens ERR

|   | Value                                                     | Description                                                                                      |
|---|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| – | Software burnout<br>[Soft burn out]<br>[Software burnout] | When this alarm event occurs, device outputs go into predefined error states.                    |
| – | Alarm output<br>[Alm out]<br>[Alarm output]               | When this alarm event occurs, device outputs go to defined outputs in each alarm output setting. |
| – | Continue<br>[Cont]<br>[Continue]                          | Operation is continued.<br>Default value.                                                        |

**Device behavior  
corrected volume  
flow configuration  
error**

① [Diag/Service] ► [Alm/Evt bhvr set] ► [Set alm] ► [Std var] ► [Bhvr corr vol cfg]

② [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Setting alarms] ► [Standard variables] ► [Device behavior corrected volume flow configuration error]

*Device behavior corrected volume flow configuration error* defines the device behavior when the following alarm occurs:

310: Corrected volume flow configuration error

310:Corr vol ERR

|   | Value                                                     | Description                                                                                      |
|---|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| – | Software burnout<br>[Soft burn out]<br>[Software burnout] | When this alarm event occurs, device outputs go into predefined error states.                    |
| – | Alarm output<br>[Alm out]<br>[Alarm output]               | When this alarm event occurs, device outputs go to defined outputs in each alarm output setting. |
| – | Continue<br>[Cont]<br>[Continue]                          | Operation is continued.<br>Default value.                                                        |

**Device behavior  
calorific value  
configuration error**

- ① [Diag/Service] ► [Alm/Evt bhvr set] ► [Set alm] ► [Std var] ► [Bhvr cal cfg]
- ② [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Setting alarms] ► [Standard variables] ► [Device behavior calorific value configuration error]

*Device behavior calorific value configuration error* defines the device behavior when the following alarm occurs:

311: Calorific value configuration error

311:Cal cfg ERR

|   | Value                                                     | Description                                                                   |
|---|-----------------------------------------------------------|-------------------------------------------------------------------------------|
| – | Software burnout<br>[Soft burn out]<br>[Software burnout] | When this alarm event occurs, device outputs go into predefined error states. |
| – | Alarm output<br>[Alm out]<br>[Alarm output]               | The alarm event causes the alarm to be displayed.                             |
| – | Continue<br>[Cont]<br>[Continue]                          | Operation is continued.<br>Default value.                                     |

**Device behavior  
total configuration  
error**

- ① [Diag/Service] ► [Alm/Evt bhvr set] ► [Set alm] ► [Std var] ► [Bhvr ttl alm]
- ② [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Setting alarms] ► [Standard variables] ► [Device behavior total configuration error]

*Device behavior total configuration error* defines the device behavior when one or more of the following alarms occur:

- 335: Totalizer 1 configuration error  
335:Ttl1 cfg ERR
- 336: Totalizer 2 configuration error  
336:Ttl2 cfg ERR
- 337: Totalizer 3 configuration error  
337:Ttl3 cfg ERR
- 338: Totalizer 4 configuration error  
338:Ttl4 cfg ERR
- 339: Totalizer 5 configuration error  
339:Ttl5 cfg ERR
- 340: Totalizer 6 configuration error  
340:Ttl6 cfg ERR

|   | Value                                                     | Description                                                                   |
|---|-----------------------------------------------------------|-------------------------------------------------------------------------------|
| – | Software burnout<br>[Soft burn out]<br>[Software burnout] | When this alarm event occurs, device outputs go into predefined error states. |

|   | Value                              | Description                                                                                      |
|---|------------------------------------|--------------------------------------------------------------------------------------------------|
| – | <b>[Alm out]</b><br>[Alarm output] | When this alarm event occurs, device outputs go to defined outputs in each alarm output setting. |
| – | <b>[Cont]</b><br>[Continue]        | Operation is continued.<br>Default value.                                                        |

### Optional variables

*Optional variables* sets parameters that define the device behavior when an alarm for optional process variables is set.

The following overview shows the selectable menu items within the submenu *Optional variables*.

|   | Full name                                                     | Display name                   | [Modbus] name                                                   | Page   |
|---|---------------------------------------------------------------|--------------------------------|-----------------------------------------------------------------|--------|
| ⑥ | Device behavior concentration configuration error             | <b>[Bhvr conc cfg]</b>         | [Device behavior concentration configuration error]             | [ 212] |
| ⑥ | Device behavior net mass flow configuration error             | <b>[Bhvr net mass cfg]</b>     | [Device behavior net mass flow configuration error]             | [ 213] |
| ⑥ | Device behavior net volume flow configuration error           | <b>[Bhvr net vol cfg]</b>      | [Device behavior net volume flow configuration error]           | [ 213] |
| ⑥ | Device behavior net corrected volume flow configuration error | <b>[Bhvr net corr vol cfg]</b> | [Device behavior net corrected volume flow configuration error] | [ 214] |
| ⑥ | Device behavior Viscosity configuration error                 | <b>[Bhvr visc]</b>             | [Device behavior Viscosity configuration error]                 | [ 214] |

### Device behavior concentration configuration error

① [Diag/Service] ► [Alm/Evt bhvr set] ► [Set alm] ► [Opt var] ► [Bhvr conc cfg]

④ [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Setting alarms] ► [Optional variables] ► [Device behavior concentration configuration error]

*Device behavior concentration configuration error* defines the device behavior when the following alarm occurs:

313: Concentration configuration error

313:Conc cfg ERR

|   | Value                                        | Description                                                                                      |
|---|----------------------------------------------|--------------------------------------------------------------------------------------------------|
| – | <b>[Soft burn out]</b><br>[Software burnout] | When this alarm event occurs, device outputs go into predefined error states.                    |
| – | <b>[Alm out]</b><br>[Alarm output]           | When this alarm event occurs, device outputs go to defined outputs in each alarm output setting. |



|   | Value                            | Description                               |
|---|----------------------------------|-------------------------------------------|
| – | Continue<br>[Cont]<br>[Continue] | Operation is continued.<br>Default value. |

#### Device behavior net mass flow configuration error

① [Diag/Service] ► [Alm/Evt bhvr set] ► [Set alm] ► [Opt var] ► [Bhvr net mass cfg]

② [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Setting alarms] ► [Optional variables] ► [Device behavior net mass flow configuration error]

*Device behavior net mass flow configuration error* defines the device behavior when one or more of the following alarms occur:

- 314: Net mass flow 1 configuration error  
314:Net mass1 ERR
- 315: Net mass flow 2 configuration error  
315:Net mass2 ERR

|   | Value                                                     | Description                                                                                      |
|---|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| – | Software burnout<br>[Soft burn out]<br>[Software burnout] | When this alarm event occurs, device outputs go into predefined error states.                    |
| – | Alarm output<br>[Alm out]<br>[Alarm output]               | When this alarm event occurs, device outputs go to defined outputs in each alarm output setting. |
| – | Continue<br>[Cont]<br>[Continue]                          | Operation is continued.<br>Default value.                                                        |

#### Device behavior net volume flow configuration error

① [Diag/Service] ► [Alm/Evt bhvr set] ► [Set alm] ► [Opt var] ► [Bhvr net vol cfg]

② [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Setting alarms] ► [Optional variables] ► [Device behavior net volume flow configuration error]

*Device behavior net volume flow configuration error* defines the device behavior when one or more of the following alarms occur:

- 316: Net volume flow 1 configuration error  
316:Net vol1 ERR
- 317: Net volume flow 2 configuration error  
317:Net vol2 ERR

|   | Value                                                     | Description                                                                   |
|---|-----------------------------------------------------------|-------------------------------------------------------------------------------|
| – | Software burnout<br>[Soft burn out]<br>[Software burnout] | When this alarm event occurs, device outputs go into predefined error states. |

|   | Value                                       | Description                                                                                      |
|---|---------------------------------------------|--------------------------------------------------------------------------------------------------|
| – | Alarm output<br>[Alm out]<br>[Alarm output] | When this alarm event occurs, device outputs go to defined outputs in each alarm output setting. |
| – | Continue<br>[Cont]<br>[Continue]            | Operation is continued.<br>Default value.                                                        |

### Device behavior net corrected volume flow configuration error

① [Diag/Service] ► [Alm/Evt bhvr set] ► [Set alm] ► [Opt var] ► [Bhvr net corr vol cfg]

② [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Setting alarms] ► [Optional variables] ► [Device behavior net corrected volume flow configuration error]

*Device behavior net corrected volume flow configuration error* defines the device behavior when the following alarm occurs:

318: Net corrected volume flow configuration error

318:Net corr vol ERR

|   | Value                                                     | Description                                                                                      |
|---|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| – | Software burnout<br>[Soft burn out]<br>[Software burnout] | When this alarm event occurs, device outputs go into predefined error states.                    |
| – | Alarm output<br>[Alm out]<br>[Alarm output]               | When this alarm event occurs, device outputs go to defined outputs in each alarm output setting. |
| – | Continue<br>[Cont]<br>[Continue]                          | Operation is continued.<br>Default value.                                                        |

### Device behavior viscosity configuration error

① [Diag/Service] ► [Alm/Evt bhvr set] ► [Set alm] ► [Opt var] ► [Bhvr visc]

② [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Setting alarms] ► [Optional variables] ► [Device behavior viscosity configuration error]

Defines the device behavior when one or more of the following alarms occur:

- 320: Viscosity configuration error  
320:Visc cfg ERR

|   | Value                                                     | Description                                                                                      |
|---|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| – | Software burnout<br>[Soft burn out]<br>[Software burnout] | When this alarm event occurs, device outputs go into predefined error states.                    |
| – | Alarm output<br>[Alm out]<br>[Alarm output]               | When this alarm event occurs, device outputs go to defined outputs in each alarm output setting. |

|   | Value                            | Description                               |
|---|----------------------------------|-------------------------------------------|
| – | Continue<br>[Cont]<br>[Continue] | Operation is continued.<br>Default value. |

### Output

*Output* sets parameters that define the device behavior when an alarm is set for output signals.

The following overview shows the selectable menu items within the submenu *Output*.

|   | Full name                                                 | Display name        | [Modbus] name                                               | Page    |
|---|-----------------------------------------------------------|---------------------|-------------------------------------------------------------|---------|
| – | Device behavior analog output configuration error         | [Bhvr AO cfg]       | [Device behavior analog output configuration error]         | [▶ 215] |
| – | Device behavior pulse/status output 1 configuration error | [Bhvr pls/sts1 cfg] | [Device behavior pulse/status output 1 configuration error] | [▶ 216] |
| – | Device behavior pulse/status output 2 configuration error | [Bhvr pls/sts2 cfg] | [Device behavior pulse/status output 2 configuration error] | [▶ 216] |
| – | Device behavior double pulse configuration error          | [Bhvr dbl pls cfg]  | [Device behavior double pulse configuration error]          | [▶ 217] |

### Device behavior analog output configuration error

① [Diag/Service] ▶ [Alm/Evt bhvr set] ▶ [Set alm] ▶ [Out] ▶ [Bhvr AO cfg]

② [Maintenance root menu] ▶ [Alarm/Event behavior settings] ▶ [Setting alarms] ▶ [Output] ▶ [Device behavior analog output configuration error]

*Device behavior analog output configuration error* defines the device behavior when the following alarm occurs:

322: Analog output configuration error  
322:AO cfg ERR

|   | Value                                                     | Description                                                                                      |
|---|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| – | Software burnout<br>[Soft burn out]<br>[Software burnout] | When this alarm event occurs, device outputs go into predefined error states.                    |
| – | Alarm output<br>[Alm out]<br>[Alarm output]               | When this alarm event occurs, device outputs go to defined outputs in each alarm output setting. |
| – | Continue<br>[Cont]<br>[Continue]                          | Operation is continued.<br>Default value.                                                        |

**Device behavior  
pulse/status  
output 1  
configuration error**

④ [Diag/Service] ► [Alm/Evt bhvr set] ► [Set alm] ► [Pls/Sts out] ► [Bhvr pls/sts1 cfg]

⑤ [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Setting alarms] ► [Output] ► [Device behavior pulse/status output 1 configuration error]

*Device behavior pulse/status output 1 configuration error* defines the device behavior when one or more of the following alarms occur:

- 323: Pulse output 1 configuration error  
323:Pls1 cfg ERR
- 324: Frequency output 1 configuration error  
324:Freq1 cfg ERR
- 325: Status output 1 configuration error  
325:Sts1 cfg ERR

|   | Value                                                     | Description                                                                                      |
|---|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| – | Software burnout<br>[Soft burn out]<br>[Software burnout] | When this alarm event occurs, device outputs go into predefined error states.                    |
| – | Alarm output<br>[Alm out]<br>[Alarm output]               | When this alarm event occurs, device outputs go to defined outputs in each alarm output setting. |
| – | Continue<br>[Cont]<br>[Continue]                          | Operation is continued.<br>Default value.                                                        |

**Device behavior  
pulse/status  
output 2  
configuration error**

④ [Diag/Service] ► [Alm/Evt bhvr set] ► [Set alm] ► [Pls/Sts out] ► [Bhvr pls/sts2 cfg]

⑤ [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Setting alarms] ► [Output] ► [Device behavior pulse/status output 2 configuration error]

*Device behavior pulse/status output 2 configuration error* defines the device behavior when one or more of the following alarms occur:

- 326: Pulse output 2 configuration error  
326:Pls2 cfg ERR
- 327: Frequency output 2 configuration error  
327:Freq2 cfg ERR
- 328: Status output 2 configuration error  
328:Sts2 cfg ERR
- 329: Pulse/Status output 2 mode configuration error  
329:Pls/Sts2 ERR

|   | Value                                                     | Description                                                                   |
|---|-----------------------------------------------------------|-------------------------------------------------------------------------------|
| – | Software burnout<br>[Soft burn out]<br>[Software burnout] | When this alarm event occurs, device outputs go into predefined error states. |

|   | Value                                       | Description                                                                                      |
|---|---------------------------------------------|--------------------------------------------------------------------------------------------------|
| – | Alarm output<br>[Alm out]<br>[Alarm output] | When this alarm event occurs, device outputs go to defined outputs in each alarm output setting. |
| – | Continue<br>[Cont]<br>[Continue]            | Operation is continued.<br>Default value.                                                        |

#### Device behavior double pulse configuration error

① [Diag/Service] ► [Alm/Evt bhvr set] ► [Set alm] ► [Pls/Sts out] ► [Bhvr dbl pls cfg]

② [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Setting alarms] ► [Output] ► [Device behavior double pulse configuration error]

*Device behavior double pulse configuration error* defines the device behavior when the following alarm occurs:

330: Double pulse configuration error

330:Dbl pls cfg ERR

|   | Value                                                     | Description                                                                                      |
|---|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| – | Software burnout<br>[Soft burn out]<br>[Software burnout] | When this alarm event occurs, device outputs go into predefined error states.                    |
| – | Alarm output<br>[Alm out]<br>[Alarm output]               | When this alarm event occurs, device outputs go to defined outputs in each alarm output setting. |
| – | Continue<br>[Cont]<br>[Continue]                          | Operation is continued.<br>Default value.                                                        |

#### Input

*Input* sets parameters that define the device behavior when an alarm is set for input signals.

The following overview shows the selectable menu items within the submenu *Input*.

|   | Full name                                        | Display name  | [Modbus] name                                      | Page    |
|---|--------------------------------------------------|---------------|----------------------------------------------------|---------|
| – | Device behavior analog input configuration error | [Bhvr AI cfg] | [Device behavior analog input configuration error] | [▶ 217] |

#### Device behavior analog input configuration error

① [Diag/Service] ► [Alm/Evt bhvr set] ► [Set alm] ► [AI] ► [Bhvr AI cfg]

② [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Setting alarms] ► [Input] ► [Device behavior analog input configuration error]

*Device behavior analog input configuration error* defines the device behavior when the following alarms occurs:

333: Analog input configuration error  
333:AI cfg ERR

|   | Value                                                     | Description                                                                                      |
|---|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| – | Software burnout<br>[Soft burn out]<br>[Software burnout] | When this alarm event occurs, device outputs go into predefined error states.                    |
| – | Alarm output<br>[Alm out]<br>[Alarm output]               | When this alarm event occurs, device outputs go to defined outputs in each alarm output setting. |
| – | Continue<br>[Cont]<br>[Continue]                          | Operation is continued.<br>Default value.                                                        |

### Batch

*Batch* sets parameters that define the device behavior when an alarm is set for input signals.

The following overview shows the selectable menu items within the submenu *Input*.

|   | Full name                                 | Display name         | [Modbus] name                               | Page   |
|---|-------------------------------------------|----------------------|---------------------------------------------|--------|
| – | Device behavior batch configuration error | [Bhvr batch cfg alm] | [Device behavior batch configuration error] | [ 218] |

### Device behavior batch configuration error

④ [Diag/Service] ► [Alm/Evt bhvr set] ► [Set alm] ► [Batch] ► [Bhvr batch cfg alm]

⑤ [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Setting alarms] ► [Batch] ► [Device behavior batch configuration error]

*Device behavior batch configuration error* defines the device behavior when the following alarm occurs:

341: Batch Configuration Error  
341:Batch cfg ERR

|   | Value                                                     | Value description                                                                                |
|---|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| – | Software burnout<br>[Soft burn out]<br>[Software burnout] | When this alarm event occurs, device outputs go into predefined error states.                    |
| – | Alarm output<br>[Alm out]<br>[Alarm output]               | When this alarm event occurs, device outputs go to defined outputs in each alarm output setting. |
| – | Continue<br>[Cont]<br>[Continue]                          | Operation is continued.<br>Default value.                                                        |

**Warnings/Information**

Sets parameters that define the device behavior when a warning occurs.

The following menus/settings are available:

|   | Full name | Display name | [Modbus] name | Page    |
|---|-----------|--------------|---------------|---------|
| – | Variables | [Var]        | [Variables]   | [▶ 219] |
| – | Output    | [Out]        | [Output]      | [▶ 224] |
| Ⓢ | Batch     | [Batch]      | [Batch]       | [▶ 229] |
| – | Others    | [Others]     | [Others]      | [▶ 230] |

**Variables**

Sets parameters that define the device behavior when a warning for process variables occurs.

The following menus/settings are available:

|   | Full name                             | Display name       | [Modbus] name                           | Page    |
|---|---------------------------------------|--------------------|-----------------------------------------|---------|
| – | Event setting density fixed           | [Evt dens fix]     | [Event setting density fixed]           | [▶ 219] |
| – | Event setting temperature fixed       | [Evt temp fix]     | [Event setting temperature fixed]       | [▶ 220] |
| – | Event setting pressure fixed          | [Evt pres fix]     | [Event setting pressure fixed]          | [▶ 221] |
| – | Event setting reference density fixed | [Evt ref dens fix] | [Event setting reference density fixed] | [▶ 221] |
| – | Event setting calorific value fixed   | [Evt cal fix]      | [Event setting calorific value fixed]   | [▶ 222] |
| – | Event setting process variables trim  | [Evt pro var trim] | [Event setting process variables trim]  | [▶ 223] |

**Event setting density fixed**

Ⓛ [Diag/Service] ▶ [Alm/Evt bhvr set] ▶ [Warn] ▶ [Var] ▶ [Evt dens fix]

Ⓢ [Maintenance root menu] ▶ [Alarm/Event behavior settings] ▶ [Warnings/Information] ▶ [Variables] ▶ [Event setting density fixed]

Defines the device behavior when the following warning occurs:

703: Density fixed

[703:Dens fix]

|   | Value                                         | Description                                           |
|---|-----------------------------------------------|-------------------------------------------------------|
| – | Ignore<br>[Ignore]<br>[Ignore]                | Event does not have any effect.                       |
| – | History only<br>[Hist only]<br>[History only] | Pre-defined Event is recorded in the device history.  |
| – | Generate<br>[Generate]<br>[Generate]          | An alarm is generated by the event.<br>Default value. |

|   | Value                                                             | Description                                                                                                                                                              |
|---|-------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Acknowledge<br>[Ack]<br>[Acknowledge]                             | An alarm is generated by the event that must be confirmed by the user, using the Alarm/Event acknowledge function.                                                       |
| – | Monitor<br>[Monitor]<br>[Monitor]                                 | Diagnostics data is logged when the event occurs.                                                                                                                        |
| – | Monitor + Acknowledge<br>[Monitor+ack]<br>[Monitor + Acknowledge] | An alarm is generated by the event that must be confirmed by the user, using the Alarm/Event acknowledge function, and diagnostics data is logged when the event occurs. |

### Event setting temperature fixed

Ⓐ [Diag/Service] ► [Alm/Evt bhvr set] ► [Warn] ► [Var] ► [Evt temp fix]

Ⓜ [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Warnings/Information] ► [Variables] ► [Event setting temperature fixed]

Defines the device behavior when the following warning occurs:

704:Temperature Fixed

[704:Temp fix]

|   | Value                                                             | Description                                                                                                                                                              |
|---|-------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Ignore<br>[Ignore]<br>[Ignore]                                    | Event does not have any effect.                                                                                                                                          |
| – | History only<br>[Hist only]<br>[History only]                     | Pre-defined Event is recorded in the device history.                                                                                                                     |
| – | Generate<br>[Generate]<br>[Generate]                              | An alarm is generated by the event.<br>Default value.                                                                                                                    |
| – | Acknowledge<br>[Ack]<br>[Acknowledge]                             | An alarm is generated by the event that must be confirmed by the user, using the Alarm/Event acknowledge function.                                                       |
| – | Monitor<br>[Monitor]<br>[Monitor]                                 | Diagnostics data is logged when the event occurs.                                                                                                                        |
| – | Monitor + Acknowledge<br>[Monitor+ack]<br>[Monitor + Acknowledge] | An alarm is generated by the event that must be confirmed by the user, using the Alarm/Event acknowledge function, and diagnostics data is logged when the event occurs. |



**Event setting  
pressure fixed**

① [Diag/Service] ► [Alm/Evt bhvr set] ► [Warn] ► [Var] ► [Evt pres fix]

② [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Warnings/Information] ► [Variables] ► [Event setting pressure fixed]

Defines the device behavior when the following warning occurs:

705: Pressure fixed

[705:Pres fix]

|   | Value                                                                | Description                                                                                                                                                              |
|---|----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Ignore<br>[Ignore]<br>[Ignore]                                       | Event does not have any effect.<br>Default value.                                                                                                                        |
| – | History only<br>[Hist only]<br>[History only]                        | Pre-defined Event is recorded in the device history.                                                                                                                     |
| – | Generate<br>[Generate]<br>[Generate]                                 | An alarm is generated by the event.                                                                                                                                      |
| – | Acknowledge<br>[Ack]<br>[Acknowledge]                                | An alarm is generated by the event that must be confirmed by the user, using the Alarm/Event acknowledge function.                                                       |
| – | Monitor<br>[Monitor]<br>[Monitor]                                    | Diagnostics data is logged when the event occurs.                                                                                                                        |
| – | Monitor + Acknowledge<br>[Monitor+ack]<br>[Monitor +<br>Acknowledge] | An alarm is generated by the event that must be confirmed by the user, using the Alarm/Event acknowledge function, and diagnostics data is logged when the event occurs. |

**Event setting  
reference density  
fixed**

① [Diag/Service] ► [Alm/Evt bhvr set] ► [Warn] ► [Var] ► [Evt ref dens fix]

② [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Warnings/Information] ► [Variables] ► [Event setting reference density fixed]

Defines the device behavior when the following warning occurs:

706: Reference density fixed

[706:Ref dens fix]

|   | Value                                         | Description                                          |
|---|-----------------------------------------------|------------------------------------------------------|
| – | Ignore<br>[Ignore]<br>[Ignore]                | Event does not have any effect.<br>Default value.    |
| – | History only<br>[Hist only]<br>[History only] | Pre-defined Event is recorded in the device history. |

|   | Value                                              | Description                                                                                                                                                              |
|---|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | <b>[Generate]</b><br>[Generate]                    | An alarm is generated by the event.                                                                                                                                      |
| – | <b>[Ack]</b><br>[Acknowledge]                      | An alarm is generated by the event that must be confirmed by the user, using the Alarm/Event acknowledge function.                                                       |
| – | <b>[Monitor]</b><br>[Monitor]                      | Diagnostics data is logged when the event occurs.                                                                                                                        |
| – | <b>[Monitor+ack]</b><br>[Monitor +<br>Acknowledge] | An alarm is generated by the event that must be confirmed by the user, using the Alarm/Event acknowledge function, and diagnostics data is logged when the event occurs. |

### Event setting calorific value fixed

④ [Diag/Service] ► [Alm/Evt bhvr set] ► [Warn] ► [Var] ► [Evt cal fix]

⑤ [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Warnings/Information] ► [Variables] ► [Event setting calorific value fixed]

Defines the device behavior when the following warning occurs:

707: Calorific value fixed

[707:Cal fix]

|   | Value                                              | Description                                                                                                                                                              |
|---|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | <b>[Ignore]</b><br>[Ignore]                        | Event does not have any effect.<br>Default value.                                                                                                                        |
| – | <b>[Hist only]</b><br>[History only]               | Pre-defined Event is recorded in the device history.                                                                                                                     |
| – | <b>[Generate]</b><br>[Generate]                    | An alarm is generated by the event.                                                                                                                                      |
| – | <b>[Ack]</b><br>[Acknowledge]                      | An alarm is generated by the event that must be confirmed by the user, using the Alarm/Event acknowledge function.                                                       |
| – | <b>[Monitor]</b><br>[Monitor]                      | Diagnostics data is logged when the event occurs.                                                                                                                        |
| – | <b>[Monitor+ack]</b><br>[Monitor +<br>Acknowledge] | An alarm is generated by the event that must be confirmed by the user, using the Alarm/Event acknowledge function, and diagnostics data is logged when the event occurs. |

Event setting  
process variables  
trim

 [Diag/Service] ► [Alm/Evt bhvr set] ► [Warn] ► [Var] ► [Evt pro var trim]

 [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Warnings/Information] ► [Variables] ► [Event setting process variables trim]

Defines the device behavior when the following warning occurs:

715: Process variable trimming  
[715:Pro var trim]

|   | Value                                    | Description                                                                                                                                                              |
|---|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   | Ignore                                   |                                                                                                                                                                          |
| – | [Ignore]<br>[Ignore]                     | Event does not have any effect.                                                                                                                                          |
|   | History only                             |                                                                                                                                                                          |
| – | [Hist only]<br>[History only]            | Pre-defined Event is recorded in the device history.                                                                                                                     |
|   | Generate                                 |                                                                                                                                                                          |
| – | [Generate]<br>[Generate]                 | An alarm is generated by the event.<br>Default value.                                                                                                                    |
|   | Acknowledge                              |                                                                                                                                                                          |
| – | [Ack]<br>[Acknowledge]                   | An alarm is generated by the event that must be confirmed by the user, using the Alarm/Event acknowledge function.                                                       |
|   | Monitor                                  |                                                                                                                                                                          |
| – | [Monitor]<br>[Monitor]                   | Diagnostics data is logged when the event occurs.                                                                                                                        |
|   | Monitor + Acknowledge                    |                                                                                                                                                                          |
| – | [Monitor+ack]<br>[Monitor + Acknowledge] | An alarm is generated by the event that must be confirmed by the user, using the Alarm/Event acknowledge function, and diagnostics data is logged when the event occurs. |

**Output**

*Output* sets parameters that define the event action and acknowledge behaviour when a warning about output signals occurs.

The following overview shows the selectable menu items within the submenu *Output*.

|   | Full name                                            | Display name       | [Modbus] name                                          | Page   |
|---|------------------------------------------------------|--------------------|--------------------------------------------------------|--------|
| – | Event setting analog output saturated                | [Evt AO sat]       | [Event setting analog output saturated]                | [ 224] |
| – | Acknowledge behavior analog output saturated         | [Ack AO]           | [Acknowledge behavior analog output saturated]         | [ 225] |
| – | Event setting pulse status output 1 saturated        | [Evt pls/sts1 sat] | [Event setting pulse status output 1 saturated]        | [ 225] |
| – | Event setting pulse status output 2 saturated        | [Evt pls/sts2 sat] | [Event setting pulse status output 2 saturated]        | [ 226] |
| – | Acknowledge behavior pulse status output 1 saturated | [Ack pls/sts1]     | [Acknowledge behavior pulse status output 1 saturated] | [ 227] |
| – | Acknowledge behavior pulse status output 2 saturated | [Ack pls/sts2]     | [Acknowledge behavior pulse status output 2 saturated] | [ 227] |
| – | Event setting double pulse output saturated          | [Evt dbl pls sat]  | [Event setting double pulse output saturated]          | [ 228] |
| – | Acknowledge behavior double pulse output saturated   | [Ack dbl pls]      | [Acknowledge behavior double pulse output saturated]   | [ 229] |

**Event setting analog output saturated**

Ⓐ [Diag/Service] ► [Alm/Evt bhvr set] ► [Warn] ► [Out] ► [Evt AO sat]

Ⓜ [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Warnings/Information] ► [Output] ► [Event setting analog output saturated]

*Event setting analog output saturated* defines the device behavior when the following warning occurs:

717: Analog output saturated

717:AO saturte

|   | Value                                         | Description                                           |
|---|-----------------------------------------------|-------------------------------------------------------|
| – | Ignore<br>[Ignore]                            | Event does not have any effect.                       |
| – | History only<br>[Hist only]<br>[History only] | Pre-defined Event is recorded in the device history.  |
| – | Generate<br>[Generate]<br>[Generate]          | An alarm is generated by the event.<br>Default value. |

|   | Value                                                                    | Description                                                                                                                                                              |
|---|--------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | <b>Acknowledge</b><br>[Ack]<br>[Acknowledge]                             | An alarm is generated by the event that must be confirmed by the user, using the Alarm/Event acknowledge function.                                                       |
| – | <b>Monitor</b><br>[Monitor]<br>[Monitor]                                 | Diagnostics data is logged when event occurs.                                                                                                                            |
| – | <b>Monitor + Acknowledge</b><br>[Monitor+ack]<br>[Monitor + Acknowledge] | An alarm is generated by the event that must be confirmed by the user, using the Alarm/Event acknowledge function, and diagnostics data is logged when the event occurs. |

### Acknowledge behavior analog output saturated

⌚ [Diag/Service] ► [Alm/Evt bhvr set] ► [Warn] ► [Out] ► [Ack AO]

Ⓜ [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Warnings/Information] ► [Output] ► [Acknowledge behavior analog output saturated]

*Acknowledge behavior analog output saturated* defines the device behavior when the following warning occurs:

717: Analog output saturated

717:AO saturte

|   | Value                                                            | Description                                                                                      |
|---|------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| – | <b>Software burnout</b><br>[Soft burn out]<br>[Software burnout] | When this alarm event occurs, device outputs go into predefined error states.                    |
| – | <b>Alarm output</b><br>[Alm out]<br>[Alarm output]               | When this alarm event occurs, device outputs go to defined outputs in each alarm output setting. |
| – | <b>Continue</b><br>[Cont]<br>[Continue]                          | Operation is continued.<br>Default value.                                                        |

### Event setting pulse status output 1 saturated

⌚ [Diag/Service] ► [Alm/Evt bhvr set] ► [Warn] ► [Pls/Sts out] ► [Evt pls/sts1 sat]

Ⓜ [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Warnings/Information] ► [Output] ► [Event setting pulse status output 1 saturated]

*Event setting pulse status output 1 saturated* defines the device behavior when the following warning occurs:

718: Pulse output 1 saturated

718:Pls1 saturte

|   | Value                                       | Description                                                                                                                                                              |
|---|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   | Ignore                                      |                                                                                                                                                                          |
| – | [Ignore]<br>[Ignore]                        | Event does not have any effect.                                                                                                                                          |
|   | History only                                |                                                                                                                                                                          |
| – | [Hist only]<br>[History only]               | Pre-defined Event is recorded in the device history.                                                                                                                     |
|   | Generate                                    |                                                                                                                                                                          |
| – | [Generate]<br>[Generate]                    | An alarm is generated by the event.<br>Default value.                                                                                                                    |
|   | Acknowledge                                 |                                                                                                                                                                          |
| – | [Ack]<br>[Acknowledge]                      | An alarm is generated by the event that must be confirmed by the user, using the Alarm/Event acknowledge function.                                                       |
|   | Monitor                                     |                                                                                                                                                                          |
| – | [Monitor]<br>[Monitor]                      | Diagnostics data is logged when the event occurs.                                                                                                                        |
|   | Monitor + Acknowledge                       |                                                                                                                                                                          |
| – | [Monitor+ack]<br>[Monitor +<br>Acknowledge] | An alarm is generated by the event that must be confirmed by the user, using the Alarm/Event acknowledge function, and diagnostics data is logged when the event occurs. |

### Event setting pulse status output 2 saturated

Ⓐ [Diag/Service] ► [Alm/Evt bhvr set] ► [Warn] ► [Pls/Sts out] ► [Evt pls/sts2 sat]

Ⓜ [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Warnings/Information] ► [Output] ► [Event setting pulse status output 2 saturated]

*Event setting pulse status output 2 saturated* defines the device behavior when the following warning occurs:

719: Pulse output 2 saturated

719:Pls2 saturte

|   | Value                         | Description                                                                                                        |
|---|-------------------------------|--------------------------------------------------------------------------------------------------------------------|
|   | Ignore                        |                                                                                                                    |
| – | [Ignore]<br>[Ignore]          | Event does not have any effect.                                                                                    |
|   | History only                  |                                                                                                                    |
| – | [Hist only]<br>[History only] | Pre-defined Event is recorded in the device history.                                                               |
|   | Generate                      |                                                                                                                    |
| – | [Generate]<br>[Generate]      | An alarm is generated by the event.<br>Default value.                                                              |
|   | Acknowledge                   |                                                                                                                    |
| – | [Ack]<br>[Acknowledge]        | An alarm is generated by the event that must be confirmed by the user, using the Alarm/Event acknowledge function. |

|   | Value                                                                    | Description                                                                                                                                                              |
|---|--------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | <b>Monitor</b><br>[Monitor]<br>[Monitor]                                 | Diagnostics data is logged when the event occurs.                                                                                                                        |
| – | <b>Monitor + Acknowledge</b><br>[Monitor+ack]<br>[Monitor + Acknowledge] | An alarm is generated by the event that must be confirmed by the user, using the Alarm/Event acknowledge function, and diagnostics data is logged when the event occurs. |

#### Acknowledge behavior pulse status output 1 saturated

① [Diag/Service] ► [Alm/Evt bhvr set] ► [Warn] ► [Pls/Sts out] ► [Ack pls/sts1]

⑨ [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Warnings/Information] ► [Output] ► [Acknowledge behavior pulse status output 1 saturated]

*Acknowledge behavior pulse status output 1 saturated* defines the device behavior when the following warning occurs:

718: Pulse output 1 saturated

718:Pls1 saturte

|   | Value                                                            | Description                                                                                      |
|---|------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| – | <b>Software burnout</b><br>[Soft burn out]<br>[Software burnout] | When this alarm event occurs, device outputs go into predefined error states.                    |
| – | <b>Alarm output</b><br>[Alm out]<br>[Alarm output]               | When this alarm event occurs, device outputs go to defined outputs in each alarm output setting. |
| – | <b>Continue</b><br>[Cont]<br>[Continue]                          | Operation is continued.<br>Default value.                                                        |

#### Acknowledge behavior pulse status output 2 saturated

① [Diag/Service] ► [Alm/Evt bhvr set] ► [Warn] ► [Pls/Sts out] ► [Ack pls/sts2]

⑨ [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Warnings/Information] ► [Output] ► [Acknowledge behavior pulse status output 2 saturated]

*Acknowledge behavior pulse status output 2 saturated* defines the device behavior when the following warning occurs:

719: Pulse output 2 saturated

719:Pls2 saturte

|   | Value                                                            | Description                                                                   |
|---|------------------------------------------------------------------|-------------------------------------------------------------------------------|
| – | <b>Software burnout</b><br>[Soft burn out]<br>[Software burnout] | When this alarm event occurs, device outputs go into predefined error states. |

|   | Value                                          | Description                                                                                      |
|---|------------------------------------------------|--------------------------------------------------------------------------------------------------|
| – | <b>[Alm out]</b><br>[Alarm output]             | When this alarm event occurs, device outputs go to defined outputs in each alarm output setting. |
| – | <b>Continue</b><br><b>[Cont]</b><br>[Continue] | Operation is continued.<br>Default value.                                                        |

### Event setting double pulse output saturated

Ⓐ [Diag/Service] ► [Alm/Evt bhvr set] ► [Warn] ► [Pls/Sts out] ► [Evt dbl pls sat]

Ⓜ [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Warnings/Information] ► [Output] ► [Event setting double pulse output saturated]

*Event setting double pulse output saturated* defines the device behavior when the following warning occurs:

720: Double pulse output saturated

720:Dbl pls saturte

|   | Value                                                                           | Description                                                                                                                                                              |
|---|---------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | <b>Ignore</b><br><b>[Ignore]</b><br>[Ignore]                                    | Event does not have any effect.                                                                                                                                          |
| – | <b>History only</b><br><b>[Hist only]</b><br>[History only]                     | Pre-defined Event is recorded in the device history.                                                                                                                     |
| – | <b>Generate</b><br><b>[Generate]</b><br>[Generate]                              | An alarm is generated by the event.<br>Default value.                                                                                                                    |
| – | <b>Acknowledge</b><br><b>[Ack]</b><br>[Acknowledge]                             | An alarm is generated by the event that must be confirmed by the user, using the Alarm/Event acknowledge function.                                                       |
| – | <b>Monitor</b><br><b>[Monitor]</b><br>[Monitor]                                 | Diagnostics data is logged when the event occurs.                                                                                                                        |
| – | <b>Monitor + Acknowledge</b><br><b>[Monitor+ack]</b><br>[Monitor + Acknowledge] | An alarm is generated by the event that must be confirmed by the user, using the Alarm/Event acknowledge function, and diagnostics data is logged when the event occurs. |



**Acknowledge behavior double pulse out saturated**

① [Diag/Service] ► [Alm/Evt bhvr set] ► [Warn] ► [Pls/Sts out] ► [Ack dbl pls]

② [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Warnings/Information] ► [Output] ► [Acknowledge behavior double pulse out saturated]

*Acknowledge behavior double pulse out saturated* defines the device behavior when the following warning occurs:

720: Double pulse output saturated

720:Dbl pls saturte

|   | Value                                                     | Description                                                                                      |
|---|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| – | Software burnout<br>[Soft burn out]<br>[Software burnout] | When this alarm event occurs, device outputs go into predefined error states.                    |
| – | Alarm output<br>[Alm out]<br>[Alarm output]               | When this alarm event occurs, device outputs go to defined outputs in each alarm output setting. |
| – | Continue<br>[Cont]<br>[Continue]                          | Operation is continued.<br>Default value.                                                        |

**Batch**

Sets parameters that define the event action when a warning about output signals occurs.

The following menus/settings are available:

|   | Full name                     | Display name      | [Modbus] name                   | Page    |
|---|-------------------------------|-------------------|---------------------------------|---------|
| – | Device behavior batch warning | [Bhvr batch warn] | [Device behavior batch warning] | [▶ 229] |

**Device behavior batch warning**

① [Diag/Service] ► [Alm/Evt bhvr set] ► [Warn] ► [Batch] ► [Bhvr batch warn]

② [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Warnings/Information] ► [Batch] ► [Device behavior batch warning]

*Event setting batch warning* defines the device behavior when the following warning occurs:

732: Batch progress indication

732:Batch progress

|   | Value                                         | Description                                          |
|---|-----------------------------------------------|------------------------------------------------------|
| – | Ignore<br>[Ignore]<br>[Ignore]                | Event does not have any effect.                      |
| – | History only<br>[Hist only]<br>[History only] | Pre-defined Event is recorded in the device history. |

|   | Value                                                                       | Description                                                                                                                                                              |
|---|-----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | <b>Generate</b><br>[Generate]<br>[Generate]                                 | An alarm is generated by the event.<br>Default value.                                                                                                                    |
| – | <b>Acknowledge</b><br>[Ack]<br>[Acknowledge]                                | An alarm is generated by the event that must be confirmed by the user, using the Alarm/Event acknowledge function.                                                       |
| – | <b>Monitor</b><br>[Monitor]<br>[Monitor]                                    | Diagnostics data is logged when the event occurs.                                                                                                                        |
| – | <b>Monitor + Acknowledge</b><br>[Monitor+ack]<br>[Monitor +<br>Acknowledge] | An alarm is generated by the event that must be confirmed by the user, using the Alarm/Event acknowledge function, and diagnostics data is logged when the event occurs. |

### Others

Sets the parameters that define the device behavior when other warnings occur.

The following menus/settings are available:

|   | Full name                        | Display name        | [Modbus] name                      | Page    |
|---|----------------------------------|---------------------|------------------------------------|---------|
| – | Event setting date/time not set  | [Evt not date/time] | [Event setting date/time not set]  | [▶ 230] |
| – | Device behavior maintenance mode | [Bhvr mainte mode]  | [Device behavior maintenance mode] | [▶ 231] |

### Event setting date/time not set

Ⓛ [Diag/Service] ▶ [Alm/Evt bhvr set] ▶ [Warn] ▶ [Others] ▶ [Evt not date/time]

Ⓜ [Maintenance root menu] ▶ [Alarm/Event behavior settings] ▶ [Warnings/Information] ▶ [Others] ▶ [Event setting date/time not set]

Defines the device behavior when the following warning occurs:

723: Date/Time not set

[723:Date/Time WARN]

|   | Value                                                | Description                                                                                                        |
|---|------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| – | <b>Ignore</b><br>[Ignore]<br>[Ignore]                | Event does not have any effect.<br>Default value.                                                                  |
| – | <b>History only</b><br>[Hist only]<br>[History only] | Pre-defined Event is recorded in the device history.                                                               |
| – | <b>Generate</b><br>[Generate]<br>[Generate]          | An alarm is generated by the event.                                                                                |
| – | <b>Acknowledge</b><br>[Ack]<br>[Acknowledge]         | An alarm is generated by the event that must be confirmed by the user, using the Alarm/Event acknowledge function. |

|   | Value                                                                    | Description                                                                                                                                                              |
|---|--------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | <b>Monitor</b><br>[Monitor]<br>[Monitor]                                 | Diagnostics data is logged when the event occurs.                                                                                                                        |
| – | <b>Monitor + Acknowledge</b><br>[Monitor+ack]<br>[Monitor + Acknowledge] | An alarm is generated by the event that must be confirmed by the user, using the Alarm/Event acknowledge function, and diagnostics data is logged when the event occurs. |

Device behavior maintenance mode

⌚ [Diag/Service] ► [Alm/Evt bhvr set] ► [Warn] ► [Others] ► [Bhvr mainte mode]

Ⓜ [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Warnings/Information] ► [Others] ► [Device behavior maintenance mode]

Defines the device behavior when the following warning occurs:

909:Maintenance Mode Running  
[909:Mainte mode]

|   | Value                                   | Description                                                                                      |
|---|-----------------------------------------|--------------------------------------------------------------------------------------------------|
| – | <b>Continue</b><br>[Cont]<br>[Continue] | Operation is continued.<br>Default value.                                                        |
| – | <b>Hold</b><br>[Hold]<br>[Hold]         | When this alarm event occurs, device outputs go to defined outputs in each alarm output setting. |

**Event setting lock status**

Sets the parameters that define the event setting when the device configuration is locked or unlocked.

The following menus/settings are available:

|   | Full name                                     | Display name       | [Modbus] name                                   | Page   |
|---|-----------------------------------------------|--------------------|-------------------------------------------------|--------|
| – | Event setting device configuration locked     | [Evt dev lock]     | [Event setting device configuration locked]     | [ 232] |
| – | Event setting device configuration not locked | [Evt dev not lock] | [Event setting device configuration not locked] | [ 233] |

**Event setting  
device  
configuration  
locked**

Ⓐ [Diag/Service] ► [Alm/Evt bhvr set] ► [Evt set lock] ► [Evt dev lock]

Ⓜ [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Event setting lock status] ► [Event setting device configuration locked]

Defines the device behavior when the configuration of the device is locked (write-protected) and the corresponding information icon appears.

For more detailed information about the protection symbols, see *Status icons* [ 15].

For more detailed information about the write protection function, see *Write protect* [ 599].

901: Device configuration locked

[901:Dev cfg lock]

|   | Value                                                             | Description                                                                                                                                                              |
|---|-------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Ignore<br>[Ignore]<br>[Ignore]                                    | Event does not have any effect.                                                                                                                                          |
| – | History only<br>[Hist only]<br>[History only]                     | Pre-defined Event is recorded in the device history.                                                                                                                     |
| – | Generate<br>[Generate]<br>[Generate]                              | An alarm is generated by the event.<br>Default value.                                                                                                                    |
| – | Acknowledge<br>[Ack]<br>[Acknowledge]                             | An alarm is generated by the event that must be confirmed by the user, using the Alarm/Event acknowledge function.                                                       |
| – | Monitor<br>[Monitor]<br>[Monitor]                                 | Diagnostics data is logged when the event occurs.                                                                                                                        |
| – | Monitor + Acknowledge<br>[Monitor+ack]<br>[Monitor + Acknowledge] | An alarm is generated by the event that must be confirmed by the user, using the Alarm/Event acknowledge function, and diagnostics data is logged when the event occurs. |

### Event setting device configuration not locked

① [Diag/Service] ► [Alm/Evt bhvr set] ► [Evt set lock] ► [Evt dev not lock]

② [Maintenance root menu] ► [Alarm/Event behavior settings] ► [Event setting lock status] ► [Event setting device configuration not locked]

Defines the device behavior when the configuration of the device is unlocked and the corresponding information icon appears.

For more detailed information about the protection symbols, see *Status icons* [ 15].

For more detailed information about the read-write function, see *Write protect* [ 599] .

902: Device configuration not locked

[902:No dev cfg lock]

|   | Value                                                             | Description                                                                                                                                                              |
|---|-------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Ignore<br>[Ignore]<br>[Ignore]                                    | Event does not have any effect.<br>Default value.                                                                                                                        |
| – | History only<br>[Hist only]<br>[History only]                     | Pre-defined Event is recorded in the device history.                                                                                                                     |
| – | Generate<br>[Generate]<br>[Generate]                              | An alarm is generated by the event.                                                                                                                                      |
| – | Acknowledge<br>[Ack]<br>[Acknowledge]                             | An alarm is generated by the event that must be confirmed by the user, using the Alarm/Event acknowledge function.                                                       |
| – | Monitor<br>[Monitor]<br>[Monitor]                                 | Diagnostics data is logged when the event occurs.                                                                                                                        |
| – | Monitor + Acknowledge<br>[Monitor+ack]<br>[Monitor + Acknowledge] | An alarm is generated by the event that must be confirmed by the user, using the Alarm/Event acknowledge function, and diagnostics data is logged when the event occurs. |

**5.4.11 Standard diagnostics**

Sets the parameters for configuring standard diagnostic functions.

The following menus/settings are available:

|   | Full name                                   | Display name   | [Modbus] name                                | Page   |
|---|---------------------------------------------|----------------|----------------------------------------------|--------|
| – | Standard diagnostics: additional parameters | [Std diag add] | [Standard diagnostics additional parameters] | [ 234] |
| – | Slug detection                              | [Slug]         | [Slug detection]                             | [ 234] |
| – | Empty pipe detection                        | [Empty]        | [Empty pipe detection]                       | [ 238] |
| – | Corrosion detection                         | [Crrsn]        | [Corrosion detection]                        | [ 239] |

**Standard diagnostics:  
additional  
parameters**

Ⓐ [Diag/Service] ► [Std diag] ► [Std diag add]

Ⓜ [Maintenance root menu] ► [Standard diagnostics] ► [Standard diagnostics additional parameters]

Sets the parameters for enabling or disabling access to the menu for standard diagnostic parameters.

|   | Value                                   | Description                                                            |
|---|-----------------------------------------|------------------------------------------------------------------------|
| – | Not apply<br>[Not apply]<br>[Not apply] | Menu for standard diagnostic parameters is disabled.<br>Default value. |
| – | Apply<br>[Apply]<br>[Apply]             | Menu for standard diagnostic parameters is enabled.                    |

**Slug detection**

Sets the parameters for configuring the slug detection function.

The following menus/settings are available:

|   | Full name                        | Display name      | [Modbus] name                      | Page   |
|---|----------------------------------|-------------------|------------------------------------|--------|
| – | Slug detection level             | [Slug lvl]        | [Slug detection level]             | [ 235] |
| – | Slug hysteresis                  | [Slug hys]        | [Slug hysteresis]                  | [ 235] |
| – | After slug mass flow             | [After slug mass] | [After slug mass flow]             | [ 235] |
| – | After slug density               | [After slug dens] | [After slug density ]              | [ 235] |
| – | Average start time               | [Start time]      | [Average start time]               | [ 236] |
| – | Average end time                 | [End time]        | [Average end time]                 | [ 236] |
| – | After slug mass flow fixed value | [Fix mass]        | [After slug mass flow fixed value] | [ 236] |
| – | After slug density fixed value   | [Fix dens]        | [After slug density fixed value]   | [ 237] |
| – | Slug alarm delay                 | [Slug alm delay]  | [Slug alarm delay]                 | [ 237] |
| Ⓜ | Drive current damping            | –                 | [Drive current damping]            | [ 237] |

**Slug detection level**

① [Diag/Service] ► [Std diag] ► [Slug] ► [Slug lvl]

② [Maintenance root menu] ► [Standard diagnostics] ► [Slug detection] ► [Slug detection level]

Sets a threshold level for activating the slug alarm. This level is set by using the drive current. If the actual drive current with the damping defined by the drive current damping parameter exceeds this level, the slug alarm is activated. The threshold value is set to a conservative value at the factory. It may need to be adjusted for customer-specific applications, if false slug detection alarms occur or if the alarm is not sensitive enough to detect the of slug flow.

|   | Value          | Description                                                    |
|---|----------------|----------------------------------------------------------------|
| – | Numeric digits | Setting range: 0.0 – 500.0 mApp.<br>Default value is 350 mApp. |

**Slug hysteresis**

① [Diag/Service] ► [Std diag] ► [Slug] ► [Slug hys]

② [Maintenance root menu] ► [Standard diagnostics] ► [Slug detection] ► [Slug hysteresis]

Sets a hysteresis value for deactivating the slug alarm. The value is set as a percentage of the slug detection level.

|   | Value          | Description                                               |
|---|----------------|-----------------------------------------------------------|
| – | Numeric digits | Setting range: 0.0 – 100.0 %.<br>Default value is 10.0 %. |

**After slug mass flow**

① [Diag/Service] ► [Std diag] ► [Slug] ► [After slug mass]

② [Maintenance root menu] ► [Standard diagnostics] ► [Slug detection] ► [After slug mass flow]

Sets the mass flow value during a slug alarm or when the drive current exceeds the slug detection level.

|   |                                                  |                                                                           |
|---|--------------------------------------------------|---------------------------------------------------------------------------|
| – | Measured value<br>[Meas val]<br>[Measured value] | Actual measured mass flow values during the slug alarm.<br>Default value. |
| – | Hold<br>[Hold]<br>[Hold]                         | Measured mass flow values before the slug alarm are held and output.      |
| – | Fixed value<br>[Fix val]<br>[Fixed value]        | After slug mass flow fixed value is used during slug alarm output.        |

**After slug density**

① [Diag/Service] ► [Std diag] ► [Slug] ► [After slug dens]

② [Maintenance root menu] ► [Standard diagnostics] ► [Slug detection] ► [After slug density]

Sets the Density value during slug alarm or when the driving current exceeds Slug detection level.

|   |                                                  |                                                                                                                                                                            |
|---|--------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Measured value<br>[Meas val]<br>[Measured value] | Actual measured density value during slug alarm output. If fixed value is selected and set for these process variables, specified fixed value is output.<br>Default value. |
| – | Hold<br>[Hold]<br>[Hold]                         | Measured density value before slug alarm are held and output. If fixed value is selected and set for these process variables, specified fixed value is output.             |
| – | Fixed value<br>[Fix val]<br>[Fixed value]        | After slug density fixed value is used during slug alarm output.                                                                                                           |

**Average start time**

Ⓐ [Diag/Service] ► [Std diag] ► [Slug] ► [Start time]

Ⓜ [Maintenance root menu] ► [Standard diagnostics] ► [Slug detection] ► [Avg start time]

This parameter is available to set when calculation of average value is started after Slug Detection is released. During this period:

- Average value is not calculated /updated
- Slug Detection judgment handling is not done
- Density value keeps *Hold*

In addition, when parameter of status of value for Density is changed from *Bad* to *Not Bad*, Average value is also not calculated /updated during this period.

|   | Value          | Description                                               |
|---|----------------|-----------------------------------------------------------|
| – | Numeric digits | Setting range: 0 – 30 [sec].<br>Default value is 5 [sec]. |

**Average end time**

Ⓐ [Diag/Service] ► [Std diag] ► [Slug] ► [End time]

Ⓜ [Maintenance root menu] ► [Standard diagnostics] ► [Slug detection] ► [Avg end time]

This parameter can be set when calculation of the average value is started after Slug Detection is released.

If 0sec is set in this parameter, last valid value is used for Hold when Slug Density occurred. Otherwise, the average value is used.

|   | Value          | Description                                               |
|---|----------------|-----------------------------------------------------------|
| – | Numeric digits | Setting range: 0 – 30 [sec].<br>Default value is 5 [sec]. |

**After slug mass flow fixed value**

Ⓐ [Diag/Service] ► [Std diag] ► [Slug] ► [Fix mass]

Ⓜ [Maintenance root menu] ► [Standard diagnostics] ► [Slug detection] ► [After slug mass flow fixed value]

Sets the fixed value for Mass flow during Slug alarm output. This value is only available when Fixed value is selected in After slug mass flow.

|   | Value          | Description               |
|---|----------------|---------------------------|
| – | Numeric digits | Default value is 0 [t/h]. |



**After slug density fixed value**

① [Diag/Service] ► [Std diag] ► [Slug] ► [Fix dens]

Ⓜ [Maintenance root menu] ► [Standard diagnostics] ► [Slug detection] ► [After slug density fixed value]

Sets the fixed value for Density during Slug alarm output. This value is only available when Fixed value is selected in After slug density.

|   | Value          | Description               |
|---|----------------|---------------------------|
| – | Numeric digits | Default value is 0 [t/h]. |

**Slug alarm delay**

① [Diag/Service] ► [Std diag] ► [Slug] ► [Slug alm delay]

Ⓜ [Maintenance root menu] ► [Standard diagnostics] ► [Slug detection] ► [Slug alarm delay]

Sets the delay time between slug detection and the occurrence of the alarm.

Slug detection occurs when the drive current exceeds the threshold slug detection level.

|   | Value          | Description                                              |
|---|----------------|----------------------------------------------------------|
| – | Numeric digits | Setting range: 0.0 – 120.0 s.<br>Default value is 0.0 s. |

**Drive current damping**

Ⓜ [Maintenance root menu] ► [Standard diagnostics] ► [Slug detection] ► [Drive current damping]

This parameter can be set in the following menu/menus:

- *Detailed setup* [► 469]

Sets the damping constant for the Drive current.

The value is the time it takes for this value to become 63.2 % of the total amount of change.

|   | Value          | Description                                              |
|---|----------------|----------------------------------------------------------|
| Ⓜ | Numeric digits | Setting range: 0.0 – 200.0 s.<br>Default value is 3.0 s. |

**Empty pipe detection**

Sets the parameters for configuring the empty pipe detection function.

The following menus/settings are available:

|   | Full name              | Display name      | [Modbus] name            | Page   |
|---|------------------------|-------------------|--------------------------|--------|
| – | Empty pipe criteria    | [Empty crit]      | [Empty pipe criteria]    | [ 238] |
| – | After empty pipe       | [After empty]     | [After empty pipe]       | [ 238] |
| – | Empty pipe alarm delay | [Empty alm delay] | [Empty pipe alarm delay] | [ 238] |

**Empty pipe criteria**

Ⓐ [Diag/Service] ► [Std diag] ► [Empty] ► [Empty crit]

Ⓜ [Maintenance root menu] ► [Standard diagnostics] ► [Empty pipe detection] ► [Empty pipe criteria]

Sets the threshold density value for activating the empty alarm. If the measured density is lower than this value, the empty pipe alarm is activated.

|   | Value          | Description                                                                                                                                       |
|---|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | Setting range: 0.0 – Maximum density value.<br>Default value is 0.0.<br>Unit correspondent to the customer configuration for density measurement. |

**After empty pipe**

Ⓐ [Diag/Service] ► [Std diag] ► [Empty] ► [After empty]

Ⓜ [Maintenance root menu] ► [Standard diagnostics] ► [Empty pipe detection] ► [After empty pipe]

Sets the mass flow value during an empty pipe alarm or when the density value falls below the value of the empty pipe criterion.

|   | Value                                            | Description                                                                          |
|---|--------------------------------------------------|--------------------------------------------------------------------------------------|
| – | Mass flow=Zero<br>[0%]<br>[0%]                   | Mass flow value is set to 0.<br>Default value.                                       |
| – | Measured value<br>[Meas val]<br>[Measured value] | Actual measured mass flow and density values during the empty pipe alarm are output. |
| – | Hold<br>[Hold]<br>[Hold]                         | Measured mass flow and density values before the slug alarm are held and output.     |

**Empty pipe alarm delay**

Ⓐ [Diag/Service] ► [Std diag] ► [Empty] ► [Empty alm delay]

Ⓜ [Maintenance root menu] ► [Standard diagnostics] ► [Empty pipe detection] ► [Empty pipe alarm delay]

Sets the delay time between the empty pipe detection and the occurrence of the alarm. Empty pipe detection occurs when the measured density falls below the value of the empty pipe criterion.

|   | Value          | Description                                                  |
|---|----------------|--------------------------------------------------------------|
| – | Numeric digits | Setting range: 0.0 – 120.0 min.<br>Default value is 5.0 min. |

### Corrosion detection

Sets parameters for configuring the corrosion detection function.

The corrosion detection function works on the principle that corroded pipes show a lower resonance frequency. This causes the measured density to increase. An upper limit for the measured density can thus be used for the detection of pipe corrosion, if the process medium's density is sufficiently well known.

The following menus/settings are available:

|   | Full name          | Display name | [Modbus] name        | Page    |
|---|--------------------|--------------|----------------------|---------|
| – | Corrosion criteria | [Crrsn crit] | [Corrosion criteria] | [▶ 239] |
| – | Corrosion damping  | [Crrsn damp] | [Corrosion damping]  | [▶ 239] |

#### Corrosion criteria

① [Diag/Service] ▶ [Std diag] ▶ [Crrsn] ▶ [Crrsn crit]

Ⓜ [Maintenance root menu] ▶ [Standard diagnostics] ▶ [Corrosion detection] ▶ [Corrosion criteria]

Sets threshold density value for activating the corrosion alarm. If the measured density with the damping that has been defined by the corrosion damping parameter is larger than this value, the corrosion alarm is activated.

|   | Value          | Description                                                                                                                                  |
|---|----------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | Setting range: 0.0 – Maximum density value.<br>Default value is 1.5.<br>Unit corresponds to the customer definition for density measurement. |

#### Corrosion damping

① [Diag/Service] ▶ [Std diag] ▶ [Crrsn] ▶ [Crrsn damp]

Ⓜ [Maintenance root menu] ▶ [Standard diagnostics] ▶ [Corrosion detection] ▶ [Corrosion damping]

Sets the damping time for the density value that is used for corrosion detection.

|   | Value          | Description                                            |
|---|----------------|--------------------------------------------------------|
| – | Numeric digits | Setting range: 0.0 – 10.0 h.<br>Default value is 10 h. |

## 5.4.12 Total health check

Shows the device integrity from the result of Events/Alarms related to measurement and Tube health check (if the option TC is active).

The following menus/settings are available:

|   | Full name           | Display name        | [Modbus] name         | Page   |
|---|---------------------|---------------------|-----------------------|--------|
| Ⓔ | Total health result | [Ttl health result] | [Total health result] | [ 240] |
| Ⓔ | Tube health check   | [Tube health chk]   | [Tube health check]   | [ 241] |

## Total health check

## Total health result

Ⓔ [Diag/Service] ► [Ttl health chk] ► [Ttl health result]

Ⓔ [Maintenance root menu] ► [Total health check] ► [Total health result]

This parameter shows the current device integrity.

|  | Display parameter                                                                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--|---------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Good (with TuHC and No critical failure)<br>- [Good(with TuHC)]<br>[Good (with TuHC and No critical failure)] | The following conditions are applied: <ul style="list-style-type: none"> <li>Result of TuHC(TuHC health result) is OK</li> <li>System alarm status 0,1,2,3 and Process alarm status 0 are not set</li> </ul> Icon can be displayed on Indicator by setting <i>On</i> in Display total health result. Despite this status, this icon is not displayed when configuration error or warning etc. occurs and then the alarm icon is displayed on indicator.                                      |
|  | Good (No critical failure)<br>- [Good]<br>[Good (No critical failure)]                                        | The following conditions are applied: <ul style="list-style-type: none"> <li>Result of TuHC(TuHC health result) is OK over 24hours or TuHC is not done (Not execute)</li> <li>System alarm status 0,1,2,3 and Process alarm status 0 are not set</li> </ul> Icon can be displayed on Indicator by setting "On" in Display total health result. Even if this status, this icon is not displayed when configuration error or warning etc occurs and then alarm icon is displayed on indicator. |
|  | Warning<br>- [Warn]<br>[Warning]                                                                              | The following conditions are applied: <ul style="list-style-type: none"> <li>Result of TuHC(TuHC health result) is Warning</li> <li>System alarm status 0,1,2,3 and Process alarm status 0 are not set</li> </ul>                                                                                                                                                                                                                                                                            |
|  | Error<br>- [Error]<br>[Error]                                                                                 | The following 1 or more conditions are applied: <ul style="list-style-type: none"> <li>Result of TuHC(TuHC health result) is Bad</li> <li>1 or more alarms of System alarm status 0,1,2,3 or Process alarm status 0 are set</li> </ul>                                                                                                                                                                                                                                                       |
|  | Start<br>- [Start]<br>[Start]                                                                                 | Start status and parameter update is not started yet.                                                                                                                                                                                                                                                                                                                                                                                                                                        |

### Tube health check

Sets the parameters for configuring the tube health check function (TuHC).

The tube health check function detects corrosion and erosion in the tubes by measuring the tube stiffness. Flow meter functions, such as flow and density measurement, are not interrupted while this function is run. The stiffness of the detection tubes decreases when the wall of the tubes becomes thinner due to corrosion and erosion. If the wall thickness of the detection tubes decreases uniformly, the stiffness varies almost in proportion to the difference in wall thickness. The proportion is determined by the inner diameter and the wall thickness of the tube. A change in stiffness produces a measuring error for flow and density.

The tube health check function does not guarantee the accuracy of flow and density measurements, but diagnoses the safety of the Coriolis flow meters. The tube health check function is not intended to measure the absolute stiffness value; rather, it is intended to measure changes in stiffness from the time reference data is acquired.

When the tube health check function is enabled by setting it to Enable, the function runs the check during specified times and intervals. If the measured change in stiffness exceeds the threshold value (*TuHC stiffness change limit TuHC configuration* [▶ 247]), the function raises an alarm 203. If the test stops before it has been completed, the function raises an alarm 722. In addition to the alarm, test results are output via a special parameter dedicated to the function. Test results include the determination of corrosion, the alarm flag and the change in stiffness.

It takes approximately 90 – 120 seconds for a single test. It takes approximately 120 – 180 seconds for reference data acquisition and the initial test after turning the power on.

Reference data is obtained during production of the device, but it is recommended that the reference data be acquired with customer fluid and an installed flow meter. Test values are affected by the stability of the measuring environment. The recommended measuring conditions are as follows:

- Temperature: The difference in temperature between when reference data is obtained and when the test is conducted should be within 20 °C. A warning is produced in measurement results if fluid (sensor) temperature fluctuates radically. Stabilize temperature so fluctuation does not exceed 0.1 °C/min.
- Pressure: If pressure is not input from outside, set pressure value manually. A warning is produced in measurement results if the pressure fluctuates radically.
- Density: A compensation is performed, but reference data should be acquired using fluid when test is executed. Variation should not exceed  $\pm 0.1$  kg/L when reference data is acquired and when test is conducted. An error is produced in measurement results if density fluctuates radically.
- Flow: "Flow noise" is produced by fluid flow, which in turn produces disparity in test values. If sufficient accuracy cannot be obtained, a warning is output to test results. Test should be conducted with low flow rate (max. 25 % of  $Q_{nom}$ ).  $Q_{nom}$  is refer to General Specification (GS) of each product.
- Flow: Foam/secondary flow could affect test results. A high flow rate should therefore be avoided.

The following menus/settings are available:

|   | Full name                               | Display name          | [Modbus] name                             | Page    |
|---|-----------------------------------------|-----------------------|-------------------------------------------|---------|
| Ⓔ | TuHC enable                             | [Enable]              | [TuHC enable]                             | [▶ 242] |
| Ⓔ | Tube health check additional parameters | [Tube health chk add] | [Tube health check additional parameters] | [▶ 243] |
| Ⓔ | TuHC result                             | [TuHC result]         | [TuHC result]                             | [▶ 243] |
| Ⓔ | TuHC configuration                      | [TuHC cfg]            | [TuHC configuration]                      | [▶ 246] |
| Ⓔ | TuHC execution/status                   | [TuHC op]             | [TuHC execution/status]                   | [▶ 250] |
| Ⓔ | TuHC reference data                     | [TuHC ref data]       | [TuHC reference data]                     | [▶ 256] |

## TuHC enable

Ⓐ [Diag/Service] ► [Ttl health chk] ► [TuHC op] ► [Enable]

Ⓜ [Maintenance root menu] ► [Total health check] ► [Tube health check] ► [TuHC enable]

This parameter can be set in the following menu/menus:

- *TuHC execution/status* [► 251]

|   | Value                                                                                                | Description                                                                                                                                                                                 |
|---|------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓜ | Not running<br>[Not run]<br>[Not running]                                                            | Indicates that the tube health check has not been executed. If it is set, the test is interrupted before completion.                                                                        |
| Ⓜ | Start tube health check<br>[Start TuHC]<br>[Start Tube Health Check]                                 | Executes the tube health check. If multiple tests are to be executed consecutively, leave Start tube health check unchanged until the test has been executed the specified number of times. |
| Ⓜ | Take reference<br>[Take ref]<br>[Take Reference]                                                     | Acquires reference data.                                                                                                                                                                    |
| Ⓜ | AGC test<br>[AGC test]<br>[AGC Test]                                                                 | Function that self-checks the stability test. Executes the stability test in automatic gain control mode. Stiffness is not measured.                                                        |
| Ⓜ | Copy current result to reference<br>[Copy result to ref]<br>[Copy current result to reference]       | Copies the test results to the reference data. This function is not effective, if the next diagnostic has started.                                                                          |
| Ⓜ | Copy reference from shipment to test<br>[Copy ref to test]<br>[Copy reference from shipment to test] | Copies the shipment reference to the reference data.                                                                                                                                        |
| Ⓜ | Initialize result and flags<br>[Init result flag]<br>[Initialize result and flags]                   | Resets the internal TuHC alarm and TuHC warning.                                                                                                                                            |
| Ⓜ | Initialize counter<br>[Init cnt]<br>[Initialize counter]                                             | Resets the test counter.                                                                                                                                                                    |
| Ⓜ | Initialize coeff for FDG<br>[Init coeff FDG]<br>[Initialize coeff for FDG]                           | Resets the drive gain control coefficient. The next test starts following adjustment of the coefficient. This is a maintenance function.                                                    |

|   | Value                                                                            | Description                                                                         |
|---|----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Ⓢ | Clear reference<br>[Clr ref]<br>[Clear reference]                                | Clears the reference data for the test.                                             |
| Ⓢ | Clear all history<br>[Clr all hist]<br>[Clear all history]                       | Sets all histories and current history number to 0. This is a maintenance function. |
| Ⓢ | Start one TuHC as interrupt<br>[Start one TuHC]<br>[Start one TuHC as interrupt] | Starts one tube health check immediately.                                           |

### Tube health check additional parameters

Ⓛ [Diag/Service] ► [Ttl health chk] ► [Tube health chk] ► [Tube health chk add]

Ⓢ [Maintenance root menu] ► [Total health check] ► [Tube health check] ► [Tube health check additional parameters]

Sets parameters for enabling or disabling the menu to access the tube health check parameters. To access the parameters, it has to be set to Apply.

|   | Value                                   | Description                                               |
|---|-----------------------------------------|-----------------------------------------------------------|
| Ⓢ | Not apply<br>[Not apply]<br>[Not apply] | Menu for Tube health check is disabled.<br>Default value. |
| Ⓢ | Apply<br>[Apply]<br>[Apply]             | The menu is enabled.                                      |

### TuHC result

Displays the result of the tube health check.

The following menus/settings are available:

|   | Full name                             | Display name       | [Modbus] name                           | Page    |
|---|---------------------------------------|--------------------|-----------------------------------------|---------|
| Ⓢ | TuHC health result                    | [TuHC result]      | [TuHC health result]                    | [▶ 244] |
| Ⓢ | TuHC result flag                      | [Result flag]      | [TuHC result flag]                      | [▶ 244] |
| Ⓢ | TuHC change ratio of inlet stiffness  | [Inlet stiff chg]  | [TuHC change ratio of inlet stiffness]  | [▶ 245] |
| Ⓢ | TuHC change ratio of outlet stiffness | [Outlet stiff chg] | [TuHC change ratio of outlet stiffness] | [▶ 245] |
| Ⓢ | TuHC date at start                    | [Date start]       | [TuHC date at start]                    | [▶ 245] |
| Ⓛ | TuHC time at start                    | [Time start]       | [TuHC time at start]                    | [▶ 246] |
| Ⓢ | TuHC operation time at start          | [Op time start]    | [TuHC operation time at start]          | [▶ 246] |

## TuHC health result

① [Diag/Service] ► [Ttl health chk] ► [Tube health chk] ► [TuHC result] ► [TuHC result]

② [Maintenance root menu] ► [Total health check] ► [Tube health check] ► [TuHC result] ► [TuHC health result]

Shows the result of the Tube health check. This result is also reflected by the icon on Indicator.

|   | Value                                     | Description                                       |
|---|-------------------------------------------|---------------------------------------------------|
| ① | Not execute<br>[Not exe]<br>[Not execute] | Test is not executed.                             |
| ② | Warning<br>[Warn]<br>[Warning]            | Test is stopped or skipped with Alarm or Warning. |
| ③ | Error<br>[Error]<br>[Error]               | Change in stiffness is above the threshold.       |
| ④ | OK<br>[OK]<br>[OK]                        | Change in stiffness is within the threshold.      |

## TuHC result flag

① [Diag/Service] ► [Ttl health chk] ► [Tube health chk] ► [TuHC result] ► [Result flag]

② [Maintenance root menu] ► [Total health check] ► [Tube health check] ► [TuHC result] ► [TuHC result flag]

Shows the result of the tube health check. The TuHC result flag is defined by a bit. Other values can also be set during the same test.

|   | Value                                                                                                                | Description                                                                                                        |
|---|----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| ① | Change of inlet stiffness is over threshold<br>[Chg inlet stiff]<br>[Change of inlet stiffness is over threshold]    | This flag is set when the change in inlet stiffness is above the threshold, except for Skip test or Stop test.     |
| ② | Change of outlet stiffness is over threshold<br>[Chg outlet stiff]<br>[Change of outlet stiffness is over threshold] | This flag is set when the change in outlet stiffness is above the threshold, except for Skip test or Stop test.    |
| ③ | Suspicious test (continue test)<br>[Suspicious test]<br>[Suspicious test (continue test)]                            | Suspicious test is set when Suspicious test on TuHC warning [▶ 254] has been set and an unstable condition occurs. |



|   | Value                                                                   | Description                                                                                                                                                             |
|---|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓔ | Skip test (continue test)<br>[Skip test]<br>[Skip test (continue test)] | Skip test is set when Stop test on TuHC warning [▶ 254] has been set, but the slope cannot be controlled. Tube health check skips this test, but continues the testing. |
| Ⓔ | Stop test<br>[Stop test]<br>[Stop test]                                 | Stop test is set when any TuHC alarm [▶ 252] has been set with an error. Tube health check stops the test and sets TuHC enable [▶ 242] to Not running.                  |

**TuHC change ratio of inlet stiffness**

Ⓔ [Diag/Service] ▶ [Ttl health chk] ▶ [Tube health chk] ▶ [TuHC result] ▶ [Inlet stiff chg]

Ⓔ [Maintenance root menu] ▶ [Total health check] ▶ [Tube health check] ▶ [TuHC result] ▶ [TuHC change ratio of inlet stiffness]

|   | Value          | Description                                                        |
|---|----------------|--------------------------------------------------------------------|
| Ⓔ | Numeric digits | Specifies stiffness in percent calculated from the inlet pick-off. |

**TuHC change ratio of outlet stiffness**

Ⓔ [Diag/Service] ▶ [Ttl health chk] ▶ [Tube health chk] ▶ [TuHC result] ▶ [Outlet stiff chg]

Ⓔ [Maintenance root menu] ▶ [Total health check] ▶ [Tube health check] ▶ [TuHC result] ▶ [TuHC change ratio of outlet stiffness]

|   | Value          | Description                                                         |
|---|----------------|---------------------------------------------------------------------|
| Ⓔ | Numeric digits | Specifies stiffness in percent calculated from the outlet pick-off. |

**TuHC date at start**

Ⓔ [Diag/Service] ▶ [Ttl health chk] ▶ [Tube health chk] ▶ [TuHC result] ▶ [Date start]

Ⓔ [Maintenance root menu] ▶ [Total health check] ▶ [Tube health check] ▶ [TuHC result] ▶ [TuHC date at start]

|   | Value          | Description                |
|---|----------------|----------------------------|
| Ⓔ | Numeric digits | Specifies test start date. |

**TuHC time at start**

Ⓔ [Diag/Service] ▶ [Ttl health chk] ▶ [Tube health chk] ▶ [TuHC result] ▶ [Time start]

|   | Value          | Description                |
|---|----------------|----------------------------|
| Ⓔ | Numeric digits | Specifies test start time. |

**TuHC operation time at start**

Ⓐ [Diag/Service] ► [Ttl health chk] ► [Tube health chk] ► [TuHC result] ► [Op time start]

Ⓜ [Maintenance root menu] ► [Total health check] ► [Tube health check] ► [TuHC result] ► [TuHC operation time at start]

|   | Value          | Description                                                                                            |
|---|----------------|--------------------------------------------------------------------------------------------------------|
| Ⓔ | Numeric digits | Specifies test start time. Time is stated in minutes starting with the time power was first turned on. |

**TuHC configuration**

Sets the parameters for the tube health check function.

The following menus/settings are available:

|   | Full name                           | Display name       | [Modbus] name                         | Page    |
|---|-------------------------------------|--------------------|---------------------------------------|---------|
| Ⓔ | TuHC continue interval              | [Cont itrvl]       | [TuHC continue interval]              | [▶ 246] |
| Ⓔ | TuHC continue number                | [Cont num]         | [TuHC continue number]                | [▶ 247] |
| Ⓔ | TuHC stiffness change limit         | [Stiff chg lim]    | [TuHC stiffness change limit]         | [▶ 247] |
| Ⓔ | TuHC retry number                   | [Retry num]        | [TuHC retry number]                   | [▶ 247] |
| Ⓔ | TuHC retry interval                 | [Retry itrvl]      | [TuHC retry interval]                 | [▶ 248] |
| Ⓔ | TuHC setting retry                  | [Set retry]        | [TuHC setting retry]                  | [▶ 248] |
| Ⓔ | TuHC reference number copy from     | [Ref cpy num]      | [TuHC reference number copy from]     | [▶ 248] |
| Ⓔ | TuHC magnet temperature selection   | [Mgnt temp sel]    | [TuHC magnet temperature selection]   | [▶ 249] |
| Ⓔ | TuHC fixed temperature              | [Fix temp]         | [TuHC fixed temperature]              | [▶ 250] |
| Ⓔ | TuHC temperature ratio for magnet 1 | [Mgnt temp ratio1] | [TuHC temperature ratio for magnet 1] | [▶ 250] |
| Ⓔ | TuHC temperature ratio for magnet 2 | [Mgnt temp ratio2] | [TuHC temperature ratio for magnet 2] | [▶ 250] |

**TuHC continue interval**

Ⓐ [Diag/Service] ► [Ttl health chk] ► [Tube health chk] ► [TuHC cfg] ► [Cont itrvl]

Ⓜ [Maintenance root menu] ► [Total health check] ► [Tube health check] ► [TuHC configuration] ► [TuHC continue interval]

|   | Value          | Description                                                                                                             |
|---|----------------|-------------------------------------------------------------------------------------------------------------------------|
| Ⓔ | Numeric digits | Specifies time between consecutive diagnostics in minutes.<br>Setting range: 0 – 65535 min.<br>Default value is 60 min. |

**TuHC continue number**

① [Diag/Service] ► [Ttl health chk] ► [Tube health chk] ► [TuHC cfg] ► [Cont num]

② [Maintenance root menu] ► [Total health check] ► [Tube health check] ► [TuHC configuration] ► [TuHC continue number]

|   | Value          | Description                                                                                                                                                                                           |
|---|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ③ | Numeric digits | Specifies the number of consecutive tests to be executed. If set to 0, consecutive diagnostics are executed until stopped by TuHC enable [▶ 242].<br>Setting range: 0 – 65535.<br>Default value is 1. |



In order to perform Tube health check without count limitation, the TuHC retry interval needs to be set to more than 1440 minutes if TuHC retry number is 0.

**TuHC stiffness change limit**

① [Diag/Service] ► [Ttl health chk] ► [Tube health chk] ► [TuHC cfg] ► [Stiff chg lim]

② [Maintenance root menu] ► [Total health check] ► [Tube health check] ► [TuHC configuration] ► [TuHC stiffness change limit]

|   | Value          | Description                                                                                                                                                                           |
|---|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ③ | Numeric digits | Indicates the threshold value for the change in stiffness. An alarm 203 is output, if the change exceeds the numeric value.<br>Setting range: 0.5 – 100 %.<br>Default value is 4.0 %. |

**TuHC retry number**

① [Diag/Service] ► [Ttl health chk] ► [Tube health chk] ► [TuHC cfg] ► [Retry num]

② [Maintenance root menu] ► [Total health check] ► [Tube health check] ► [TuHC configuration] ► [TuHC retry number]

|   | Value          | Description                                                                                                                                                                                       |
|---|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ③ | Numeric digits | Specifies the maximum number of retries. If a TuHC warning is output, diagnostics are attempted again after the specified period has elapsed.<br>Setting range: 0 – 65535.<br>Default value is 3. |

## TuHC retry interval

Ⓐ [Diag/Service] ► [Ttl health chk] ► [Tube health chk] ► [TuHC cfg] ► [Retry itrvl]

Ⓜ [Maintenance root menu] ► [Total health check] ► [Tube health check] ► [TuHC configuration] ► [TuHC retry interval]

|   | Value          | Description                                                                                                                                                                                                             |
|---|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓔ | Numeric digits | Specifies time in minutes until a retry is attempted. If a TuHC warning is output, diagnostics are attempted again after the specified period has elapsed.<br>Setting range: 0 – 65535 mins.<br>Default value is 2 min. |

## TuHC setting retry

Ⓐ [Diag/Service] ► [Ttl health chk] ► [Tube health chk] ► [TuHC cfg] ► [Set retry]

Ⓜ [Maintenance root menu] ► [Total health check] ► [Tube health check] ► [TuHC configuration] ► [TuHC setting retry]

Sets the condition for executing the retry.

|   | Value                                                                                | Description                                                                                            |
|---|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| Ⓔ | No retry<br>[No retry]<br>[No retry]                                                 | Do not attempt a retry of the Tube health check when it has failed due to unstable process conditions. |
| Ⓔ | Retry when skip test<br>[Retry when skip test]<br>[Retry when skip test]             | Retry the Tube health check when Skip test has occurred.                                               |
| Ⓔ | Retry when suspicious test<br>[Retry when sus. test]<br>[Retry when suspicious test] | Retry the Tube health check when Suspicious test has occurred.<br>Default value.                       |
| Ⓔ | Retry by force<br>[Retry by force]<br>[Retry by force]                               | Force retry of Tube health check.                                                                      |

## TuHC reference number copy from

Ⓐ [Diag/Service] ► [Ttl health chk] ► [Tube health chk] ► [TuHC cfg] ► [Ref cpy num]

Ⓜ [Maintenance root menu] ► [Total health check] ► [Tube health check] ► [TuHC configuration] ► [TuHC reference number copy from]

There are stored reference stiffness values for a measurement of the tube stiffness when filled with water, air or a user-defined medium (test). This test data is the active reference data against which changes are detected. If the reference data was overwritten by the user, it can be restored by setting the *TuHC reference number copy from* to air or water and then executing a copy by setting *TuHC enable* in *Tube health check* [▶ 242] to Copy reference from shipment to test.

|   | Value                       | Description                          |
|---|-----------------------------|--------------------------------------|
| ⑥ | Test<br>[Test]<br>[Test]    | Reference for test.                  |
| ⑥ | Air<br>[Air]<br>[Air]       | Reference for air.<br>Default value. |
| ⑥ | Water<br>[Water]<br>[Water] | Reference for water.                 |

### TuHC magnet temperature selection

① [Diag/Service] ► [Ttl health chk] ► [Tube health chk] ► [TuHC cfg] ► [Mgnt temp sel]

④ [Maintenance root menu] ► [Total health check] ► [Tube health check] ► [TuHC configuration] ► [TuHC magnet temperature selection]

A temperature difference between the tubes on one side and the coils (driver and pick-offs) on the other side causes a measuring error in the stiffness. *TuHC magnet temperature selection* defines the calculation method for the temperature of the driver system and pick-offs.

|   | Value                                                                                                      | Description                                                                                                                                                                   |
|---|------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ⑥ | Use temperature on sensor<br>[Snsr temp]<br>[Use temperature on sensor]                                    | Use temperature on sensor as the temperature of the driver system and pick-offs.<br>Default value.                                                                            |
| ⑥ | Compensate with fixed temperature<br>[Comp fix temp]<br>[Compensate with fixed temperature]                | Use analog input temperature that is set with the parameter TuHC fixed temperature [▶ 250] as the temperature of the driver system and pick-offs.                             |
| ⑥ | Compensate with indicator temperature<br>[Comp ind temp]<br>[Compensate with indicator temperature]        | Use indicator temperature as the temperature of the driver system and pick-offs. The accuracy of the indicator temperature is poor and is influenced by sunshine.             |
| ⑥ | Compensate with transmitter temperature<br>[Comp trsmtr temp]<br>[Compensate with transmitter temperature] | Use transmitter temperature as the temperature of the driver system and pick-offs. The accuracy of the transmitter temperature is poor, because electric parts generate heat. |

**TuHC fixed temperature**

① [Diag/Service] ► [Ttl health chk] ► [Tube health chk] ► [TuHC cfg] ► [Fix temp]

② [Maintenance root menu] ► [Total health check] ► [Tube health check] ► [TuHC configuration] ► [TuHC fixed temperature]

|   | Value          | Description                                                                                                                             |
|---|----------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| ③ | Numeric digits | Specifies field temperature for calculating the temperature of the driver system and pick-offs.<br>Default value is 20 degrees Celsius. |

**TuHC temperature ratio for magnet 1**

① [Diag/Service] ► [Ttl health chk] ► [Tube health chk] ► [TuHC cfg] ► [Mgmt temp ratio1]

② [Maintenance root menu] ► [Total health check] ► [Tube health check] ► [TuHC configuration] ► [TuHC temperature ratio for magnet 1]

|   | Value          | Description                                                                                                                                               |
|---|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| ③ | Numeric digits | Specifies the temperature change ratio from the temperature of the tube to the temperature of the S1 pick-off and driver system.<br>Default value is 0.1. |

**TuHC temperature ratio for magnet 2**

① [Diag/Service] ► [Ttl health chk] ► [Tube health chk] ► [TuHC cfg] ► [Mgmt temp ratio2]

② [Maintenance root menu] ► [Total health check] ► [Tube health check] ► [TuHC configuration] ► [TuHC temperature ratio for magnet 2]

|   | Value          | Description                                                                                                                                               |
|---|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| ③ | Numeric digits | Specifies the temperature change ratio from the temperature of the tube to the temperature on the S2 pick-off and driver system.<br>Default value is 0.1. |

**TuHC execution/status**

Activates the Tube Health Check function and indicates its status. The following parameters can be read electronically to follow the progress of the Tube Health Check function on an external device.

|   | Full name                | Display name | [Modbus] name              | Page    |
|---|--------------------------|--------------|----------------------------|---------|
| ④ | TuHC enable              | [Enable]     | [TuHC enable]              | [▶ 251] |
| ④ | TuHC progress percentage | [Progress %] | [TuHC progress percentage] | [▶ 252] |
| ④ | TuHC test counter        | [Test cnt]   | [TuHC test counter]        | [▶ 252] |
| ④ | TuHC alarm               | [Alm]        | [TuHC alarm]               | [▶ 252] |
| ④ | TuHC warning             | [Warn]       | [TuHC warning]             | [▶ 254] |

## TuHC enable

① [Diag/Service] ► [Ttl health chk] ► [Tube health chk] ► [TuHC op] ► [Enable]

② [Maintenance root menu] ► [Total health check] ► [Tube health check] ► [TuHC execution/status] ► [TuHC enable]

This parameter can be set in the following menu/menus:

*Total health check* [► 242]

|   | Value                                                                                                | Description                                                                                                                                                                                 |
|---|------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ⑤ | Not running<br>[Not run]<br>[Not running]                                                            | Indicates that the tube health check has not been executed. If it is set, the test is interrupted before completion.                                                                        |
| ⑤ | Start tube health check<br>[Start TuHC]<br>[Start Tube Health Check]                                 | Executes the tube health check. If multiple tests are to be executed consecutively, leave Start tube health check unchanged until the test has been executed the specified number of times. |
| ⑤ | Take reference<br>[Take ref]<br>[Take Reference]                                                     | Acquires reference data.                                                                                                                                                                    |
| ⑤ | AGC test<br>[AGC test]<br>[AGC Test]                                                                 | Function that self-checks the stability test. Executes the stability test in automatic gain control mode. Stiffness is not measured.                                                        |
| ⑤ | Copy current result to reference<br>[Copy result to ref]<br>[Copy current result to reference]       | Copies the test results to the reference data. This function is not effective, if the next diagnostic has started.                                                                          |
| ⑤ | Copy reference from shipment to test<br>[Copy ref to test]<br>[Copy reference from shipment to test] | Copies the shipment reference to the reference data.                                                                                                                                        |
| ⑤ | Initialize result and flags<br>[Init result flag]<br>[Initialize result and flags]                   | Resets the internal TuHC alarm and TuHC warning.                                                                                                                                            |
| ⑤ | Initialize counter<br>[Init cnt]<br>[Initialize counter]                                             | Resets the test counter.                                                                                                                                                                    |
| ⑤ | Initialize coeff for FDG<br>[Init coeff FDG]<br>[Initialize coeff for FDG]                           | Resets the drive gain control coefficient. The next test starts following adjustment of the coefficient. This is a maintenance function.                                                    |

|   | Value                                                                            | Description                                                                         |
|---|----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Ⓔ | Clear reference<br>[Clr ref]<br>[Clear reference]                                | Clears the reference data for the test.                                             |
| Ⓔ | Clear all history<br>[Clr all hist]<br>[Clear all history]                       | Sets all histories and current history number to 0. This is a maintenance function. |
| Ⓔ | Start one TuHC as interrupt<br>[Start one TuHC]<br>[Start one TuHC as interrupt] | Starts one tube health check immediately.                                           |

### TuHC progress percentage

Ⓖ [Diag/Service] ► [Ttl health chk] ► [Tube health chk] ► [TuHC op] ► [Progress %]

Ⓗ [Maintenance root menu] ► [Total health check] ► [Tube health check] ► [TuHC execution/status] ► [TuHC progress percentage]

|   | Value          | Description                                                                                     |
|---|----------------|-------------------------------------------------------------------------------------------------|
| Ⓔ | Numeric digits | Specifies test progress by percentage. Progress is 100 % when a single test has been completed. |

### TuHC test counter

Ⓖ [Diag/Service] ► [Ttl health chk] ► [Tube health chk] ► [TuHC op] ► [Test cnt]

Ⓗ [Maintenance root menu] ► [Total health check] ► [Tube health check] ► [TuHC execution/status] ► [TuHC test counter]

|   | Value          | Description                                                                                       |
|---|----------------|---------------------------------------------------------------------------------------------------|
| Ⓔ | Numeric digits | Specifies total test count. Reset to 0 when TuHC enable<br>[▶ 242] = Initialize result and flags. |

### TuHC alarm

Ⓖ [Diag/Service] ► [Ttl health chk] ► [Tube health chk] ► [TuHC op] ► [Alm]

Ⓗ [Maintenance root menu] ► [Total health check] ► [Tube health check] ► [TuHC execution/status] ► [TuHC alarm]

|   | Value                                                                             | Description                                                                    |
|---|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| Ⓔ | No error<br>[No err]<br>[No error]                                                | No error.                                                                      |
| Ⓔ | S1 amplitude is zero at AGC<br>[S1 amp zero AGC]<br>[S1 amplitude is zero at AGC] | S1 (Pick-off #1) amplitude is zero at AGC. Check the connection to the sensor. |



|   | Value                                                                                                                  | Description                                                                                                                     |
|---|------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| ⑥ | S2 amplitude is zero at AGC<br><b>[S2 amp zero AGC]</b><br>[S2 amplitude is zero at AGC]                               | S2 (Pick-off #2) amplitude is zero at AGC. Check the connection to the sensor.                                                  |
| ⑥ | Drive current is zero at AGC<br><b>[Drv curr zero AGC]</b><br>[Drive current is zero at AGC]                           | Drive current is zero at AGC. Check the connection to the sensor.                                                               |
| ⑥ | Drive gain is zero at AGC<br><b>[Drv gain zero AGC]</b><br>[Drive gain is zero at AGC]                                 | Drive gain is zero at AGC. Check the connection to the sensor.                                                                  |
| ⑥ | Amplitude is zero at fixed drive gain<br><b>[Amp zero fix drv]</b><br>[Amplitude is zero at fixed drive gain]          | Amplitude of pick-off is zero at AGC. Check the connection to the sensor.                                                       |
| ⑥ | No reference data<br><b>[No ref data]</b><br>[No reference data]                                                       | No reference data. A new reference must be taken.                                                                               |
| ⑥ | Different sensor parameters from reference<br><b>[Snsr param to ref]</b><br>[Different sensor parameters to reference] | Different sensor from reference. When sensor or parameters are changed, a new reference must be taken.                          |
| ⑥ | Unable to copy bad result to reference<br><b>[Unable copy result]</b><br>[Unable to copy bad result to reference]      | Unable to copy result to reference because test result is bad (warning has occurred). Check TuHC warning [▶ 254] and try again. |
| ⑥ | Next test was started to copy reference<br><b>[Next test start]</b><br>[Next test was started to copy reference]       | The next test was started before copying the test result to reference. Stop continuous testing before the next test is started. |
| ⑥ | Parameter error<br><b>[Param err]</b><br>[Parameter error]                                                             | TuHC parameter is out of range. Check TuHC parameters.                                                                          |

## TuHC warning

Ⓐ [Diag/Service] ► [Ttl health chk] ► [Tube health chk] ► [TuHC op] ► [Warn]

Ⓜ [Maintenance root menu] ► [Total health check] ► [Tube health check]  
► [TuHC execution/status] ► [TuHC warning]

Indicates information related to a warning. This parameter is defined by bit. Other values can also be set during the same test.

|   | Value                                                                                                       | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---|-------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓜ | Suspicious test<br>Ⓜ [Suspicious test]<br>[Suspicious test]                                                 | This flag shows that the test did not run under good conditions. This flag is set when the stability of conditions is above the limit or the number of good scans is below the limit. Tube Health Check sets the TuHC result flag [▶ 244] to Suspicious test, calculates the change in the stiffness and continues testing. Retry the test. When this warning is shown continuously, check the mechanical vibration, flow noise, electric noise and stability of the testing condition. When this flag is set and the parameter TuHC setting retry [▶ 248] is Retry when suspicious test or Retry by force, Tube Health Check retries the test. |
| Ⓜ | Unstable condition at AGC1 & AGC2<br>Ⓜ [Unstable AGC1,2]<br>[Unstable condition at AGC1 & AGC2]             | This flag is set when a change in conditions (between AGC1 and AGC2) is above the limit. Check the stability of conditions: temperature, frequency (density), pressure, flow rate.                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Ⓜ | Unstable condition at test & reference<br>Ⓜ [Unstable test/ref]<br>[Unstable condition at test & reference] | This flag is set when the change in conditions between test and reference is above the limit. Check the change in conditions: temperature, frequency (density), pressure, flow rate.                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Ⓜ | Fluctuation of condition at AGC1<br>Ⓜ [Fluct at AGC1]<br>[Fluctuation of condition at AGC1]                 | The fluctuation of the signal (amplitude, drive gain, drive current, frequency, and phase shift) is above the limit. Check mechanical vibration, flow noise and electric noise.                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Ⓜ | Change threshold level<br>Ⓜ [Chng thresh lev]<br>[Change threshold level]                                   | This flag is set when the threshold level is changed to keep the change ratio of the drive gain within the limit. Because the test result (stiffness) depends on the amplitude, this will lower the accuracy of the test. Take the reference under test conditions to prevent this warning.                                                                                                                                                                                                                                                                                                                                                     |
| Ⓜ | Temperature or Pressure is out of range<br>Ⓜ [T or P out]<br>[Temperature or Pressure is out of range]      | This flag is set when temperature or pressure is out of range. Check the temperature or pressure value (input value or fixed value in parameter).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

|   | Value                                                                                          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ⑤ | Fluctuation of condition at scan<br>[Fluct at scan]<br>[Fluctuation of condition at scan]      | The fluctuation of the signal (frequency, compensated frequency and phase shift) is above the limit during the scan. Check mechanical vibration, flow noise and electric noise.                                                                                                                                                                                                                                                                  |
| ⑤ | No cross thresholds<br>[No cross thr]<br>[No cross thresholds]                                 | This flag is set when the amplitude does not cross 4 thresholds. A control error of the slope causes this warning. Normally, the first scan at power-on or taking reference does not cross the thresholds. Check mechanical vibration, flow noise and electric noise.                                                                                                                                                                            |
| ⑤ | Deviation of slope<br>[Dev of slope]<br>[Deviation of slope]                                   | This flag is set when the difference in the slope between setting and measurement is above the limit. Control of slope with fixed drive gain is poor. Check mechanical vibration, flow noise and electric noise.                                                                                                                                                                                                                                 |
| ⑤ | Unstable condition at AGC1 & scan<br>[Unstable AGC1 sc]<br>[Unstable condition at AGC1 & scan] | This flag is set when the change in test conditions between AGC1 and Scan is above the limit. Check the stability of the conditions: temperature, frequency (density), pressure, flow rate.                                                                                                                                                                                                                                                      |
| ⑤ | Skip test<br>[Skip test]<br>[Skip test]                                                        | This flag shows that the test has been skipped with an error. Tube Health Check does not stop next test. The TuHC result flag [▶ 244] is set to Skip test (continue test), and the change ratio of the stiffness is set to 999.99 %. Check the connection to the sensor and the change in conditions from the reference. When this flag is set and the parameter TuHC setting retry [▶ 248] is not No retry, Tube Health Check retries the test. |
| ⑤ | Slope control error<br>[slope cnt err]<br>[Slope control error]                                | This flag is set when one of 3 factors (coefficients for fixed drive gain, target slope and percentage change of drive gain) is out of range at the slope control. Check the connection to the sensor and the change in conditions from the reference.                                                                                                                                                                                           |
| ⑤ | Amplitude is out of limit<br>[Amp out limit]<br>[Amplitude is out of limit]                    | This flag is set when the amplitude is out of limit during AGC or during the hold time. Check the connection to the sensor and the change in conditions from the reference.                                                                                                                                                                                                                                                                      |
| ⑤ | Data trans error<br>[Data trans err]<br>[Data trans error]                                     | This flag is set when data transfer is stopped at the transmitter. This error is detected if any of these three factors apply: watchdog timer error, buffer overflow, DSP-Main check counter is changed during scan. Retry the test.                                                                                                                                                                                                             |
| ⑤ | Calculation error<br>[Calc err]<br>[Calculation error]                                         | This flag is set when the calculation is stopped to avoid division by zero. Retry the test.                                                                                                                                                                                                                                                                                                                                                      |

**TuHC reference data**

Configures the reference for Tube health function. The reference data that was taken by the TuHC can be examined in the menu *Tube health check Ref n*.

The following menus/settings are available:

|        | Full name                          | Display name  | [Modbus] name                        | Page    |
|--------|------------------------------------|---------------|--------------------------------------|---------|
| ⓔ      | TuHC date at reference 1           | [Date ref]    | [TuHC date at reference 1]           | [▶ 256] |
| ⓔ      | TuHC time at reference 1           | [Time ref]    | [TuHC time at reference 1]           | [▶ 256] |
| ⓔ      | TuHC operation time at reference 1 | [Op time ref] | [TuHC operation time at reference 1] | [▶ 256] |
| ⓗ<br>ⓔ | TuHC temperature at reference 1    | —             | [TuHC temperature at reference 1]    | [▶ 257] |
| ⓗ<br>ⓔ | TuHC mass flow at reference 1      | —             | [TuHC mass flow at reference 1]      | [▶ 257] |
| ⓗ<br>ⓔ | TuHC density at reference 1        | —             | [TuHC density at reference 1]        | [▶ 257] |

**TuHC date at reference 1**

Ⓛ [Diag/Service] ▶ [Ttl health chk] ▶ [Tube health chk] ▶ [TuHC ref data] ▶ [Date ref]

ⓗ [Maintenance root menu] ▶ [Total health check] ▶ [Tube health check] ▶ [TuHC reference data] ▶ [TuHC date at reference 1]

|   | Value          | Description                         |
|---|----------------|-------------------------------------|
| ⓔ | Numeric digits | Date when TuHC reference was taken. |

**TuHC time at reference 1**

Ⓛ [Diag/Service] ▶ [Ttl health chk] ▶ [Tube health chk] ▶ [TuHC ref data] ▶ [Time ref]

ⓗ [Maintenance root menu] ▶ [Total health check] ▶ [Tube health check] ▶ [TuHC reference data] ▶ [TuHC time at reference 1]

|   | Value          | Description                         |
|---|----------------|-------------------------------------|
| ⓔ | Numeric digits | Time when TuHC reference was taken. |

**TuHC operation time at reference 1**

Ⓛ [Diag/Service] ▶ [Ttl health chk] ▶ [Tube health chk] ▶ [TuHC ref data] ▶ [Op time ref]

ⓗ [Maintenance root menu] ▶ [Total health check] ▶ [Tube health check] ▶ [TuHC reference data] ▶ [TuHC operation time at reference 1]

|   | Value          | Description                                              |
|---|----------------|----------------------------------------------------------|
| ⓔ | Numeric digits | Operation time when the reference measurement was taken. |

**TuHC temperature at reference 1**

| <div>Ⓜ</div> <div>ⓔ</div> | [Maintenance root menu] ▶ [Total health check] ▶ [Tube health check] ▶ [TuHC reference data] ▶ [TuHC temperature at reference 1] |                                            |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|
|                           |                                                                                                                                  |                                            |
|                           | Value                                                                                                                            | Description                                |
| <div>Ⓜ</div> <div>ⓔ</div> | Numeric digits                                                                                                                   | Tube temperature when reference was taken. |

**TuHC mass flow at reference 1**

| <div>Ⓜ</div> <div>ⓔ</div> | [Maintenance root menu] ▶ [Total health check] ▶ [Tube health check] ▶ [TuHC reference data] ▶ [TuHC mass flow at reference 1] |                                     |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
|                           |                                                                                                                                |                                     |
|                           | Value                                                                                                                          | Description                         |
| <div>Ⓜ</div> <div>ⓔ</div> | Numeric digits                                                                                                                 | Mass flow when reference was taken. |

**TuHC density at reference 1**

| <div>Ⓜ</div> <div>ⓔ</div> | [Maintenance root menu] ▶ [Total health check] ▶ [Tube health check] ▶ [TuHC reference data] ▶ [TuHC density at reference 1] |                                   |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
|                           |                                                                                                                              |                                   |
|                           | Value                                                                                                                        | Description                       |
| <div>Ⓜ</div> <div>ⓔ</div> | Numeric digits                                                                                                               | Density when reference was taken. |

**5.4.13 Data logging**

Sets the parameters to save a maximum of 4 process and related variables on a microSD card with a defined logging interval and duration.

The following menus/settings are available:

|   | Full name             | Display name  | [Modbus] name           | Page             |
|---|-----------------------|---------------|-------------------------|------------------|
| – | Logging file name     | [Log file]    | [Logging file name]     | [ 258]           |
| – | Logging 1 – 4 select  | [PV sel1 – 4] | [Logging 1 – 4 select]  | [ 259]           |
| – | Logging interval time | [Itrvl time]  | [Logging interval time] | [ 260]           |
| – | Logging end time      | [End time]    | [Logging end time]      | [ 261]           |
| – | Logging execute       | [Exe]         | [Logging execute]       | [ 262]           |
| – | Logging start date    | [Start date]  | [Logging start date]    | [ 262]           |
| – | Logging start time    | [Start time]  | [Logging start time]    | [ 262]           |
| Ⓜ | Data logging display  | –             | [Data logging display]  | [ 263]<br>[ 263] |

**Logging file name**

Ⓛ [Diag/Service] ► [Data log] ► [Log file]

Ⓜ [Maintenance root menu] ► [Data logging] ► [Logging file name]

Sets the file name of the data logging function on the microSD card.



If "Logging file name" is changed, the logged data is saved as a new file.

If "Logging file name" is not changed, the logged data is added to the existing file.

|   | Value            | Description                                                                                                                 |
|---|------------------|-----------------------------------------------------------------------------------------------------------------------------|
| – | ASCII characters | Maximum length is 8 characters.<br>The following are invalid characters: space, ", *, +, ,, ., /, :, ;, <, =, >, ?, [, \, ] |

Logging 1 – 4  
select

- ① [Diag/Service] ► [Data log] ► [PV sel1 - 4]
- ② [Maintenance root menu] ► [Data logging] ► [Logging 1 - 4 select]

Sets the process variables that are to be logged to the microSD card.

|   | Value                             | Description                                                                                                                                                                                                                                                 |
|---|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   | None                              | Set Logging 1 – 4 select.<br>Default value for setting of Logging 1 is Mass flow.<br>Default value for setting of Logging 2 is Density.<br>Default value for setting of Logging 3 is Temperature.<br>Default value for setting of Logging 4 is Volume flow. |
| – | [None]<br>[None]                  |                                                                                                                                                                                                                                                             |
|   | Mass flow                         |                                                                                                                                                                                                                                                             |
| – | [Mass]<br>[Mass flow]             |                                                                                                                                                                                                                                                             |
|   | Density                           |                                                                                                                                                                                                                                                             |
| – | [Dens]<br>[Density]               |                                                                                                                                                                                                                                                             |
|   | Temperature                       |                                                                                                                                                                                                                                                             |
| – | [Temp]<br>[Temperature]           |                                                                                                                                                                                                                                                             |
|   | Volume flow                       |                                                                                                                                                                                                                                                             |
| – | [Vol]<br>[Volume flow]            |                                                                                                                                                                                                                                                             |
|   | Pressure                          |                                                                                                                                                                                                                                                             |
| – | [Pres]<br>[Pressure]              |                                                                                                                                                                                                                                                             |
|   | Concentration                     |                                                                                                                                                                                                                                                             |
| Ⓢ | [Conc]<br>[Concentration]         |                                                                                                                                                                                                                                                             |
|   | Net mass flow 1                   |                                                                                                                                                                                                                                                             |
| Ⓢ | [Net mass1]<br>[Net Mass Flow 1]  |                                                                                                                                                                                                                                                             |
|   | Net volume flow 1                 |                                                                                                                                                                                                                                                             |
| Ⓢ | [Net vol1]<br>[Net volume flow 1] |                                                                                                                                                                                                                                                             |
|   | Viscosity                         |                                                                                                                                                                                                                                                             |
| Ⓢ | [Visc]<br>[Viscosity]             |                                                                                                                                                                                                                                                             |

|   | Value                                                                 | Description                                                                                                                                                                                                                                                 |
|---|-----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Resonance Frequency<br>[Freq]<br>[Resonance Frequency]                | Set Logging 1 – 4 select.<br>Default value for setting of Logging 1 is Mass flow.<br>Default value for setting of Logging 2 is Density.<br>Default value for setting of Logging 3 is Temperature.<br>Default value for setting of Logging 4 is Volume flow. |
| – | Phase difference<br>[Phase diff]<br>[Phase difference]                |                                                                                                                                                                                                                                                             |
| – | Drive gain<br>[Drv gain]<br>[Drive gain]                              |                                                                                                                                                                                                                                                             |
| – | Drive current<br>[Drv curr]<br>[Drive current]                        |                                                                                                                                                                                                                                                             |
| – | Transmitter temperature<br>[Trsmtr temp]<br>[Transmitter temperature] |                                                                                                                                                                                                                                                             |

### Logging interval time

Ⓒ [Diag/Service] ► [Data log] ► [Itrvl time]

Ⓜ [Maintenance root menu] ► [Data logging] ► [Logging interval time]

Sets the interval at which data logging takes place.

If Logging interval time is more than Logging end time, data logging cannot be executed.

|   | Value                        | Description                                               |
|---|------------------------------|-----------------------------------------------------------|
| – | 1 s<br>[1s]<br>[1s]          | Data logging takes place once a second.<br>Default value. |
| – | 10 s<br>[10s]<br>[10s]       | Data logging takes place every 10 seconds.                |
| – | 30 s<br>[30s]<br>[30s]       | Data logging takes place every 30 seconds.                |
| – | 1 min<br>[1min]<br>[1min]    | Data logging takes place every minute .                   |
| – | 5 min<br>[5min]<br>[5min]    | Data logging takes place every 5 minutes.                 |
| – | 30 min<br>[30min]<br>[30min] | Data logging takes place every 30 minutes.                |



|   | Value              | Description                          |
|---|--------------------|--------------------------------------|
|   | 60 min             |                                      |
| – | [60min]<br>[60min] | Data logging takes place every hour. |

**Logging end time**

① [Diag/Service] ► [Data log] ► [End time]

Ⓜ [Maintenance root menu] ► [Data logging] ► [Logging end time]

Sets the period for which data logging is executed.

If Logging interval time is more than Logging end time, data logging cannot be executed.

|   | Value               | Description                                                |
|---|---------------------|------------------------------------------------------------|
|   | 10 min              |                                                            |
| – | [10min]<br>[10min]  | Data logging is executed for 10 minutes.<br>Default value. |
|   | 30 min              |                                                            |
| – | [30min]<br>[30min]  | Data logging is executed for 30 minutes.                   |
|   | 60 min              |                                                            |
| – | [60min]<br>[60min]  | Data logging is executed for 1 hour.                       |
|   | 3 hour              |                                                            |
| – | [3h]<br>[3hour]     | Data logging is executed for 3 hours.                      |
|   | 12 hour             |                                                            |
| – | [12h]<br>[12hour]   | Data logging is executed for 12 hours.                     |
|   | 24 hour             |                                                            |
| – | [24h]<br>[24hour]   | Data logging is executed for 24 hours.                     |
|   | 72 hour             |                                                            |
| – | [72h]<br>[72hour]   | Data logging is executed for 72 hours.                     |
|   | 240 hour            |                                                            |
| – | [240h]<br>[240hour] | Data logging is executed for 240 hours.                    |
|   | 720 hour            |                                                            |
| – | [720h]<br>[720hour] | Data logging is executed for 720 hours.                    |

## Logging execute

Ⓐ [Diag/Service] ► [Data log] ► [Exe]

Ⓜ [Maintenance root menu] ► [Data logging] ► [Logging execute]

Starts data logging and indicates the status.

|   | Value                                                                            | Description                                                                                                                                                                                                                                                      |
|---|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Not Execute<br>[Not exe]<br>[Not Execute]                                        | Data logging is stopped. While this value is set, data logging is not executed.                                                                                                                                                                                  |
| – | Execute<br>[Exe]<br>[Execute]                                                    | Data logging is started.<br>While this value is set, data logging is executing. When data logging via manual control is completed, this value becomes Not execute.<br>Through auto control of a monitoring event, this value becomes Execute with monitor event. |
| – | Execute with monitor event<br>[Exe with monitor]<br>[Execute with monitor event] | While this value is set, data logging is not executed.<br>When a monitored Event, as set in the Event settings, occurs, this parameter value becomes Execute, so data logging is started.                                                                        |

## Logging start date

Ⓐ [Diag/Service] ► [Data log] ► [Start date]

Ⓜ [Maintenance root menu] ► [Data logging] ► [Logging 1 - 4 start date]

Shows the date on which data logging was started.

|   | Value          | Description                                                                                                                                |
|---|----------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | When the Logging execute parameter becomes Execute, the Logging start date is updated with the current date.<br>Date format is YYYY/MM/DD. |

## Logging start time

Ⓐ [Diag/Service] ► [Data log] ► [Start time]

Ⓜ [Maintenance root menu] ► [Data logging] ► [Logging start time]

Shows the time when data logging has started.

|   | Value          | Description                                                                                                  |
|---|----------------|--------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | When the Logging execute parameter becomes Execute, the Logging start time is updated with the current time. |

**Data logging display**

Defines how trend charts of logged process variables are shown on the LCD display.

The following menus/settings are available:

|   | Full name                | Display name | [Modbus] name              | Page    |
|---|--------------------------|--------------|----------------------------|---------|
| Ⓜ | Display measurement mode | –            | [Display measurement mode] | [▶ 263] |
| Ⓜ | Trend offline LRV        | –            | [Trend offline LRV]        | [▶ 263] |
| Ⓜ | Trend offline URV        | –            | [Trend offline URV]        | [▶ 263] |

**Display measurement mode**

Ⓜ [Maintenance root menu] ▶ [Data logging] ▶ [Data logging display] ▶ [Display measurement mode]

This parameter can be set in the following menu/menus:

- *Diag/Service* [▶ 263]
- *Easy setup wizard* [▶ 319]
- *Basic setup* [▶ 372]
- Detailed setup
  - *Display* [▶ 516]
  - *Batch function* [▶ 563]

Sets the display mode for logging data on the LCD display of the Indicator.

|   | Value                            | Description                                                                                                                                                                                                                                                                                                                      |
|---|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓜ | Normal<br>[Normal]               | Normal display mode.<br>Default value.                                                                                                                                                                                                                                                                                           |
| Ⓜ | Trend online<br>[Trend online]   | Real-time trend chart of process values which were specified in the parameters, Logging 1 – 4 select. The trend chart of one of four process values is displayed. By using Up/Down operation on the Indicator, the process value to be shown as trend chart can be changed when the Display scroll parameters are set to Manual. |
| Ⓜ | Batch control<br>[Batch control] | Batch specific screen can be displayed on Indicator.                                                                                                                                                                                                                                                                             |

**Trend offline LRV**

Ⓜ [Maintenance root menu] ▶ [Data logging] ▶ [Data logging display] ▶ [Trend offline LRV]

This parameter can be set in the following menu/menus:

- *Diag/Service* [▶ 263]
- *Detailed Setup* [▶ 546]

Sets the LRV for the trend display of logging data to a microSD card on the LCD of the Indicator.

|   | Value          | Description         |
|---|----------------|---------------------|
| Ⓜ | Numeric digits | Default value is 0. |

**Trend offline URV**

Ⓜ [Maintenance root menu] ▶ [Data logging] ▶ [Data logging display] ▶ [Trend offline URV]

This parameter can be set in the following menu/menus:

- *Diag/Service* [▶ 263]
- *Detailed Setup* [▶ 546]

Sets the URV for the trend display of logging data from the microSD card on the LCD of the Indicator.

|   | Value          | Description            |
|---|----------------|------------------------|
| ⊕ | Numeric digits | Default value is 10.0. |

**5.4.14 Parameter backup/restore**

Menu for configuring the backup/restore function.

The following menus/settings are available:

If accessed via Modbus communication, each item that is set to gather information is set and controlled via an interactive user interface called Method.

|   | Full name                            | Display name     | [Modbus] name | Page    |
|---|--------------------------------------|------------------|---------------|---------|
| ① | Backup file name                     | [Bkup name]      |               | [▶ 265] |
| ① | User configuration backup            | [U cfg bkup]     |               | [▶ 265] |
| ① | User configuration backup name 1 – 3 | [Save name1 – 3] |               | [▶ 267] |
| ① | User configuration backup date 1 – 3 | [Save date1 – 3] |               | [▶ 266] |
| ① | Factory backup name                  | [F bkup name]    |               | [▶ 266] |
| ① | Factory backup date                  | [F bkup date]    |               | [▶ 266] |
| ① | Restore                              | [Restore]        |               | [▶ 266] |

**Backup file name**

① [Diag/Service] ▶ [Param bkup/restore] ▶ [Bkup name]

Sets the file name of the parameter backup data on the microSD card.

|   | Value            | Description                                                                                                                                           |
|---|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| ① | ASCII characters | Maximum length is 8 characters.<br>Default value is SD_FILE.<br>The following are invalid characters: space, ", *, +, ,, /, :, ;, <, =, >, ?, [, \, ] |

**User configuration backup**

① [Diag/Service] ▶ [Param bkup/restore] ▶ [U cfg bkup]

Executes parameter backup.

|   | Value                                           | Description                                                                                                                                 |
|---|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| ① | Not execute<br>[Not exe]                        | Parameter backup is not executed.                                                                                                           |
| ① | Store to 1<br>[Store to 1]                      | Parameter backup is executed to indicator memory 1.                                                                                         |
| ① | Store to 2<br>[Store to 2]                      | Parameter backup is executed to indicator memory 2.                                                                                         |
| ① | Store to 3<br>[Store to 3]                      | Parameter backup is executed to indicator memory 3.                                                                                         |
| ① | Store to microSD<br>[Store to SD]               | Parameter backup is executed to the microSD card.<br>The file name defined in the parameter Backup file name is used.                       |
| ① | Store from 1 to mi-<br>croSD<br>[Store 1 to SD] | Parameter backup is copied from indicator memory 1 to the microSD card.<br>The file name defined in the parameter Backup file name is used. |

|   | Value                                      | Description                                                                                                                                 |
|---|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| ① | Store from 2 to microSD<br>[Store 2 to SD] | Parameter backup is copied from indicator memory 2 to the microSD card.<br>The file name defined in the parameter Backup file name is used. |
| ① | Store from 3 to microSD<br>[Store 3 to SD] | Parameter backup is copied from indicator memory 3 to the microSD card.<br>The file name defined in the parameter Backup file name is used. |

**User configuration backup date 1 – 3**

① [Diag/Service] ► [Param bkup/restore] ► [Save date1 – 3]

Shows the date of the parameter Backup data in indicator memory 1 – 3.

|   | Value          | Description                |
|---|----------------|----------------------------|
| ① | Numeric digits | Date format is YYYY/MM/DD. |

**Factory backup name**

① [Diag/Service] ► [Param bkup/restore] ► [F bkup name]

|   | Value            | Description                                   |
|---|------------------|-----------------------------------------------|
| ① | Factory Delivery | Name of factory backup.<br>Cannot be changed. |

**Factory backup date**

① [Diag/Service] ► [Param bkup/restore] ► [F bkup date]

Shows the date of factory backup.

|   | Value          | Description                                      |
|---|----------------|--------------------------------------------------|
| ① | Numeric digits | Date format is YYYY/MM/DD.<br>Cannot be changed. |

**Restore**

① [Diag/Service] ► [Param bkup/restore] ► [Restore]

Restores or duplicates the user configuration backup to a device.

|   | Value                                              | Description                                                                                                                                                              |
|---|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ① | Not Execute<br>[Not exe]                           | Parameter restore is not executed or cancelled.                                                                                                                          |
| ① | Duplicate user configuration 1<br>[Duplicate cfg1] | Parameters are duplicated from backup settings in indicator memory 1.                                                                                                    |
| ① | Duplicate user configuration 2<br>[Duplicate cfg2] | Parameters are duplicated from backup settings in indicator memory 2.                                                                                                    |
| ① | Duplicate user configuration 3<br>[Duplicate cfg3] | Parameters are duplicated from backup settings in indicator memory 3.                                                                                                    |
| ① | Duplicate from microSD<br>[Duplicate SD]           | Parameters are duplicated from backup settings on the microSD card.<br>The file on the microSD card that has the name defined in the parameter Backup file name is used. |

|   | Value                                                                     | Description                                                                                                                                                            |
|---|---------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ① | Restore user configuration 1<br>[Restore cfg1]                            | Parameters are restored from backup settings in indicator memory 1.                                                                                                    |
| ① | Restore user configuration 2<br>[Restore cfg2]                            | Parameters are restored from backup settings in indicator memory 2.                                                                                                    |
| ① | Restore user configuration 3<br>[Restore cfg3]                            | Parameters are restored from backup settings in indicator memory 3.                                                                                                    |
| ① | Restore from microSD<br>[Restore SD]                                      | Parameters are restored from backup settings on the microSD card.<br>The file on the microSD card that has the name defined in the parameter Backup file name is used. |
| ① | Restore factory default<br>[Restore F val]                                | Parameters are restored from default settings.                                                                                                                         |
| ① | Download sensor constant from user configuration 1<br>[DL snsr cnst cfg1] | Sensor constants are downloaded from indicator memory 1.                                                                                                               |
| ① | Download sensor constant from microSD<br>[DL snsr cnst SD]                | Sensor constants are downloaded from the microSD card.<br>The file on the microSD card that has the name defined in the parameter Backup file name is used.            |
| ① | Disable compensations<br>[Disable comp]                                   | Disable compensations to keep compatibility with Release 1. Specifically, initialize each coefficient of SKT1/SKT2/SKT3/FT1/FT2/FT3.                                   |

### User configuration backup name 1 – 3

① [Diag/Service] ► [Param bkup/restore] ► [Save name1 – 3]

Shows the file name of the parameter Backup data in indicator memory 1 – 3.

|   | Value            | Description                                                        |
|---|------------------|--------------------------------------------------------------------|
| ① | ASCII characters | Maximum length is 16 characters.<br>Default value is Backup 1 – 3. |

**5.4.15 Calibration date**

Defines the parameters to set for the calibration date. These parameters are notes that the user can write and read as a reference. The date is not set automatically. If the user wants to use these parameters, the user must write the date manually.

The following menus/settings are available:

|   | Full name                   | Display name            | [Modbus] name                 | Page    |
|---|-----------------------------|-------------------------|-------------------------------|---------|
| – | Last calibration date 1 – 5 | [Last calib date 1 – 5] | [Last calibration date 1 – 5] | [▶ 268] |
| – | Next calibration date       | [Next calib date]       | [Next calibration date]       | [▶ 268] |

**Last calibration date 1 – 5**

Ⓐ [Diag/Service] ▶ [Last calib info] ▶ [Last calib date 1 – 5]

Ⓜ [Maintenance root menu] ▶ [Calibration date] ▶ [Last calibration date 1 – 5]

Sets the date when the calibration was performed. The display format of the date is specified by the *Display format date* [▶ 543] parameter.

|   | Value          | Description                                                |
|---|----------------|------------------------------------------------------------|
| – | Numeric digits | Date format is DD/MM/YYYY.<br>Default value is 01/01/2015. |

**Next calibration date**

Ⓐ [Diag/Service] ▶ [Last calib info] ▶ [Next calib date]

Ⓜ [Maintenance root menu] ▶ [Calibration date] ▶ [Next calibration date]

Sets the planned date for the next calibration. The display format of the date is specified by the *Display format date* [▶ 543] parameter.

|   | Value          | Description                                                |
|---|----------------|------------------------------------------------------------|
| – | Numeric digits | Date format is DD/MM/YYYY.<br>Default value is 01/01/2155. |

**5.4.16 Last calibration information**

Defines parameters for setting calibration or service information.

**Last calibration information 1 – 5**

Ⓐ [Diag/Service] ▶ [Last calib info] ▶ [Last calib info 1 – 5]

Ⓜ [Maintenance root menu] ▶ [Last calibration information] ▶ [Last calibration information 1 – 5]

Sets text about calibration or service.

|   | Value            | Description                                                 |
|---|------------------|-------------------------------------------------------------|
| – | ASCII characters | Maximum length is 32 characters.<br>Default value is space. |



## 5.5 Easy setup wizard

Sets up basic parameters for configuring the device.

Most of the menu items and values are available for all devices. Exceptions are marked with corresponding symbols.

Tab. 30: Explanation of symbols used in the menu description

| Sym-bols | Description                                                                                           |
|----------|-------------------------------------------------------------------------------------------------------|
| Ⓐ        | Menu item or menu path is available via display.                                                      |
| Ⓜ        | Menu item or menu path is available via the [Modbus] configuration tool.                              |
| Ⓢ        | Menu item is optional. It is available only if a transmitter with the corresponding function is used. |
| —        | No restrictions.                                                                                      |

The following menus/settings are available:

|   | Full name                  | Display name  | [Modbus] name                | Page    |
|---|----------------------------|---------------|------------------------------|---------|
| — | Installation configuration | [Install cfg] | [Installation configuration] | [▶ 269] |
| — | Standard device variables  | [Std dev var] | [Standard device variables]  | [▶ 272] |
| — | Analog output              | [AO]          | [Analog output]              | [▶ 282] |
| — | Pulse/Status output        | [Pls/Sts out] | [Pulse/Status output]        | [▶ 287] |
| — | Totalizer                  | [Ttl]         | [Totalizer]                  | [▶ 302] |
| — | Display select             | [Disp sel]    | [Display select]             | [▶ 306] |
| — | Date/Time                  | [Date/Time]   | [Date/Time]                  | [▶ 309] |
| Ⓜ | Events/Alarms acknowledge  |               | [Events/Alarms acknowledge]  | [▶ 310] |
| Ⓢ | Batch 1 function           | [Batch1]      | [Batch 1 function]           | [▶ 310] |

### 5.5.1 Installation configuration

Menu for parameters used to configure the installation information.

This submenu is also available in additional menus. The values can be set in each of these menus:

- *Easy setup wizard* [▶ 269]
- *Basic setup* [▶ 323]
- *Detailed setup* [▶ 378]

The following menus/settings are available:

If accessed via Modbus communication, each item that is set to gather information is set and controlled via an interactive user interface called Method.

|   | Full name                  | Display name     | [Modbus] name                | Page   |
|---|----------------------------|------------------|------------------------------|--------|
| – | Installation orientation   | [Install orient] | [Installation orientation]   | [ 270] |
| – | Density offset orientation | [Dens offset]    | [Density offset orientation] | [ 270] |
| – | Flow direction             | [Flow dir]       | [Flow direction]             | [ 271] |
| – | Pressure fixed value       | [Fix val]        | [Pressure fixed value]       | [ 271] |

## Installation orientation

Ⓛ [Easy setup wizard] ► [Install cfg] ► [Install orient]

Ⓜ [Device root menu] ► [Easy setup wizard] ► [Installation configuration]

Sets the installation orientation of the device.

|   | Value                                                                | Description                |
|---|----------------------------------------------------------------------|----------------------------|
| – | Vertical<br>[Vertical]<br>[Vertical]                                 | Default value is Vertical. |
| – | Horizontal bend down<br>[Hrzntl bend down]<br>[Horizontal bend down] |                            |
| – | Horizontal bend up<br>[Hrzntl bend up]<br>[Horizontal bend up]       |                            |

## Density offset orientation

Ⓛ [Easy setup wizard] ► [Install cfg] ► [Dens offset]

Ⓜ [Device root menu] ► [Easy setup wizard] ► [Installation configuration]

Sets the density offset value to compensate for the gravitational effect when the device is installed horizontally. This value is added to the originally measured density value.

|   | Value          | Description                                                                                                                                                  |
|---|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | The value is automatically converted based on the unit setting.<br>When Vertical is selected in the <i>Installation orientation</i> , this value is ignored. |

| Meter size | Default value in kg/l |
|------------|-----------------------|
| Nano 06    | 5.25e-03              |
| Nano 08    | 2.70e-03              |
| Nano 10    | 1.80e-03              |
| Nano 15    | 2.00e-03              |
| Nano 20    | 6.00e-04              |
| Supreme 34 | 9.00e-04              |
| Supreme 36 | 3.50e-04              |

| Meter size  | Default value in kg/l |
|-------------|-----------------------|
| Supreme 38  | 0                     |
| Supreme 39  | 0                     |
| Giga 1F     | 0                     |
| Giga 2H     | 0                     |
| Intense 34  | 9.00e-04              |
| Intense 36  | 3.50e-04              |
| Intense 38  | 0                     |
| Prime 25    | 1.70e-04              |
| Prime 40    | 1.30e-04              |
| Prime 50    | 7.00e-05              |
| Prime 80    | 1.50e-04              |
| Hygienic 25 | 1.70e-04              |
| Hygienic 40 | 1.30e-04              |
| Hygienic 50 | 7.00e-05              |
| Hygienic 80 | 1.50e-04              |

**Flow direction**

⌚ [Easy setup wizard] ► [Install cfg] ► [Flow dir]

⊕ [Device root menu] ► [Easy setup wizard] ► [Installation configuration]

Sets the flow direction of the device.

|   | Value                             | Description                                                                   |
|---|-----------------------------------|-------------------------------------------------------------------------------|
| – | Forward<br>[Forward]<br>[Forward] | Direction of flow is the same as the arrow mark on the sensor. Default value. |
| – | Reverse<br>[Reverse]<br>[Reverse] | Opposite direction.                                                           |

**Pressure fixed value**

⌚ [Easy setup wizard] ► [Install cfg] ► [Fix val]

⊕ [Device root menu] ► [Easy setup wizard] ► [Installation configuration]

This parameter is also available in additional menus. The values can be set in each of these menus:

- Easy setup wizard [► 271]
- Basic setup [► 325]
- Detailed setup
  - Pressure [► 404]
  - Installation configuration [► 379]

Sets the average static line pressure to compensate for the effect of the line pressure on mass flow and density. In case of gas measurement, no setting is required.

|   | Value          | Description                                                                                                                                                                                                                                                                           |
|---|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | <p>The value is automatically converted based on the unit setting.</p> <p>Default value is 0.0.</p> <p>When the value of the parameter External function is not Pressure compensation and the device is not in simulation mode, this value is used for the pressure compensation.</p> |

### 5.5.2 Standard device variables

Menu for parameters that configure standard process variables.

The following menus/settings are available:

|   | Full name   | Display name | [Modbus] name | Page   |
|---|-------------|--------------|---------------|--------|
| – | Mass flow   | [Mass]       | [Mass flow]   | [ 273] |
| – | Density     | [Dens]       | [Density]     | [ 275] |
| – | Temperature | [Temp]       | [Temperature] | [ 278] |
| – | Volume flow | [Vol]        | [Volume flow] | [ 280] |

Mass flow

Menu for configuring the mass flow measurement.

The following menus/settings are available:

If accessed via Modbus communication, each item that is set to gather information is set and controlled via an interactive user interface called Method.

|   | Full name         | Display name | [Modbus] name     | Page    |
|---|-------------------|--------------|-------------------|---------|
| – | Mass flow unit    | [Unit]       | Mass flow unit    | [▶ 273] |
| – | Mass flow LRV     | [LRV]        | Mass flow LRV     | [▶ 274] |
| – | Mass flow URV     | [URV]        | Mass flow URV     | [▶ 274] |
| – | Mass flow damping | [Damp]       | Mass flow damping | [▶ 275] |

Mass flow unit

⌚ [Easy setup wizard] ▶ [Std dev var] ▶ [Mass] ▶ [Unit]

⊕ [Device root menu] ▶ [Easy setup wizard] ▶ [Standard device variables] ▶ [Mass flow] ▶ [Mass flow unit]

This parameter can be set in the following menu/menus:

- Easy setup wizard [▶ 273]
- Basic setup [▶ 326]
- Detailed setup [▶ 381]

Sets the unit for mass flow.



The unit displayed on the LCD may vary depending on the setting of the parameter *Display unit selection*. During Modbus communication, the actually displayed unit may vary depending on the Modbus tool. For details, refer to *Units of the parameters* [▶ 819].

| Value         | Description                                                  |
|---------------|--------------------------------------------------------------|
| – g/s         | Sets the displayed Mass flow unit.<br>Default value is kg/h. |
| – g/min       |                                                              |
| – g/h         |                                                              |
| – kg/s        |                                                              |
| – kg/min      |                                                              |
| – kg/h        |                                                              |
| – kg/d        |                                                              |
| – t/min       |                                                              |
| – t/h         |                                                              |
| – t/d         |                                                              |
| – ton(US)/min |                                                              |
| – ton(US)/h   |                                                              |
| – ton(US)/d   |                                                              |
| – ton(UK)/min |                                                              |
| – ton(UK)/h   |                                                              |
| – ton(UK)/d   |                                                              |
| – lb/s        |                                                              |
| – lb/min      |                                                              |
| – lb/h        |                                                              |
| – lb/d        |                                                              |
| – User unit   |                                                              |

**Mass flow LRV**

Ⓔ [Easy setup wizard] ► [Std dev var] ► [Mass] ► [LRV]

Ⓗ [Device root menu] ► [Easy setup wizard] ► [Standard device variables] ► [Mass flow] ► [Mass flow LRV]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [▶ 274]
- *Basic setup* [▶ 327]
- *Detailed setup* [▶ 382]

Sets the lower range value, 0 %, for scaling the analog, frequency and pulse outputs during mass flow measurement.

| Value            | Description                                                                                                                                                                                                            |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – Numeric digits | Default value is 0.0.<br>Settings must satisfy the following conditions:<br>URV ≠ LRV<br>$LRV \leq Q_{max}$<br>$LRV \geq -Q_{max}$<br>For the $Q_{max}$ value refer to the General Specification (GS) of each product. |

**Mass flow URV**

Ⓔ [Easy setup wizard] ► [Std dev var] ► [Mass] ► [URV]

Ⓗ [Device root menu] ► [Easy setup wizard] ► [Standard device variables] ► [Mass flow] ► [Mass flow URV]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [► 274]
- *Basic setup* [► 327]
- *Detailed setup* [► 382]

Sets the upper range value, 100 %, for scaling the analog, frequency and pulse outputs during mass flow measurement.

|   | Value          | Description                                                                                                                                                                                                                                                                                       |
|---|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | <p>Default value is 10000.0.</p> <p>Settings must satisfy the following conditions:</p> $\text{URV} \leq Q_{\text{max}}$ $\text{URV} \geq -Q_{\text{max}}$ $\text{URV} \neq \text{LRV}$ <p>For the <math>Q_{\text{max}}</math> value refer to the General Specification (GS) of each product.</p> |

## Mass flow damping

Ⓛ [Easy setup wizard] ► [Std dev var] ► [Mass] ► [Damp]

Ⓜ [Device root menu] ► [Easy setup wizard] ► [Standard device variables] ► [Mass flow] ► [Mass flow damping]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [► 275]
- *Basic setup* [► 327]
- *Detailed setup* [► 383]

Sets the damping constant for mass flow measurement. The value is the time it takes for this value to become 63.2 % of the total amount of change.

|   | Value          | Description                                                             |
|---|----------------|-------------------------------------------------------------------------|
| Ⓜ | Numeric digits | <p>Setting range: 0.0 – 200.0 s.</p> <p>The default value is 3.0 s.</p> |

## Density

Menu for configuring the density measurement.

The following menus/settings are available:



Density measurement is only reliable if there is no gas in the liquid.

If accessed via Modbus communication, each item that is set to gather information is set and controlled via an interactive user interface called Method.

|   | Full name       | Display name | [Modbus] name     | Page    |
|---|-----------------|--------------|-------------------|---------|
| – | Density unit    | [Unit]       | [Density unit]    | [► 276] |
| – | Density LRV     | [LRV]        | [Density LRV]     | [► 276] |
| – | Density URV     | [URV]        | [Density URV]     | [► 277] |
| – | Density damping | [Damp]       | [Density damping] | [► 277] |

## Density unit

Ⓐ [Easy setup wizard] ► [Std dev var] ► [Dens] ► [Unit]

Ⓜ [Device root menu] ► [Easy setup wizard] ► [Standard device variables] ► [Density] ► [Density unit]

This parameter is also available in additional menus. The values can be set in each of these menus:

- *Easy setup wizard* [ 276]
- *Basic setup* [ 328]
- *Detailed setup* [ 387]

Sets the unit for density.



The unit displayed on the LCD may vary depending on the setting of the parameter *Display unit selection*. During Modbus communication, the actually displayed unit may vary depending on the Modbus tool. For details, refer to *Units of the parameters* [ 819].

| Value                | Description                                                |
|----------------------|------------------------------------------------------------|
| – g/mL               | Sets the displayed Density unit.<br>Default value is g/ml. |
| – kg/L               |                                                            |
| – kg/cm <sup>3</sup> |                                                            |
| – kg/dm <sup>3</sup> |                                                            |
| – kg/m <sup>3</sup>  |                                                            |
| – lb/gal             |                                                            |
| – lb/ft <sup>3</sup> |                                                            |
| – g/cm <sup>3</sup>  |                                                            |
| – g/cc               |                                                            |
| – g/L                |                                                            |
| – User unit          |                                                            |

## Density LRV

Ⓐ [Easy setup wizard] ► [Std dev var] ► [Dens] ► [LRV]

Ⓜ [Device root menu] ► [Easy setup wizard] ► [Standard device variables] ► [Density] ► [Density LRV]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [ 276]
- *Basic setup* [ 328]
- *Detailed setup* [ 388]

Sets the lower range value, 0 %, for the scaling of frequency output during density measurement.

| Value            | Description                                                                    |
|------------------|--------------------------------------------------------------------------------|
| Ⓜ Numeric digits | Default value is 0.<br>Setting must satisfy the following condition: URV ≠ LRV |



**Density URV**

🕒 [Easy setup wizard] ► [Std dev var] ► [Dens] ► [URV]

Ⓜ [Device root menu] ► [Easy setup wizard] ► [Standard device variables] ► [Density] ► [Density URV]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [► 277]
- *Basic setup* [► 329]
- *Detailed setup* [► 388]

Sets the upper range value, 100 %, for scaling the analog and frequency output during density measurement.

|   | Value          | Description                                                                          |
|---|----------------|--------------------------------------------------------------------------------------|
| – | Numeric digits | Default value is 1.5.<br>Settings must satisfy the following condition:<br>URV ≠ LRV |

**Density damping**

🕒 [Easy setup wizard] ► [Std dev var] ► [Dens] ► [Damp]

Ⓜ [Device root menu] ► [Easy setup wizard] ► [Standard device variables] ► [Density] ► [Density damping]

This parameter is also available in additional menus. The values can be set in each of these menus:

- *Easy setup wizard* [► 277]
- *Basic setup* [► 329]
- *Detailed setup* [► 388]

Sets the damping constant for density measurement. The value is the time it takes for this value to become 63.2 % of the total amount of change.

|   | Value          | Description                                              |
|---|----------------|----------------------------------------------------------|
| – | Numeric digits | Setting range: 0.0 – 200.0 s.<br>Default value is 3.0 s. |

**Temperature**

Menu for configuring the temperature measurement.

The following menus/settings are available:

If accessed via Modbus communication, each item that is set to gather information is set and controlled via an interactive user interface called Method.

|   | Full name           | Display name | [Modbus] name         | Page   |
|---|---------------------|--------------|-----------------------|--------|
| – | Temperature unit    | [Unit]       | [Temperature unit]    | [ 278] |
| – | Temperature LRV     | [LRV]        | [Temperature LRV]     | [ 278] |
| – | Temperature URV     | [URV]        | [Temperature URV]     | [ 279] |
| – | Temperature damping | [Damp]       | [Temperature damping] | [ 279] |

**Temperature unit**

⌚ [Easy setup wizard] ► [Std dev var] ► [Temp] ► [Unit]

Ⓜ [Device root menu] ► [Easy setup wizard] ► [Standard device variables] ► [Temperature] ► [Temperature unit]

This parameter is also available in additional menus. The values can be set in each of these menus:

- *Easy setup wizard* [ 278]
- *Basic setup* [ 330]
- *Detailed setup* [ 392]

Sets the unit for temperature.



The unit displayed on the LCD may vary depending on the setting of the parameter *Display unit selection*. During Modbus communication, the actually displayed unit may vary depending on the Modbus tool. For details, refer to *Units of the parameters* [ 819].

|   | Value | Description                                                    |
|---|-------|----------------------------------------------------------------|
| – | degC  | Sets the displayed Temperature unit.<br>Default value is degC. |
| – | degF  |                                                                |
| – | degR  |                                                                |
| – | K     |                                                                |

**Temperature LRV**

⌚ [Easy setup wizard] ► [Std dev var] ► [Temp] ► [LRV]

Ⓜ [Device root menu] ► [Easy setup wizard] ► [Standard device variables] ► [Temperature] ► [Temperature LRV]

This parameter is also available in additional menus. The values can be set in each of these menus:

- *Easy setup wizard* [ 278]
- *Basic setup* [ 330]
- *Detailed setup* [ 393]

Sets the lower range value, 0 %, for scaling the analog and frequency output during temperature measurement.

|   | Value          | Description                                                                                                                                                                            |
|---|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | Default value is 0.0.<br>Settings must satisfy the following conditions:<br>URV $\neq$ LRV<br>LRV $\geq$ Temperature Lower Limit [▶ 587]<br>LRV $\leq$ Temperature Upper Limit [▶ 587] |

**Temperature URV**

⌚ [Easy setup wizard] ▶ [Std dev var] ▶ [Temp] ▶ [URV]

Ⓜ [Device root menu] ▶ [Easy setup wizard] ▶ [Standard device variables] ▶ [Temperature] ▶ [Temperature URV]

This parameter is also available in additional menus. The values can be set in each of these menus:

- Easy setup wizard [▶ 279]
- Basic setup [▶ 331]
- Detailed setup [▶ 393]

Sets the upper range value, 100 %, for scaling the analog and frequency output during temperature measurement.

|   | Value          | Description                                                                                                                                                                              |
|---|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | Default value is 150.0.<br>Settings must satisfy the following conditions:<br>URV $\neq$ LRV<br>URV $\geq$ Temperature lower limit [▶ 587]<br>URV $\leq$ Temperature upper limit [▶ 587] |

**Temperature damping**

⌚ [Easy setup wizard] ▶ [Std dev var] ▶ [Temp] ▶ [Damp]

Ⓜ [Device root menu] ▶ [Easy setup wizard] ▶ [Standard device variables] ▶ [Temperature] ▶ [Temperature damping]

This parameter is also available in additional menus. The values can be set in each of these menus:

- Easy setup wizard [▶ 279]
- Basic setup [▶ 331]
- Detailed Setup [▶ 394]

Sets the damping constant for temperature measurement. The value is the time it takes for this value to become 63.2 % of the total amount of change.

|   | Value          | Description                                               |
|---|----------------|-----------------------------------------------------------|
| – | Numeric digits | Setting range: 0.0 – 200.0 s.<br>Default value is 10.0 s. |

**Volume flow**

Menu for configuring the volume flow measurement.



Volume flow is derived from the density and the mass flow measurement. Errors in density measurement, e.g. from gas bubbles, affect the accuracy of the volume flow. For liquids it is therefore recommended that mass flow be used wherever possible.

The following menus/settings are available:

If accessed via Modbus communication, each item that is set to gather information is set and controlled via an interactive user interface called Method.

|   | Full name           | Display name | [Modbus] name         | Page   |
|---|---------------------|--------------|-----------------------|--------|
| – | Volume flow unit    | [Unit]       | [Volume flow unit]    | [ 280] |
| – | Volume flow LRV     | [LRV]        | [Volume flow LRV]     | [ 281] |
| – | Volume flow URV     | [URV]        | [Volume flow URV]     | [ 282] |
| – | Volume flow damping | [Damp]       | [Volume flow damping] | [ 282] |

**Volume flow unit**

Ⓐ [Easy setup wizard] ► [Std dev var] ► [Vol] ► [Unit]

Ⓜ [Device root menu] ► [Easy setup wizard] ► [Standard device variables] ► [Volume flow] ► [Volume flow unit]

This parameter is also available in additional menus. The values can be set in each of these menus:

- *Easy setup wizard* [ 280]
- *Basic setup* [ 332]
- *Detailed setup* [ 397]

Sets the unit for volume flow.



The unit displayed on the LCD may vary depending on the setting of the parameter *Display unit selection*. During Modbus communication, the actually displayed unit may vary depending on the Modbus tool. For details, refer to *Units of the parameters* [ 819].

|   | Value                | Description                                                                 |
|---|----------------------|-----------------------------------------------------------------------------|
| – | cm <sup>3</sup> /s   | Sets the displayed Volume flow unit.<br>Default value is m <sup>3</sup> /h. |
| – | cm <sup>3</sup> /min |                                                                             |
| – | cm <sup>3</sup> /h   |                                                                             |
| – | l/s                  |                                                                             |
| – | l/min                |                                                                             |
| – | l/h                  |                                                                             |
| – | l/d                  |                                                                             |
| – | m <sup>3</sup> /s    |                                                                             |
| – | m <sup>3</sup> /min  |                                                                             |
| – | m <sup>3</sup> /h    |                                                                             |
| – | m <sup>3</sup> /d    |                                                                             |
| – | gal/s                |                                                                             |
| – | gal/min              |                                                                             |
| – | gal/h                |                                                                             |
| – | gal/d                |                                                                             |
| – | ft <sup>3</sup> /s   |                                                                             |
| – | ft <sup>3</sup> /min |                                                                             |
| – | ft <sup>3</sup> /h   |                                                                             |
| – | ft <sup>3</sup> /d   |                                                                             |
| – | bbl/s                |                                                                             |
| – | bbl/min              |                                                                             |
| – | bbl/h                |                                                                             |
| – | bbl/d                |                                                                             |
| – | Impgal/s             |                                                                             |
| – | Impgal/min           |                                                                             |
| – | Impgal/h             |                                                                             |
| – | Impgal/d             |                                                                             |
| – | User unit            |                                                                             |

**Volume flow LRV**

🕒 [Easy setup wizard] ► [Std dev var] ► [Vol] ► [LRV]

🕒 [Device root menu] ► [Easy setup wizard] ► [Standard device variables] ► [Volume flow] ► [Volume flow LRV]

This parameter is also available in additional menus. The values can be set in each of these menus:

- *Easy setup wizard* [► 281]
- *Basic setup* [► 333]
- *Detailed Setup* [► 398]

Sets the lower range value, 0 %, for scaling the analog, frequency and pulse output during volume flow measurement.

|   | Value          | Description                                                                           |
|---|----------------|---------------------------------------------------------------------------------------|
| – | Numeric digits | Default value is 0.0.<br>Settings must satisfy the following conditions:<br>URV ≠ LRV |

## Volume flow URV

Ⓐ [Easy setup wizard] ► [Std dev var] ► [Vol] ► [URV]

Ⓜ [Device root menu] ► [Easy setup wizard] ► [Standard device variables] ► [Volume flow] ► [Volume flow URV]

This parameter is also available in additional menus. The values can be set in each of these menus:

- *Easy setup wizard* [▶ 282]
- *Basic setup* [▶ 333]
- *Detailed setup* [▶ 399]

Sets the upper range value, 100 %, for scaling the analog, frequency and pulse output during volume flow measurement.

|   | Value          | Description                                                                            |
|---|----------------|----------------------------------------------------------------------------------------|
| – | Numeric digits | Default value is 10.0.<br>Settings must satisfy the following conditions:<br>URV ≠ LRV |

## Volume flow damping

Ⓐ [Easy setup wizard] ► [Std dev var] ► [Vol] ► [Damp]

Ⓜ [Device root menu] ► [Easy setup wizard] ► [Standard device variables] ► [Volume flow] ► [Volume flow damping]

This parameter is also available in additional menus. The values can be set in each of these menus:

- *Easy setup wizard* [▶ 282]
- *Basic setup* [▶ 333]
- *Detailed setup* [▶ 399]

Sets the damping constant for volume flow measurement. The value is the time it takes for this value to become 63.2 % of the total amount of change.

|   | Value          | Description                                              |
|---|----------------|----------------------------------------------------------|
| – | Numeric digits | Setting range: 0.0 – 200.0 s.<br>Default value is 3.0 s. |

## 5.5.3 Analog output

*Analog output* is a menu for configuring Analog output.

The following overview shows the selectable menu items within the submenu *Analog output*.

If accessed via Modbus communication, each item that is set to gather information is set and controlled via an interactive user interface called Method.

|   | Full name                  | Display name | [Modbus] name                | Page    |
|---|----------------------------|--------------|------------------------------|---------|
| – | Analog output select       | [Sel]        | [Analog output select]       | [▶ 283] |
| – | Analog output low limit    | [Lo lim]     | [Analog output low limit]    | [▶ 285] |
| – | Analog output high limit   | [Hi lim]     | [Analog output high limit]   | [▶ 285] |
| – | Analog output alarm output | [Alm out]    | [Analog output alarm output] | [▶ 286] |

Analog output select

⌚ [Easy setup wizard] ▶ [AO] ▶ [Sel]

Ⓜ [Device root menu] ▶ [Easy setup wizard] ▶ [Analog output] ▶ [Analog output select]

This parameter is also available in additional menus. The values can be set in each of these menus:

- Basic setup [▶ 334]
- Detailed setup [▶ 471]

Analog output select sets the process variables for Analog output.

|   | Value                   | Description                                                                           |
|---|-------------------------|---------------------------------------------------------------------------------------|
|   | None                    | Sets the value for Analog output.<br>The default value of Analog output is Mass flow. |
| – | [None]<br>[None]        |                                                                                       |
|   | Mass flow               |                                                                                       |
| – | [Mass]<br>[Mass flow]   |                                                                                       |
|   | Density                 |                                                                                       |
| – | [Dens]<br>[Density]     |                                                                                       |
|   | Temperature             |                                                                                       |
| – | [Temp]<br>[Temperature] |                                                                                       |

|   | Value                                                                      | Description                                                                           |
|---|----------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|   | Pressure                                                                   |                                                                                       |
| – | [Pres]<br>[Pressure]                                                       |                                                                                       |
|   | Volume flow                                                                |                                                                                       |
| – | [vol]<br>[Volume flow]                                                     |                                                                                       |
|   | Reference density                                                          |                                                                                       |
| – | [Ref dens]<br>[Reference density]                                          |                                                                                       |
|   | Relative density                                                           |                                                                                       |
| – | [Rel dens]<br>[Relative density]                                           |                                                                                       |
|   | Corrected volume flow                                                      |                                                                                       |
| – | [Corr vol]<br>[Corrected volume flow]                                      |                                                                                       |
| Ⓕ | Concentration<br>[Conc]<br>[Concentration]                                 | Sets the value for Analog output.<br>The default value of Analog output is Mass flow. |
| Ⓕ | Net mass flow 1<br>[Net mass1]<br>[Net mass flow 1]                        |                                                                                       |
| Ⓕ | Net mass flow 2<br>[Net mass2]<br>[Net mass flow 2]                        |                                                                                       |
| Ⓕ | Net volume flow 1<br>[Net vol1]<br>[Net volume flow 1]                     |                                                                                       |
| Ⓕ | Net volume flow 2<br>[Net vol2]<br>[Net volume flow 2]                     |                                                                                       |
| Ⓕ | Net corrected volume flow<br>[Net corr vol]<br>[Net corrected volume flow] |                                                                                       |



|              | Value                            | Description                                                                           |
|--------------|----------------------------------|---------------------------------------------------------------------------------------|
| Ⓢ [Batch]    | Batch<br>[Batch]                 | Sets the value for Analog output.<br>The default value of Analog output is Mass flow. |
| Ⓢ [Visc]     | Viscosity<br>[Viscosity]         |                                                                                       |
| Ⓢ [Drv curr] | Drive current<br>[Drive current] |                                                                                       |

**Analog output low limit**

Ⓢ [Easy setup wizard] ► [AO] ► [Lo lim]

Ⓢ [Device root menu] ► [Easy setup wizard] ► [Analog output] ► [Analog output low limit]

This parameter is also available in additional menus. The values can be set in each of these menus:

- *Basic setup* [► 335]
- *Detailed setup* [► 472]

*Analog output low limit* sets the lower limit of the current for Analog output during normal operation.



This parameter depends on the parameter of NE43 opt. If NE43 opt is set to NE43, the value of this parameter must be set to 3.8 mA.

|   | Value          | Description                                              |
|---|----------------|----------------------------------------------------------|
| – | Numeric digits | Setting range: 2.4 – 21.6 mA<br>Default value is 2.4 mA. |

**Analog output high limit**

Ⓢ [Easy setup wizard] ► [AO] ► [Hi lim]

Ⓢ [Device root menu] ► [Easy setup wizard] ► [Analog output] ► [Analog output high limit]

This parameter is also available in additional menus. The values can be set in each of these menus:

- *Basic setup* [► 336]
- *Detailed setup* [► 473]

Sets the higher limit current of Analog output during normal operation.



This parameter depends on the parameter of NE43 opt. If NE43 opt is set to NE43, the value of this parameter must be set to 20.50 mA.

|   | Value          | Description                                                |
|---|----------------|------------------------------------------------------------|
| – | Numeric digits | Setting range: 2.4 – 21.6 mA.<br>Default value is 21.6 mA. |

Analog output  
alarm output

⌚ [Easy setup wizard] ► [AO] ► [Alm out]

Ⓜ [Device root menu] ► [Easy setup wizard] ► [Analog output] ► [Analog output alarm output]

This parameter is also available in additional menus. The values can be set in each of these menus:

- *Basic setup* [▶ 336]
- *Detailed setup* [▶ 473]

Sets the value of the current value for Analog output during an alarm state.

|   | Value                          | Description                                                                            |
|---|--------------------------------|----------------------------------------------------------------------------------------|
|   | < 2.4 mA                       | Sets the value for Analog output during an alarm state.<br>Default value is > 21.6 mA. |
| – | [<2.4mA]<br>[< 2.4 mA]         |                                                                                        |
|   | 4 mA                           |                                                                                        |
| – | [4.0mA]<br>[4 mA]              |                                                                                        |
|   | > 21.6 mA                      |                                                                                        |
| – | [>21.6mA]<br>[> 21.6 mA]       |                                                                                        |
|   | Measured value                 |                                                                                        |
| – | [Meas val]<br>[Measured value] |                                                                                        |
|   | Hold                           |                                                                                        |
| – | [Hold]<br>[Hold]               |                                                                                        |

5.5.4 Pulse/Status outputs

Menu for configuring the pulse/status output.

The following menus/settings are available:

If accessed via Modbus communication, each item that is set to gather information is set and controlled via an interactive user interface called Method.

|   | Full name                  | Display name    | [Modbus] name                | Page    |
|---|----------------------------|-----------------|------------------------------|---------|
| – | Pulse/Status configuration | [Pls/Sts cfg]   | [Pulse/Status configuration] | [▶ 287] |
| – | Pulse output 1 – 2         | [Pls out1]      | [Pulse output 1 – 2]         | [▶ 288] |
| – | Frequency output 1 – 2     | [Freq out1 – 2] | [Frequency output 1 – 2]     | [▶ 294] |
| – | Status output 1 – 2        | [Sts out]       | [Status output 1 – 2]        | [▶ 297] |
| Ⓛ | Double pulse output        | [Dbl pls out]   |                              | [▶ 300] |

Pulse/Status configuration

Menu for configuring the pulse/status output.

The following menus/settings are available:

If accessed via Modbus communication, each item that is set to gather information is set and controlled via an interactive user interface called Method.

|   | Full name                      | Display name        | [Modbus] name                    | Page    |
|---|--------------------------------|---------------------|----------------------------------|---------|
| – | Pulse/Status output type       | [Pls/Sts type]      | [Pulse/Status output type]       | [▶ 287] |
| – | Pulse/Status output 1 – 2 mode | [Pls/Sts1 – 2 mode] | [Pulse/Status output 1 – 2 mode] | [▶ 288] |

Pulse/Status output type

|   |                                                                                                  |
|---|--------------------------------------------------------------------------------------------------|
| Ⓛ | [Easy setup wizard] ▶ [Pls/Sts out] ▶ [Pls/Sts cfg] ▶ [Pls/Sts type]                             |
| Ⓜ | [Device root menu] ▶ [Easy setup wizard] ▶ [Pulse/Status outputs] ▶ [Pulse/Status configuration] |

This parameter is also available in additional menus. The value can be set in each of these menus:

- *Basic setup* [▶ 337]
- *Detailed setup* [▶ 474]

Sets the pulse signal type of the Pulse/Status signal.

When this parameter has just been changed, the output signal of pulse/status is not exact.

|   | Value                                        | Description                                                                                         |
|---|----------------------------------------------|-----------------------------------------------------------------------------------------------------|
| – | Single pulse<br>[Sngl pls]<br>[Single pulse] | No synchronize. Output 1 – 2 is individual.<br>Default value.                                       |
| – | Double pulse<br>[Dbl pls]<br>[Double pulse]  | Pulse/status Output 1 – 2 are set to frequency mode and provide a synchronized double pulse signal. |

**Pulse/Status 1 – 2 mode**

⌚ [Easy setup wizard] ► [Pls/Sts out] ► [Pls/Sts cfg] ► [Pls/Sts1 – 2 mode]

Ⓜ [Device root menu] ► [Easy setup wizard] ► [Pulse/Status outputs] ► [Pulse/Status configuration]

This parameter is also available in additional menus. The value can be set in each of these menus:

- *Basic setup* [▶ 337]
- *Detailed setup* [▶ 475]

Sets the pulse signal mode of Pulse/Status output 1 – 2.

If Pulse/Status output 1 – 2 mode has just been changed, the output signal of pulse/status is not exact.

|   | Value                                                       | Description                                                                                                                              |
|---|-------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| – | No function<br>[No func]<br>[No function]                   | Pulse signal or status signal is not available.<br>Default value.<br>Output signal level depends on the Status output 1 – 2 active mode. |
| – | Fixed pulse output<br>[Fix pls out]<br>[Fixed pulse output] | Pulse signal with fixed pulse width, duty ratio changes. Status signal is not available.                                                 |
| – | Frequency output<br>[Freq out]<br>[Frequency output]        | Pulse signal with fixed duty ratio, pulse width changes. Status signal is not available.                                                 |
| – | Status output<br>[Sts out]<br>[Status output]               | Status signal. Pulse or frequency signal is not available.                                                                               |

**Pulse output 1 – 2**

Menu for configuring the pulse signal. This is available when Fixed pulse output is selected in the parameter Pulse/Status output 1 – 2 mode.

The following menus/settings are available:

If accessed via Modbus communication, each item that is set to gather information is set and controlled via an interactive user interface called Method.

|   | Full name                      | Display name | [Modbus] name                    | Page    |
|---|--------------------------------|--------------|----------------------------------|---------|
| – | Pulse output 1 – 2 select      | [Sel]        | [Pulse output 1 – 2 select]      | [▶ 289] |
| – | Pulse output 1 – 2 unit select | [Unit]       | [Pulse output 1 – 2 unit select] | [▶ 290] |
| – | Pulse output 1 – 2 width       | [Width]      | [Pulse output 1 – 2 width]       | [▶ 292] |
| – | Pulse output 1 – 2 rate        | [Rate]       | [Pulse output 1 – 2 rate]        | [▶ 294] |

Pulse output 1 – 2  
select

[Easy setup wizard] ▶ [Pls/Sts out] ▶ [Pls out1 – 2] ▶ [Sel]

[Device root menu] ▶ [Easy setup wizard] ▶ [Pulse/Status outputs] ▶ [Pulse output 1 – 2]

This parameter can be set in the following menu/menus:

- *Basic setup* [▶ 338]
- *Detailed setup* [▶ 476]

Assigns a process variable to pulse output 1 – 2.

|   | Value                                                                      | Description                                                                                                                                        |
|---|----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
|   | Mass flow<br>– [Mass]<br>[Mass flow]                                       | Sets the value for Pulse output 1 – 2.<br>The default value of Pulse output 1 is Mass flow.<br>The default value of Pulse output 2 is Volume flow. |
|   | Volume flow<br>– [Vol]<br>[Volume flow]                                    |                                                                                                                                                    |
|   | Corrected volume flow<br>– [Corr vol]<br>[Corrected volume flow]           |                                                                                                                                                    |
|   | Energy<br>– [Energy]<br>[Energy]                                           |                                                                                                                                                    |
| Ⓜ | Net mass flow 1<br>[Net mass1]<br>[Net mass flow 1]                        |                                                                                                                                                    |
| Ⓜ | Net mass flow 2<br>[Net mass2]<br>[Net mass flow 2]                        |                                                                                                                                                    |
| Ⓜ | Net volume flow 1<br>[Net vol1]<br>[Net volume flow 1]                     |                                                                                                                                                    |
| Ⓜ | Net volume flow 2<br>[Net vol2]<br>[Net volume flow 2]                     |                                                                                                                                                    |
| Ⓜ | Net corrected volume flow<br>[Net corr vol]<br>[Net corrected volume flow] |                                                                                                                                                    |

Pulse output 1 – 2  
unit select

⌚ [Easy setup wizard] ► [Pls/Sts out] ► [Pls out1 – 2] ► [Unit]

Ⓜ [Device root menu] ► [Easy setup wizard] ► [Pulse/Status outputs] ►  
[Pulse output 1 – 2]

This parameter can be set in the following menu/menus:

- *Basic setup* [► 339]
- *Detailed setup* [► 477]

It can be selected and set for the following process variables. The available units change depending on the process variables that are assigned to the output. The default value for Pulse output 1 is kg/P, and Pulse output 2 is cm<sup>3</sup>/P.



The unit displayed on the LCD may vary depending on the setting of the parameter *Display unit selection*. During Modbus communication, the actually displayed unit may vary depending on the Modbus tool. For details, refer to *Units of the parameters* [► 819].

|  | Process variables                                                    | Available units                                                                                                                                                                                                                             |
|--|----------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | For<br>Mass flow 1 – 2<br>– [Mass flow 1 – 2]<br>[Mass flow 1 – 2 ]  | <ul style="list-style-type: none"><li>▪ g/P</li><li>▪ kg/P</li><li>▪ t/P</li><li>▪ ton(US)/P</li><li>▪ ton(UK)/P</li><li>▪ lb/P</li><li>▪ P/g</li><li>▪ P/kg</li><li>▪ P/t</li><li>▪ P/ton(US)</li><li>▪ P/ton(UK)</li><li>▪ P/lb</li></ul> |
|  | For<br>Net mass flow 1 – 2<br>– [Net mass1]<br>[Net mass flow 1 – 2] | <ul style="list-style-type: none"><li>▪ g/P</li><li>▪ kg/P</li><li>▪ t/P</li><li>▪ ton(US)/P</li><li>▪ ton(UK)/P</li><li>▪ lb/P</li><li>▪ P/g</li><li>▪ P/kg</li><li>▪ P/t</li><li>▪ P/ton(US)</li><li>▪ P/ton(UK)</li><li>▪ P/lb</li></ul> |

|   | Process variables                                                                  | Available units                                                                                                                                                                                                                                                                                                                                      |
|---|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| - | For<br>Volume flow 1 – 2<br>[Volume flow 1 – 2]<br>[Volume flow 1 – 2]             | <ul style="list-style-type: none"><li>▪ cm³/P</li><li>▪ L/P</li><li>▪ m³/P</li><li>▪ gal/P</li><li>▪ kgal/P</li><li>▪ ft³/P</li><li>▪ bbl/P</li><li>▪ Impgal/P</li><li>▪ kImpgal/P</li><li>▪ P/Cucm</li><li>▪ P/L</li><li>▪ P/Cum</li><li>▪ P/gal</li><li>▪ P/kgal</li><li>▪ P/Cuft</li><li>▪ P/bbl</li><li>▪ P/Impgal</li><li>▪ P/kImpgal</li></ul> |
| - | For<br>Net volume flow 1 – 2<br>[Net volume flow 1 – 2]<br>[Net volume flow 1 – 2] | <ul style="list-style-type: none"><li>▪ cm³/P</li><li>▪ L/P</li><li>▪ m³/P</li><li>▪ gal/P</li><li>▪ kgal/P</li><li>▪ Cuft/P</li><li>▪ bbl/P</li><li>▪ Impgal/P</li><li>▪ kImpgal/P</li><li>▪ P/Cum</li><li>▪ P/L</li><li>▪ P/m³</li><li>▪ P/gal</li><li>▪ P/kgal</li><li>▪ P/Cuft</li><li>▪ P/bbl</li><li>▪ P/Impgal</li><li>▪ P/kImpgal</li></ul>  |

|   | Process variables                                                                                | Available units                                                                                                                                                                                                                                        |
|---|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | For<br>Corrected volume<br>flow<br>[ <b>Corr vol</b> ]<br>[Corrected volume<br>flow]             | <ul style="list-style-type: none"> <li>▪ NmlL/P</li> <li>▪ NmlCum/P</li> <li>▪ Std L/P</li> <li>▪ StdCuft/P</li> <li>▪ StdCum/P</li> <li>▪ P/Nml L</li> <li>▪ P/Nmlm<sup>3</sup></li> <li>▪ P/Std L</li> <li>▪ PStdCuft</li> <li>▪ P/StdCum</li> </ul> |
| – | For<br>Net corrected volume<br>flow<br>[ <b>Net corr vol</b> ]<br>[Net corrected<br>volume flow] | <ul style="list-style-type: none"> <li>▪ NmlL/P</li> <li>▪ NmlCum/P</li> <li>▪ Std L/P</li> <li>▪ StdCuft/P</li> <li>▪ StdCum/P</li> <li>▪ P/Nml L</li> <li>▪ P/Nmlm<sup>3</sup></li> <li>▪ P/Std L</li> <li>▪ PStdCuft</li> <li>▪ P/StdCum</li> </ul> |
| – | For<br>Energy<br>[ <b>Energy</b> ]<br>[Energy]                                                   | <ul style="list-style-type: none"> <li>▪ MJ/P</li> <li>▪ Btu/P</li> <li>▪ P/MJ</li> <li>▪ P/Btu</li> </ul>                                                                                                                                             |

### Pulse output 1 – 2 width

① [Easy setup wizard] ► [Pls/Sts out] ► [Pls out1 – 2] ► [width]

② [Device root menu] ► [Easy setup wizard] ► [Pulse/Status outputs] ►  
[Pulse output 1 – 2]

This parameter can be set in the following menu/menus:

- *Basic setup* [ 342]
- *Detailed setup* [ 480]

Sets the pulse width, this means the duration of the active state.



| Value                              | Description                                                                              |
|------------------------------------|------------------------------------------------------------------------------------------|
| 0.05 ms<br>– [0.05ms]<br>[0.05 ms] | <div>Sets the pulse width.</div> <div>Default value of Pulse output 1 – 2 is 1 ms.</div> |
| 0.1 ms<br>– [0.1ms]<br>[0.1 ms]    |                                                                                          |
| 0.5 ms<br>– [0.5ms]<br>[0.5 ms]    |                                                                                          |
| 1 ms<br>– [1ms]<br>[1 ms]          |                                                                                          |
| 5 ms<br>– [5ms]<br>[5 ms]          |                                                                                          |
| 10 ms<br>– [10ms]<br>[10 ms]       |                                                                                          |
| 20 ms<br>– [20ms]<br>[20 ms]       |                                                                                          |
| 33 ms<br>– [33ms]<br>[33 ms]       |                                                                                          |
| 50 ms<br>– [50ms]<br>[50 ms]       |                                                                                          |
| 100 ms<br>– [100ms]<br>[100 ms]    |                                                                                          |
| 200 ms<br>– [200ms]<br>[200 ms]    |                                                                                          |
| 330 ms<br>– [330ms]<br>[330 ms]    |                                                                                          |
| 500 ms<br>– [500ms]<br>[500 ms]    |                                                                                          |
| 1000 ms<br>– [1000ms]<br>[1000 ms] |                                                                                          |
| 2000 ms<br>– [2000ms]<br>[2000 ms] |                                                                                          |

**Pulse output 1 – 2  
rate**

⌚ [Easy setup wizard] ► [Pls/Sts out] ► [Pls out1 – 2] ► [Rate]

Ⓜ [Device root menu] ► [Easy setup wizard] ► [Pulse/Status outputs] ►  
[Pulse output 1 – 2]

This parameter can be set in the following menu/menus:

- *Basic setup* [▶ 343]
- *Detailed setup* [▶ 482]

Parameter for defining the number of units of the assigned process variable for 1 pulse of Pulse output 1 – 2.

|   | Value          | Description                                                                                                                                                                                                                                      |
|---|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | <p>Setting range: 0 – no check.</p> <p>Default value is 1.0.</p> <p>The unit for this value is defined in the parameter Pulse output 1 – 2 unit.</p> <p>This value depends on the parameter of Pulse output 1 – 2 width and on maximum flow.</p> |

**Frequency output 1 – 2**

Menu for configuring the frequency signal. It is available when Frequency output is selected in the parameter Pulse/Status output 1 – 2 mode.

The following menus/settings are available:

|   | Full name                     | Display name | [Modbus] name                   | Page    |
|---|-------------------------------|--------------|---------------------------------|---------|
| – | Frequency output 1 – 2 select | [Sel]        | [Frequency output 1 – 2 select] | [▶ 294] |
| – | Max frequency 1 – 2           | [Max freq]   | [Max frequency 1 – 2]           | [▶ 296] |
| – | Min frequency 1 – 2           | [Min freq]   | [Min frequency 1 – 2]           | [▶ 296] |

**Frequency output  
1 – 2 select**

⌚ [Easy setup wizard] ► [Pls/Sts out] ► [Freq out1 – 2] ► [Sel]

Ⓜ [Device root menu] ► [Easy setup wizard] ► [Pulse/Status outputs] ►  
[Frequency output 1 – 2]

This parameter can be set in the following menu/menus:

- *Basic setup* [▶ 344]
- *Detailed setup* [▶ 485]

Assigns a process variable to Frequency output 1 – 2.

| Value                                                                   | Description                                                                                                                                                           |
|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Mass flow<br>– <b>[Mass]</b><br>[Mass flow]                             | Sets the process variable for Frequency output 1 – 2.<br>The default value of Frequency output 1 is Mass flow.<br>The default value of Frequency output 2 is Density. |
| Density<br>– <b>[Dens]</b><br>[Density]                                 |                                                                                                                                                                       |
| Temperature<br>– <b>[Temp]</b><br>[Temperature]                         |                                                                                                                                                                       |
| Pressure<br>– <b>[Pres]</b><br>[Pressure]                               |                                                                                                                                                                       |
| Volume flow<br>– <b>[vol]</b><br>[Volume flow]                          |                                                                                                                                                                       |
| Reference density<br>– <b>[Ref dens]</b><br>[Reference density]         |                                                                                                                                                                       |
| Relative density<br>– <b>[Rel dens]</b><br>[Relative density]           |                                                                                                                                                                       |
| Corrected volume flow<br>– <b>[Corr vol]</b><br>[Corrected volume flow] |                                                                                                                                                                       |
| Concentration<br>⑤ <b>[Conc]</b><br>[Concentration]                     |                                                                                                                                                                       |
| Net mass flow 1<br>⑤ <b>[Net mass1]</b><br>[Net mass flow 1]            |                                                                                                                                                                       |
| Net mass flow 2<br>⑤ <b>[Net mass2]</b><br>[Net mass flow 2]            |                                                                                                                                                                       |
| Net volume flow 1<br>⑤ <b>[Net vol1]</b><br>[Net volume flow 1]         |                                                                                                                                                                       |

|   | Value                                                                      | Description                                                                                                                                                           |
|---|----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓔ | Net volume flow 2<br>[Net vol2]<br>[Net volume flow 2]                     | Sets the process variable for Frequency output 1 – 2.<br>The default value of Frequency output 1 is Mass flow.<br>The default value of Frequency output 2 is Density. |
| Ⓔ | Net corrected volume flow<br>[Net corr vol]<br>[Net corrected volume flow] |                                                                                                                                                                       |
| Ⓔ | Viscosity<br>[Visc]<br>[Viscosity]                                         |                                                                                                                                                                       |
| – | Drive current<br>[Drv curr]<br>[Drive current]                             |                                                                                                                                                                       |

### Max frequency 1 – 2

Ⓔ [Easy setup wizard] ► [Pls/Sts out] ► [Freq out1 – 2] ► [Max freq]

Ⓔ [Device root menu] ► [Easy setup wizard] ► [Pulse/Status outputs] ► [Frequency output 1 – 2]

This parameter can be set in the following menu/menus:

- *Basic setup* [► 345]
- *Detailed setup* [► 486]

Sets the frequency value when the process value that is assigned to the Frequency output is the upper range value, 100 %.

|   | Value          | Description                                                         |
|---|----------------|---------------------------------------------------------------------|
| – | Numeric digits | Setting range: 0.0001 – 10000.0 Hz.<br>Default value is 10000.0 Hz. |

### Min frequency 1 – 2

Ⓔ [Easy setup wizard] ► [Pls/Sts out] ► [Freq out1 – 2] ► [Min freq]

Ⓔ [Device root menu] ► [Easy setup wizard] ► [Pulse/Status outputs] ► [Frequency output 1 – 2]

This parameter can be set in the following menu/menus:

- *Basic setup* [► 345]
- *Detailed setup* [► 486]

Sets the frequency value when the process value that is assigned to the Frequency output is the lower range value, 0 %.

|   | Value          | Description                                                  |
|---|----------------|--------------------------------------------------------------|
| – | Numeric digits | Setting range: 0.0 – 10000.0 Hz.<br>Default value is 0.0 Hz. |

**Status output 1 – 2**

Menu for configuring the status output signal. It is available when Status output is selected in the parameter Pulse/Status output mode.

The following menus/settings are available:

If accessed via Modbus communication, each item that is set to gather information is set and controlled via an interactive user interface called Method.

**Status output 1 – 2 function**

① [Easy setup wizard] ► [Pls/Sts out] ► [Status output 1 – 2] ► [Func]

Ⓜ [Device root menu] ► [Easy setup wizard] ► [Pulse/Status outputs] ► [Status output 1 – 2] ► [Status output 1 – 2 function]

This parameter can be set in the following menu/menus:

- *Basic setup* [► 346]
- *Detailed setup* [► 488]

Set of menus for configuring Status output functions. These menus are available when Status output is selected in the parameter *Pulse/Status output 1 – 2 mode*.

Concentration high low alarm, Net mass flow 1 – 2 high low alarm, Net volume flow 1 – 2 high low alarm and Net corrected volume flow high low alarm can only be selected if the concentration function is available in the device.

|   | Value                                                           | Description                                                                                                       |
|---|-----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| – | Off<br>[off]<br>[Off]                                           | Not used. Status signal does not become active.<br>Default value.                                                 |
| – | Flow direction<br>[Flow dir]<br>[Flow direction]                | The signal becomes inactive when flow direction is forward and active when flow direction is reverse.             |
| – | Total limit 1 – 6<br>[Total limit 1 – 6]<br>[Total limit 1 – 6] | Signal becomes active when the value of Totalizer 1 – 6 exceeds the value of the parameter Total 1 – 6 set point. |
| – | F category<br>[F only]<br>[F category]                          | Signal becomes active when an alarm that is categorized as F on NE107 occurs.                                     |
| – | S,C,M category<br>[s,c,m]<br>[S,C,M category]                   | Signal becomes active when an alarm that is categorized as S, C or M on NE107 occurs.                             |
| – | F + S,C,M category<br>[F+s,c,m]<br>[F + S,C,M category]         | Signal becomes active when an alarm that is categorized as F, S, C or M on NE107 occurs.                          |
| – | Slug detection<br>[slug]<br>[Slug detection]                    | Signal becomes active when a Slug alarm occurs.                                                                   |
| – | Empty pipe<br>[Empty]<br>[Empty pipe]                           | Signal becomes active when an Empty alarm occurs.                                                                 |

|   | Value                                                                                                | Description                                                                  |
|---|------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| – | Corrosion detection<br>[Crrsn]<br>[Corrosion detection]                                              | Signal becomes active when a Corrosion detection alarm occurs.               |
| – | Mass flow high low alarm<br>[Mass H/L alm]<br>[Mass flow high low alarm]                             | Signal becomes active when a Mass flow high or low alarm occurs.             |
| – | Density high low alarm<br>[Dens H/L alm]<br>[Density high low alarm]                                 | Signal becomes active when a Density high or low alarm occurs.               |
| – | Reference density high low alarm<br>[Ref dens H/L alm]<br>[Reference density high low alarm]         | Signal becomes active when a Reference density high or low alarm occurs.     |
| – | Relative density high low alarm<br>[Rel dens H/L alm]<br>[Relative density high low alarm]           | Signal becomes active when a Relative density high or low alarm occurs.      |
| – | Temperature high low alarm<br>[Temp H/L alm]<br>[Temperature high low alarm]                         | Signal becomes active when a Temperature high or low alarm occurs.           |
| – | Pressure high low alarm<br>[Pres H/L alm]<br>[Pressure high low alarm]                               | Signal becomes active when a Pressure high or low alarm occurs.              |
| – | Volume flow high low alarm<br>[Vol H/L alm]<br>[Volume flow high low alarm]                          | Signal becomes active when a Volume high or low alarm occurs.                |
| – | Corrected volume flow high low alarm<br>[Corr vol H/L alm]<br>[Corrected volume flow high low alarm] | Signal becomes active when a Corrected volume flow high or low alarm occurs. |

|   | Value                                                                                                    | Description                                                                      |
|---|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| ⑥ | Concentration high low alarm<br>[Conc H/L alm]<br>[Concentration high low alarm]                         | Signal becomes active when a Concentration high or low alarm occurs.             |
| ⑥ | Net mass flow 1 high low alarm<br>[Net mass1 H/L alm]<br>[Net mass flow 1 high low alarm]                | Signal becomes active when a Net mass flow 1 high or low alarm occurs.           |
| ⑥ | Net mass flow 2 high low alarm<br>[Net mass2 H/L alm]<br>[Net mass flow 2 high low alarm]                | Signal becomes active when a Net mass flow 2 high or low alarm occurs.           |
| ⑥ | Net volume flow 1 high low alarm<br>[Net vol1 H/L alm]<br>[Net volume flow 1 high low alarm]             | Signal becomes active when a Net volume flow 1 high or low alarm occurs.         |
| ⑥ | Net volume flow 2 high low alarm<br>[Net vol2 H/L alm]<br>[Net volume flow 2 high low alarm]             | Signal becomes active when a Net volume flow 2 high or low alarm occurs.         |
| ⑥ | Net corrected volume flow high low alarm<br>[Net corr vol]<br>[Net corrected volume flow high low alarm] | Signal becomes active when a Net corrected volume flow high or low alarm occurs. |
| ⑥ | Batch function<br>[Batch]<br>[Batch function]                                                            | Need to be set when a Batch function is used.                                    |
| ⑥ | Viscosity high low alarm<br>[Visc H/L alm]<br>[Viscosity high low alarm]                                 | Signal becomes active when a Viscosity high or low alarm occurs.                 |

**Double pulse output**

Menu for configuring the double pulse signal. This menu is available when Double pulse is selected in the parameter Puls/Status output type.

The following menus/settings are available:

- *Basic setup* [▶ 348]
- *Detailed setup* [▶ 491]

This parameter can be set in the following menu/menus:

If accessed via Modbus communication, each item that is set to gather information is set and controlled via an interactive user interface called Method.

|   | Full name                     | Display name       | [Modbus] name | Page    |
|---|-------------------------------|--------------------|---------------|---------|
| ① | Frequency output 1 select     | [Sel]              | —             | [▶ 300] |
| ① | Double pulse phase shift mode | [Phase shift mode] | —             | [▶ 301] |
| ① | Max frequency 1               | [Max freq]         | —             | [▶ 302] |
| ① | Min frequency 1               | [Min freq]         | —             | [▶ 302] |

**Frequency output 1 select**

① [Easy setup wizard] ▶ [Pls/Sts out] ▶ [Db1 pls out] ▶ [Sel]

This parameter can be set in the following menu/menus:

- *Basic setup* [▶ 349]
- *Detailed setup* [▶ 492]

Assigns a process variable to double pulse output.

Concentration, Net mass flow 1 – 2, Net volume flow 1 – 2 and Net corrected volume flow can only be selected, if the concentration function is available on the device.



|        | Value                                       | Description                                                             |
|--------|---------------------------------------------|-------------------------------------------------------------------------|
| Ⓐ      | Mass flow<br>[Mass]                         | Sets the displayed process variable.<br>The default value is Mass flow. |
| Ⓐ      | Density<br>[Dens]                           |                                                                         |
| Ⓐ      | Temperature<br>[Temp]                       |                                                                         |
| Ⓐ      | Pressure<br>[Pres]                          |                                                                         |
| Ⓐ      | Volume flow<br>[Vol]                        |                                                                         |
| Ⓐ      | Reference density<br>[Ref dens]             |                                                                         |
| Ⓐ      | Relative density<br>[Rel dens]              |                                                                         |
| Ⓐ      | Corrected volume flow<br>[Corr vol]         |                                                                         |
| Ⓐ<br>ⓕ | Concentration<br>[Conc]                     |                                                                         |
| Ⓐ<br>ⓕ | Net mass flow 1<br>[Net mass1]              |                                                                         |
| Ⓐ<br>ⓕ | Net mass flow 2<br>[Net mass2]              |                                                                         |
| Ⓐ<br>ⓕ | Net volume flow 1<br>[Net vol1]             |                                                                         |
| Ⓐ<br>ⓕ | Net volume flow 2<br>[Net vol2]             |                                                                         |
| Ⓐ<br>ⓕ | Net corrected volume flow<br>[Net corr vol] |                                                                         |

### Double pulse phase shift mode

Ⓐ [Easy setup wizard] ► [Pls/Sts out] ► [Dbl pls out] ► [Phase shift mode]

This parameter can be set in the following menu/menus:

- Basic setup [► 350]
- Detailed setup [► 493]

Sets the pulse shift mode of double pulse.

Directly after changing the shift mode, the output signal of pulse/status is not exact.

|   | Value                | Description                                                |
|---|----------------------|------------------------------------------------------------|
| Ⓐ | 0 degree<br>[0°]     | No phase shift between pulse signal 1 and 2.               |
| Ⓐ | 180 degree<br>[180°] | Phase shift between pulse signal 1 and 2 is 180 degrees.   |
| Ⓐ | -90 degree<br>[-90°] | Pulse 2 signal is shifted -90 degrees from pulse 1 signal. |

|   | Value                      | Description                                                                                                                                                                                       |
|---|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓐ | +90 degree<br>[+90°]       | Pulse 2 signal is shifted +90 degrees from pulse 1 signal.                                                                                                                                        |
| Ⓐ | Quadrature<br>[Quadrature] | When the flow direction is forward, pulse 2 signal is shifted +90 degrees from pulse 1 signal. When the flow direction is reverse, pulse 2 is shifted -90 degrees from pulse 1.<br>Default value. |

**Max frequency 1**

Ⓐ [Easy setup wizard] ► [Pls/Sts out] ► [Dbl pls out] ► [Max freq]

This parameter can be set in the following menu/menus:

- *Basic setup* [► 350]
- *Detailed setup* [► 494]

Sets the frequency value when the process value that is assigned to Double pulse output is the upper range value, 100 %.

|   | Value          | Description                                                        |
|---|----------------|--------------------------------------------------------------------|
| Ⓐ | Numeric digits | Setting range: 0.0001 – 10000.0 Hz<br>Default value is 10000.0 Hz. |

**Min frequency 1**

Ⓐ [Easy setup wizard] ► [Pls/Sts out] ► [Dbl pls out] ► [Min freq]

This parameter can be set in the following menu/menus:

- *Basic setup* [► 351]
- *Detailed setup* [► 494]

Sets the frequency value when the process value that is assigned to Double pulse output is the lower range value, 0 %.

|   | Value          | Description                                                 |
|---|----------------|-------------------------------------------------------------|
| Ⓐ | Numeric digits | Setting range: 0.0 – 10000.0 Hz<br>Default value is 0.0 Hz. |

**5.5.5 Totalizer**

Menu for configuring the totalizer.

**Totalizer 1 – 3**

Menus for configuring Totalizer 1 – 3.

To configure the additional 3 Totalizers, *Totalizer 4 – 6*, see the *Detailed setup menu* [► 503].

The following menus/settings are available:

If accessed via Modbus communication, each item that is set to gather information is set and controlled via an interactive user interface called Method.

|   | Full name                  | Display name | [Modbus] name                | Page    |
|---|----------------------------|--------------|------------------------------|---------|
| – | Total 1 – 3 channel        | [Channel]    | [Total 1 – 3 channel]        | [► 303] |
| – | Total 1 – 3 unit           | [Unit]       | [Total 1 – 3 unit]           | [► 304] |
| – | Total 1 – 3 failure option | [Fail opt]   | [Total 1 – 3 failure option] | [► 305] |
| – | Total 1 – 3 start/stop     | [Start/Stop] | [Total 1 – 3 start/stop]     | [► 305] |

## Total 1 – 3 channel

① [Easy setup wizard] ► [Tt1] ► [Tt1 1 – 3] ► [Channel]

② [Device root menu] ► [Easy setup wizard] ► [Totalizer] ► [Totalizer 1 – 3]

This parameter can be set in the following menu/menus:

- *Basic setup* [► 352]
- *Detailed setup* [► 503]

Sets the process value for Totalizer 1 – 3.

Net mass flow 1 – 2, Net volume flow 1 – 2 and Net corrected volume flow can only be selected if the concentration function is available on the device.

|   | Value                                                                      | Description                                                                                                                                                                                                                     |
|---|----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Mass flow<br>[Mass]<br>[Mass flow]                                         | Sets the displayed process variable for Totalizer 1 – 3.<br>The default value for Totalizer 1 is Mass flow.<br>The default value for Totalizer 2 is Volume flow.<br>The default value for Totalizer 3 is Corrected volume flow. |
| – | Volume flow<br>[vol]<br>[Volume flow]                                      |                                                                                                                                                                                                                                 |
| – | Corrected volume flow<br>[Corr vol]<br>[Corrected volume flow]             |                                                                                                                                                                                                                                 |
| – | Energy<br>[Energy]<br>[Energy]                                             |                                                                                                                                                                                                                                 |
| Ⓢ | Net mass flow 1<br>[Net mass1]<br>[Net mass flow 1]                        |                                                                                                                                                                                                                                 |
| Ⓢ | Net mass flow 2<br>[Net mass2]<br>[Net mass flow 2]                        |                                                                                                                                                                                                                                 |
| Ⓢ | Net volume flow 1<br>[Net vol1]<br>[Net volume flow 1]                     |                                                                                                                                                                                                                                 |
| Ⓢ | Net volume flow 2<br>[Net vol2]<br>[Net volume flow 2]                     |                                                                                                                                                                                                                                 |
| Ⓢ | Net corrected volume flow<br>[Net corr vol]<br>[Net corrected volume flow] |                                                                                                                                                                                                                                 |

## Total 1 – 3 unit

⌚ [Easy setup wizard] ► [Ttl] ► [Ttl 1 – 3] ► [Unit]

Ⓜ [Device root menu] ► [Easy setup wizard] ► [Totalizer] ► [Totalizer 1 – 3]

This parameter can be set in the following menu/menus:

- *Basic setup* [▶ 353]
- *Detailed setup* [▶ 504]

Sets the unit for Total 1 – 3.



The unit displayed on the LCD may vary depending on the setting of the parameter *Display unit selection*. During Modbus communication, the actually displayed unit may vary depending on the Modbus tool. For details, refer to *Units of the parameters* [▶ 819].

|   | Value                      | Description                                                                                                                                                                                                |
|---|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | g                          | Sets the unit for Totalizer 1 – 3.<br>The default value for Totalizer 1 is kg.<br>The default value for Totalizer 2 is m <sup>3</sup> .<br>The default value for Totalizer 3 is m <sup>3</sup> (standard). |
| – | kg                         |                                                                                                                                                                                                            |
| – | t                          |                                                                                                                                                                                                            |
| – | ton(US)                    |                                                                                                                                                                                                            |
| – | ton(UK)                    |                                                                                                                                                                                                            |
| – | lb                         |                                                                                                                                                                                                            |
| – | cm <sup>3</sup>            |                                                                                                                                                                                                            |
| – | L                          |                                                                                                                                                                                                            |
| – | m <sup>3</sup>             |                                                                                                                                                                                                            |
| – | gal                        |                                                                                                                                                                                                            |
| – | kgal                       |                                                                                                                                                                                                            |
| – | ft <sup>3</sup>            |                                                                                                                                                                                                            |
| – | bbl                        |                                                                                                                                                                                                            |
| – | Impgal                     |                                                                                                                                                                                                            |
| – | kImpgal                    |                                                                                                                                                                                                            |
| – | L(normal)                  |                                                                                                                                                                                                            |
| – | m <sup>3</sup> (normal)    |                                                                                                                                                                                                            |
| – | L(standard)                |                                                                                                                                                                                                            |
| – | ft <sup>3</sup> (standard) |                                                                                                                                                                                                            |
| – | MMscuft                    |                                                                                                                                                                                                            |
| – | m <sup>3</sup> (standard)  |                                                                                                                                                                                                            |
| – | MJ                         |                                                                                                                                                                                                            |
| – | Btu                        |                                                                                                                                                                                                            |
| – | User unit                  |                                                                                                                                                                                                            |

**Total 1 – 3 failure option**

① [Easy setup wizard] ► [Tt1] ► [Tt1 1 – 3] ► [Fail opt]

Ⓜ [Device root menu] ► [Easy setup wizard] ► [Totalizer] ► [Totalizer 1 – 3]

This parameter can be set in the following menu/menus:

- *Basic setup* [► 354]
- *Detailed setup* [► 505]

Defines the behavior of the totalizers when an alarm occurs.

|   | Value                                                      | Description                                                                  |
|---|------------------------------------------------------------|------------------------------------------------------------------------------|
| – | Run<br>[Run]<br>[Run]                                      | Totalizer accumulates assigned process value anyway.<br>Default value.       |
| – | Hold<br>[Hold]<br>[Hold]                                   | Totalizer stops accumulating the assigned process value.                     |
| – | Last Valid Value<br>[Last valid val]<br>[Last valid value] | Totalizer accumulates the value that was measured before the alarm occurred. |

**Total 1 – 3 start/stop**

① [Easy setup wizard] ► [Tt1] ► [Tt1 1 – 3] ► [Start/Stop]

Ⓜ [Device root menu] ► [Easy setup wizard] ► [Totalizer] ► [Totalizer 1 – 3]

This parameter can be set in the following menu/menus:

- *Basic setup* [► 355]
- *Detailed setup* [► 506]

Starts or stops Totalizer 1 – 3 and shows its status.

|   | Value            | Description                                                                                                                                              |
|---|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓜ | Stop<br>[Stop]   | Totalizer 1 – 3 stops accumulation of the assigned process value. When accumulation is stopped, the value is kept.                                       |
| Ⓜ | Start<br>[Start] | Totalizer 1 – 3 starts accumulation of the assigned process value. If it already contains a value other than 0, the accumulation starts from that value. |

### 5.5.6 Display select

Menu for assigning process variables to be displayed.

If accessed via Modbus communication, each item that is set to gather information is set and controlled via an interactive user interface called Method.

#### Display select 1 – 4

Ⓐ [Easy setup wizard] ► [Disp sel] ► [Sel1 – 4]

Ⓜ [Device root menu] ► [Easy setup wizard] ► [Display select]

This parameter can be set in the following menu/menus:

- *Basic setup* [ 356]
- *Detailed setup* [ 516]

Assigns process variables to display lines 1, 2, 3 and 4 of the LCD display. On display, Display measurement mode can be selected and Batch display select 1 – 4 or Logging select 1 – 4 can be selected based on the selection of Display measurement mode.

|   | Value                                                          | Description                                                                                                                                                                                                                                                                                                 |
|---|----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | None<br>[None]<br>[None]                                       | Sets Display select 1 – 4.<br>The default value for Display select 1 is Mass flow.<br>None is not available for Display select 1.<br>The default value for Display select 2 is Density.<br>The default value for Display select 3 is Temperature.<br>The default value for Display select 4 is Volume flow. |
| – | Mass flow<br>[Mass]<br>[Mass flow]                             |                                                                                                                                                                                                                                                                                                             |
| – | Density<br>[Dens]<br>[Dens]                                    |                                                                                                                                                                                                                                                                                                             |
| – | Temperature<br>[Temp]<br>[Temp]                                |                                                                                                                                                                                                                                                                                                             |
| – | Volume flow<br>[Vol]<br>[Volume flow]                          |                                                                                                                                                                                                                                                                                                             |
| – | Reference density<br>[Ref dens]<br>[Reference density]         |                                                                                                                                                                                                                                                                                                             |
| – | Relative density<br>[Rel dens]<br>[Relative density]           |                                                                                                                                                                                                                                                                                                             |
| – | Corrected volume flow<br>[Corr vol]<br>[Corrected volume flow] |                                                                                                                                                                                                                                                                                                             |
| – | Pressure<br>[Pres]<br>[Pressure]                               |                                                                                                                                                                                                                                                                                                             |

|   | Value                                                  | Description                                                                                                                                                                                                                                                                                                 |
|---|--------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   | Totalizer 1                                            |                                                                                                                                                                                                                                                                                                             |
| – | <b>[Tt11]</b><br>[Totalizer 1]                         |                                                                                                                                                                                                                                                                                                             |
|   | Totalizer 2                                            |                                                                                                                                                                                                                                                                                                             |
| – | <b>[Tt12]</b><br>[Totalizer 2]                         |                                                                                                                                                                                                                                                                                                             |
|   | Totalizer 3                                            |                                                                                                                                                                                                                                                                                                             |
| – | <b>[Tt13]</b><br>[Totalizer 3]                         |                                                                                                                                                                                                                                                                                                             |
|   | Totalizer 4                                            |                                                                                                                                                                                                                                                                                                             |
| – | <b>[Tt14]</b><br>[Totalizer 4]                         |                                                                                                                                                                                                                                                                                                             |
|   | Totalizer 5                                            |                                                                                                                                                                                                                                                                                                             |
| – | <b>[Tt15]</b><br>[Totalizer 5]                         |                                                                                                                                                                                                                                                                                                             |
|   | Totalizer 6                                            |                                                                                                                                                                                                                                                                                                             |
| – | <b>[Tt16]</b><br>[Totalizer 6]                         |                                                                                                                                                                                                                                                                                                             |
|   | Mass flow % graph                                      | Sets Display select 1 – 4.<br>The default value for Display select 1 is Mass flow.<br>None is not available for Display select 1.<br>The default value for Display select 2 is Density.<br>The default value for Display select 3 is Temperature.<br>The default value for Display select 4 is Volume flow. |
| – | <b>[Mass %]</b><br>[Mass flow % graph]                 |                                                                                                                                                                                                                                                                                                             |
|   | Volume flow % graph                                    |                                                                                                                                                                                                                                                                                                             |
| – | <b>[Vol %]</b><br>[Volume flow % graph]                |                                                                                                                                                                                                                                                                                                             |
|   | Corrected volume flow % graph                          |                                                                                                                                                                                                                                                                                                             |
| – | <b>[Corr vol %]</b><br>[Corrected volume flow % graph] |                                                                                                                                                                                                                                                                                                             |
|   | Tag                                                    |                                                                                                                                                                                                                                                                                                             |
| – | <b>[Tag]</b><br>[Tag]                                  |                                                                                                                                                                                                                                                                                                             |
|   | Long tag                                               |                                                                                                                                                                                                                                                                                                             |
| – | <b>[Long tag]</b><br>[Long tag]                        |                                                                                                                                                                                                                                                                                                             |
|   | Velocity                                               |                                                                                                                                                                                                                                                                                                             |
| – | <b>[ve1]</b><br>[Velocity]                             |                                                                                                                                                                                                                                                                                                             |
|   | Concentration                                          |                                                                                                                                                                                                                                                                                                             |
| Ⓔ | <b>[Conc]</b><br>[Concentration]                       |                                                                                                                                                                                                                                                                                                             |
|   | Net mass flow 1                                        |                                                                                                                                                                                                                                                                                                             |
| Ⓔ | <b>[Net mass1]</b><br>[Net mass flow 1]                |                                                                                                                                                                                                                                                                                                             |

|   | Value                                                                      | Description                                                                                                                                                                                                                                                                                                 |
|---|----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓕ | Net mass flow 2<br>[Net mass2]<br>[Net mass flow 2]                        | Sets Display select 1 – 4.<br>The default value for Display select 1 is Mass flow.<br>None is not available for Display select 1.<br>The default value for Display select 2 is Density.<br>The default value for Display select 3 is Temperature.<br>The default value for Display select 4 is Volume flow. |
| Ⓕ | Net volume flow 1<br>[Net vol1]<br>[Net volume flow 1]                     |                                                                                                                                                                                                                                                                                                             |
| Ⓕ | Net volume flow 2<br>[Net vol2]<br>[Net volume flow 2]                     |                                                                                                                                                                                                                                                                                                             |
| Ⓕ | Net corrected volume flow<br>[Net corr vol]<br>[Net corrected volume flow] |                                                                                                                                                                                                                                                                                                             |
| Ⓕ | Viscosity<br>[Visc]<br>[Viscosity]                                         |                                                                                                                                                                                                                                                                                                             |
| – | Drive current<br>[Drv curr]<br>[Drive current]                             |                                                                                                                                                                                                                                                                                                             |
| – | 24hours totalizer 1<br>[24h tt11]<br>[24hours totalizer 1]                 |                                                                                                                                                                                                                                                                                                             |
|   | 24hours totalizer 2<br>[24h tt12]<br>[24hours totalizer 2]                 |                                                                                                                                                                                                                                                                                                             |
|   | 24hours totalizer 3<br>[24h tt13]<br>[24hours totalizer 3]                 |                                                                                                                                                                                                                                                                                                             |
|   | Gas void fraction<br>[GVF]<br>[Gas void fraction]                          |                                                                                                                                                                                                                                                                                                             |
|   | Display unit flow dual<br>[Mass flow (dual)]                               |                                                                                                                                                                                                                                                                                                             |
|   | Display unit density dual<br>[Dens (dual)]                                 |                                                                                                                                                                                                                                                                                                             |



### 5.5.7 Date/Time

The following menus/settings are available:

If accessed via Modbus communication, each item that is set to gather information is set and controlled via an interactive user interface called Method.

|   | Full name        | Display name | [Modbus] name      | Page    |
|---|------------------|--------------|--------------------|---------|
| – | Current Date     | [Date]       | [Current Date]     | [▶ 309] |
| – | Current Time     | [Time]       | [Current Time]     | [▶ 309] |
| – | Set current date | [Set date]   | [Set current date] | [▶ 310] |
| – | Set current time | [Set time]   | [Set current time] | [▶ 310] |

#### Current Date

Ⓛ [Easy setup wizard] ▶ [Date/Time] ▶ [Date]

Ⓜ [Device root menu] ▶ [Easy setup wizard] ▶ [Date/Time] ▶ [Current Date]

This parameter can be set in the following menu/menus:

- *Diag/Service* [▶ 146]
- *Basic setup* [▶ 359]

Shows the current date on the device.

|   | Value | Description                                                                                                                                                       |
|---|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Date  | Shows the actual current date if the date was set correctly when the device started running. On the [Modbus] tool, date and time are displayed in this parameter. |

#### Current Time

Ⓛ [Easy setup wizard] ▶ [Date/Time] ▶ [Time]

Ⓜ [Device root menu] ▶ [Easy setup wizard] ▶ [Date/Time] ▶ [Current Time]

This parameter can be set in the following menu/menus:

- *Diag/Service* [▶ 146]
- *Basic setup* [▶ 359]

Shows the current time on the device.

|   | Value | Description                                                                                  |
|---|-------|----------------------------------------------------------------------------------------------|
| – | Time  | Shows the actual current time if the time was set correctly when the device started running. |

**Set current date**

Ⓐ [Easy setup wizard] ► [Date/Time] ► [Set date]

Ⓜ [Device root menu] ► [Easy setup wizard] ► [Date/Time]

This parameter can be set in the following menu/menus:

- *Basic setup* [▶ 359]
- *Detailed setup* [▶ 547]

Sets the date.

|   | Value          | Description                                                                                                                                          |
|---|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | The date format on the LCD is defined in the parameter Display format date.<br>The format in [Modbus] is MM/DD/YYYY.<br>Default value is 01/01/2015. |

**Set current time**

Ⓐ [Easy setup wizard] ► [Date/Time] ► [Set time]

Ⓜ [Device root menu] ► [Easy setup wizard] ► [Date/Time]

This parameter can be set in the following menu/menus:

- *Basic setup* [▶ 360]
- *Detailed setup* [▶ 548]

Sets the time.

|   | Value          | Description                                            |
|---|----------------|--------------------------------------------------------|
| – | Numeric digits | Time format is hh:mm:ss.<br>Default value is 00:00.00. |

**5.5.8 Events/Alarms acknowledge**

Menu used during Modbus communication for setting the acknowledgment of Events/Alarms.

If accessed via Modbus communication, each item that is set to gather information is set and controlled via an interactive user interface called Method.

**5.5.9 Batch 1 function**

Menu for configuring the Batch function.

The following menus/settings are available:

If accessed via Modbus communication, each item that is set to gather information is set and controlled via an interactive user interface called Method.

|   | Full name             | Display name | [Modbus] name           | Page    |
|---|-----------------------|--------------|-------------------------|---------|
| Ⓐ | Batch 1 configuration | [TuHC cfg]   | [Batch 1 configuration] | [▶ 311] |
| Ⓐ | Batch 1 setting       | [Setting]    | [Batch 1 setting]       | [▶ 313] |

Batch 1 configuration

Menu for configuring the Batch function 1.

The following menus/settings are available:

If accessed via Modbus communication, each item that is set to gather information is set and controlled via an interactive user interface called Method.

|   | Full name                  | Display name    | [Modbus] name                | Page    |
|---|----------------------------|-----------------|------------------------------|---------|
| ⓔ | Batch mode                 | [Mode]          | [Batch mode]                 | [▶ 311] |
| ⓔ | Batch variable select 1    | [Var sel]       | [Batch variable select 1]    | [▶ 311] |
| – | Pulse/Status output 1 mode | [Pls/Sts1 mode] | [Pulse/Status output 1 mode] | [▶ 312] |

Batch mode

Ⓛ [Easy setup wizard] ▶ [Batch1] ▶ [TuHC cfg] ▶ [Mode]

Ⓜ [Device root menu] ▶ [Easy setup wizard] ▶ [Batch 1 function] ▶ [Batch 1 configuration]

This parameter can be set in the following menu/menus:

- Basic setup [▶ 364]
- Detailed setup [▶ 550]

Activates the Batch function.

|   | Value        | Description    |
|---|--------------|----------------|
| – | No<br>[No]   | Default value. |
| – | Yes<br>[Yes] |                |

Batch variable select 1

Ⓛ [Easy setup wizard] ▶ [Batch1] ▶ [TuHC cfg] ▶ [Var sel]

Ⓜ [Device root menu] ▶ [Easy setup wizard] ▶ [Batch 1 function] ▶ [Batch 1 configuration]

This parameter can be set in the following menu/menus:

- Basic setup [▶ 366]
- Detailed setup [▶ 554]

Sets the Process variable which is used in Batch function.

|   | Value                                                                      | Value description               |
|---|----------------------------------------------------------------------------|---------------------------------|
|   | Mass flow<br>– [Mass]<br>[Mass flow]                                       | The default value is Mass flow. |
|   | Volume flow<br>– [vol]<br>[Volume flow]                                    |                                 |
|   | Corrected volume flow<br>– [Corr vol]<br>[Corrected volume flow]           |                                 |
| Ⓢ | Net mass flow 1<br>[Net mass1]<br>[Net mass flow 1]                        |                                 |
| Ⓢ | Net mass flow 2<br>[Net mass2]<br>[Net mass flow 2]                        |                                 |
| Ⓢ | Net volume flow 1<br>[Net vol1]<br>[Net volume flow 1]                     |                                 |
| Ⓢ | Net volume flow 2<br>[Net vol2]<br>[Net volume flow 2]                     |                                 |
| Ⓢ | Net corrected volume flow<br>[Net corr vol]<br>[Net corrected volume flow] |                                 |

### Pulse/Status 1 mode

Ⓢ [Easy setup wizard] ► [Batch1] ► [TuHC cfg] ► [Pls/Sts1 mode]

Ⓢ [Device root menu] ► [Easy setup wizard] ► [Batch 1 function] ► [Batch 1 configuration]

This parameter can be set in the following menu/menus:

- *Basic setup* [ 365]
- *Detailed setup* [ 562]

Sets the pulse signal mode of Pulse/Status output 1.

If Pulse/Status output 1 mode has just been changed, the output signal of pulse/status is not exact.

|  | Value                                       | Value description                                                                                                                    |
|--|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
|  | No function<br>– [No func]<br>[No function] | Pulse signal or status signal is not available.<br>Default value.<br>Output signal level depends on the Status output 1 active mode. |

|   | Value                                                       | Value description                                                                          |
|---|-------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| – | Fixed pulse output<br>[Fix pls out]<br>[Fixed pulse output] | Pulse signal with fixed pulse width, duty ratio changes. Status signal is not available.   |
| – | Frequency output<br>[Freq out]<br>[Frequency output]        | Pulse signal with fixed duty ratio, pulse width changes, . Status signal is not available. |
| – | Status output<br>[Sts out]<br>[Status output]               | Status signal. Pulse or frequency signal is not available.                                 |

### Batch 1 setting

Menu for configuring the Batch 1 function.

The following menus/settings are available:

If accessed via Modbus communication, each item that is set to gather information is set and controlled via an interactive user interface called Method.

|   | Full name                  | Display name      | [Modbus] name                | Page    |
|---|----------------------------|-------------------|------------------------------|---------|
| Ⓢ | Batch unit 1               | [Unit]            | [Batch unit 1]               | [▶ 313] |
| Ⓢ | Batch quantity 1           | [Qty]             | [Batch quantity 1]           | [▶ 314] |
| Ⓢ | Fixed compensation value 1 | [Fix comp val]    | [Fixed compensation value 1] | [▶ 314] |
| Ⓢ | Batch end judgment value 1 | [End judge val]   | [Batch end judgment value 1] | [▶ 315] |
| Ⓢ | Max batch quantity 1       | [Max qty]         | [Max batch quantity 1]       | [▶ 315] |
| – | Status output 1 function   | [Func]            | [Status output 1 function]   | [▶ 315] |
| Ⓢ | Batch status output 1      | [Sts out1]        | [Batch status output 1]      | [▶ 318] |
| – | Display measurement mode   | [Meas mode]       | [Display measurement mode]   | [▶ 319] |
| Ⓢ | Batch display select 1 – 4 | [Batch disp1 – 4] | [Batch display select 1 – 4] | [▶ 319] |
| Ⓢ | Display format batch       | [Format batch]    | [Display format batch]       | [▶ 321] |

### Batch unit 1

Ⓢ [Easy setup wizard] ▶ [Batch1] ▶ [Setting] ▶ [Unit]

Ⓢ [Device root menu] ▶ [Easy setup wizard] ▶ [Batch 1 function] ▶ [Batch 1 setting]

This parameter can be set in the following menu/menus:

- Basic setup [▶ 367]
- Detailed setup [▶ 556]

Sets the unit for Batch.

| Value                        | Description                                          |
|------------------------------|------------------------------------------------------|
| – g                          | Sets the unit for Batch.<br>The default value is kg. |
| – kg                         |                                                      |
| – t                          |                                                      |
| – ton(US)                    |                                                      |
| – ton(UK)                    |                                                      |
| – cm <sup>3</sup>            |                                                      |
| – L                          |                                                      |
| – m <sup>3</sup>             |                                                      |
| – gal                        |                                                      |
| – kgal                       |                                                      |
| – ft <sup>3</sup>            |                                                      |
| – bbl                        |                                                      |
| – Impgal                     |                                                      |
| – kImpgal                    |                                                      |
| – N(normal)                  |                                                      |
| – m <sup>3</sup> (normal)    |                                                      |
| – L(standard)                |                                                      |
| – ft <sup>3</sup> (standard) |                                                      |
| – Mmscuf                     |                                                      |
| – m <sup>3</sup> (standard)  |                                                      |
| – User unit                  |                                                      |

**Batch quantity 1**

Ⓐ [Easy setup wizard] ► [Batch1] ► [Setting] ► [Qty]

Ⓜ [Device root menu] ► [Easy setup wizard] ► [Batch 1 function] ► [Batch 1 setting]

This parameter can be set in the following menu/menus:

- *Basic setup* [▶ 368]
- *Detailed setup* [▶ 555]

Sets the quantity for the Batch function.

| Value            | Description                |
|------------------|----------------------------|
| – Numeric digits | Default value is 100.0 kg. |

**Fix compensation value 1**

Ⓐ [Easy setup wizard] ► [Batch1] ► [Setting] ► [Fix comp val]

Ⓜ [Device root menu] ► [Easy setup wizard] ► [Batch 1 function] ► [Batch 1 setting]

This parameter can be set in the following menu/menus:

- *Basic setup* [▶ 368]
- *Detailed setup* [▶ 557]

Sets the leakage compensation value.

Valve is closed when quantity reaches Batch qty - Fix comp val.

**Batch end judgment value 1**

① [Easy setup wizard] ► [Batch1] ► [Setting] ► [End judge val]

② [Device root menu] ► [Easy setup wizard] ► [Batch 1 function] ► [Batch 1 setting]

This parameter can be set in the following menu/menus:

- *Basic setup* [► 369]
- *Detailed setup* [► 557]

Sets the judgment value of leakage value. The unit is depend on Process variable which is selected by Batch variable select.

|   | Value          | Description           |
|---|----------------|-----------------------|
| – | Numeric digits | Default value 5 kg/h. |

**Max batch quantity 1**

① [Easy setup wizard] ► [Batch1] ► [Setting] ► [Max qty]

② [Device root menu] ► [Easy setup wizard] ► [Batch 1 function] ► [Batch 1 setting]

This parameter can be set in the following menu/menus:

- *Basic setup* [► 369]
- *Detailed setup* [► 557]

Sets threshold value of maximum flow.

When the flow rate for batch operation is bigger than the parameter value, 208:Batch overrun/underrun alarm occurs.

If this value is set to 0, this threshold is not active.

|   | Value          | Description              |
|---|----------------|--------------------------|
| – | Numeric digits | Default value is 0.0 kg. |

**Status output 1 function**

① [Easy setup wizard] ► [Batch1] ► [Setting] ► [Func]

② [Device root menu] ► [Easy setup wizard] ► [Batch 1 function] ► [Batch 1 setting]

This parameter can be set in the following menu/menus:

- *Basic setup* [► 369]
- *Detailed setup* [► 562]

Set of menus for configuring Status output functions. These menus are available when Status output is selected in the parameter *Pulse/Status output 1 – 2 mode*.

Concentration high low alarm, Net mass flow 1 – 2 high low alarm, Net volume flow 1 – 2 high low alarm and Net corrected volume flow high low alarm can only be selected if the concentration function is available in the device.

|   | Value                 | Description                                                       |
|---|-----------------------|-------------------------------------------------------------------|
| – | Off<br>[off]<br>[Off] | Not used. Status signal does not become active.<br>Default value. |

|   | Value                                                                                        | Description                                                                                                       |
|---|----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| – | Flow direction<br>[Flow dir]<br>[Flow direction]                                             | The signal becomes inactive when flow direction is forward and active when flow direction is reverse.             |
| – | Total limit 1 – 6<br>[Total limit 1 – 6]<br>[Total limit 1 – 6]                              | Signal becomes active when the value of Totalizer 1 – 6 exceeds the value of the parameter Total 1 – 6 set point. |
| – | F category<br>[F only]<br>[F category]                                                       | Signal becomes active when an alarm that is categorized as F on NE107 occurs.                                     |
| – | S,C,M category<br>[s,c,m]<br>[S,C,M category]                                                | Signal becomes active when an alarm that is categorized as S, C or M on NE107 occurs.                             |
| – | F + S,C,M category<br>[F+s,c,m]<br>[F + S,C,M category]                                      | Signal becomes active when an alarm that is categorized as F, S, C or M on NE107 occurs.                          |
| – | Slug detection<br>[slug]<br>[Slug detection]                                                 | Signal becomes active when a Slug alarm occurs.                                                                   |
| – | Empty pipe<br>[Empty]<br>[Empty pipe]                                                        | Signal becomes active when an Empty alarm occurs.                                                                 |
| – | Corrosion detection<br>[Crrsn]<br>[Corrosion detection]                                      | Signal becomes active when a Corrosion detection alarm occurs.                                                    |
| – | Mass flow high low alarm<br>[Mass H/L alm]<br>[Mass flow high low alarm]                     | Signal becomes active when a Mass flow high or low alarm occurs.                                                  |
| – | Density high low alarm<br>[Dens H/L alm]<br>[Density high low alarm]                         | Signal becomes active when a Density high or low alarm occurs.                                                    |
| – | Reference density high low alarm<br>[Ref dens H/L alm]<br>[Reference density high low alarm] | Signal becomes active when a Reference density high or low alarm occurs.                                          |



|   | Value                                                                                                         | Description                                                                  |
|---|---------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
|   | Relative density high low alarm<br>– <b>[Rel dens H/L alm]</b><br>[Relative density high low alarm]           | Signal becomes active when a Relative density high or low alarm occurs.      |
|   | Temperature high low alarm<br>– <b>[Temp H/L alm]</b><br>[Temperature high low alarm]                         | Signal becomes active when a Temperature high or low alarm occurs.           |
|   | Pressure high low alarm<br>– <b>[Pres H/L alm]</b><br>[Pressure high low alarm]                               | Signal becomes active when a Pressure high or low alarm occurs.              |
|   | Volume flow high low alarm<br>– <b>[Vol H/L alm]</b><br>[Volume flow high low alarm]                          | Signal becomes active when a Volume high or low alarm occurs.                |
|   | Corrected volume flow high low alarm<br>– <b>[Corr vol H/L alm]</b><br>[Corrected volume flow high low alarm] | Signal becomes active when a Corrected volume flow high or low alarm occurs. |
| Ⓔ | Concentration high low alarm<br><b>[Conc H/L alm]</b><br>[Concentration high low alarm]                       | Signal becomes active when a Concentration high or low alarm occurs.         |
| Ⓔ | Net mass flow 1 high low alarm<br><b>[Net mass1 H/L alm]</b><br>[Net mass flow 1 high low alarm]              | Signal becomes active when a Net mass flow 1 high or low alarm occurs.       |
| Ⓔ | Net mass flow 2 high low alarm<br><b>[Net mass2 H/L alm]</b><br>[Net mass flow 2 high low alarm]              | Signal becomes active when a Net mass flow 2 high or low alarm occurs.       |
| Ⓔ | Net volume flow 1 high low alarm<br><b>[Net vol1 H/L alm]</b><br>[Net volume flow 1 high low alarm]           | Signal becomes active when a Net volume flow 1 high or low alarm occurs.     |

|   | Value                                                                                                             | Description                                                                      |
|---|-------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| ⓔ | Net volume flow 2<br>high low alarm<br>[Net vol2 H/L alm]<br>[Net volume flow<br>2 high low alarm]                | Signal becomes active when a Net volume flow 2 high or low alarm occurs.         |
| ⓔ | Net corrected volume<br>flow high low alarm<br>[Net corr vol]<br>[Net corrected<br>volume flow high<br>low alarm] | Signal becomes active when a Net corrected volume flow high or low alarm occurs. |
| ⓔ | Batch function<br>[Batch]<br>[Batch function]                                                                     | Need to be set when a Batch function is used.                                    |
| ⓔ | Viscosity high low<br>alarm<br>[Visc H/L alm]<br>[Viscosity high<br>low alarm]                                    | Signal becomes active when a Viscosity high or low alarm occurs.                 |

### Batch status output 1

Ⓐ [Easy setup wizard] ► [Batch1] ► [Setting] ► [Sts out1]

Ⓜ [Device root menu] ► [Easy setup wizard] ► [Batch 1 function] ►  
[Batch 1 setting]

This parameter can be set in the following menu/menus:

- *Basic setup* [► 371]
- *Detailed setup* [► 562]

Sets the Status output function for Batch.

|   | Value                                                                          | Description                       |
|---|--------------------------------------------------------------------------------|-----------------------------------|
| – | No function<br>[No func]<br>[No function]                                      | The default value is No function. |
| – | Primary valve control<br>[1st valve ctrl]<br>[Primary valve<br>control]        |                                   |
| – | Secondary valve<br>control<br>[2nd valve ctrl]<br>[Secondary valve<br>control] |                                   |
| – | Batch running<br>[Batch run]<br>[Batch running]                                |                                   |
| – | Batch ended<br>[Batch end]<br>[Batch ended]                                    |                                   |

**Display measurement mode**

① [Easy setup wizard] ► [Batch1] ► [Setting] ► [Meas mode]

⑨ [Device root menu] ► [Easy setup wizard] ► [Batch 1 function] ► [Batch 1 setting]

This parameter can be set in the following menu/menus:

- *Diag/Service* [► 263]
- *Easy setup wizard* [► 319]
- *Basic setup* [► 372]
- Detailed setup
  - *Display* [► 516]
  - *Batch function* [► 563]

Sets the display mode for logging data on the LCD display of the Indicator.

|   | Value                                                | Description                                                                                                                                                                                                                                                                                                                 |
|---|------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Normal<br>[Normal]<br>[Normal]                       | Default value.<br>Normal display mode.                                                                                                                                                                                                                                                                                      |
| – | Trend online<br>[Trend]<br>[Trend online]            | Real-time trend chart of process values which were specified in parameters, Logging 1 – 4 select. Trend chart of one of four process values is displayed. By using Up/Down operation on the Indicator, the process values to be shown as a trend chart can be changed when the Display scroll parameters are set to Manual. |
| Ⓣ | Batch control<br>[Batch control1]<br>[Batch control] | Batch specific mode to indicate/operate batch.                                                                                                                                                                                                                                                                              |

**Batch display select 1 – 4**

⑨ [Device root menu] ► [Easy setup wizard] ► [Batch 1 function] ► [Batch 1 setting] ► [Batch display select 1 – 4]

This parameter can be set in the following menu/menus:

- *Basic setup* [► 373]
- *Detailed setup* [► 564]

Sets Display select for batch, if batch variables are shown on Indicator. This is available when Batch control is selected in Display measurement mode.

|   | Value                                            | Value description                                                                                                                                                                                                                                                                                                                                                                                           |
|---|--------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| — | None<br>[None]                                   | <p>Sets Batch display select 1 – 4.</p> <p>The default value for Batch display select 1 is Batch quantity.</p> <p>None is not available for Batch display select 1.</p> <p>The default value for Batch display select 2 is Batch upward value.</p> <p>The default value for Batch display select 3 is Total batch quantity.</p> <p>The default value for Batch display select 4 is Batch counter value.</p> |
| Ⓢ | Batch quantity<br>[Batch quantity]               |                                                                                                                                                                                                                                                                                                                                                                                                             |
| Ⓢ | Batch upwards value<br>[Batch upwards value]     |                                                                                                                                                                                                                                                                                                                                                                                                             |
| Ⓢ | Batch downwards value<br>[Batch downwards value] |                                                                                                                                                                                                                                                                                                                                                                                                             |
| Ⓢ | Batch total quantity<br>[Batch total quantity]   |                                                                                                                                                                                                                                                                                                                                                                                                             |
| Ⓢ | Batch counter value<br>[Batch counter value]     |                                                                                                                                                                                                                                                                                                                                                                                                             |
| Ⓢ | Batch select<br>[Batch select]                   |                                                                                                                                                                                                                                                                                                                                                                                                             |
| Ⓢ | Batch variable select<br>[Batch variable select] |                                                                                                                                                                                                                                                                                                                                                                                                             |
| Ⓢ | Compensation value<br>[Compensation value]       |                                                                                                                                                                                                                                                                                                                                                                                                             |
| Ⓢ | Internal close point<br>[Internal close point]   |                                                                                                                                                                                                                                                                                                                                                                                                             |
| Ⓢ | Batch time<br>[Batch time]                       |                                                                                                                                                                                                                                                                                                                                                                                                             |
| — | Mass flow<br>[Mass flow]                         |                                                                                                                                                                                                                                                                                                                                                                                                             |
| — | Density<br>[Density]                             |                                                                                                                                                                                                                                                                                                                                                                                                             |
| — | Temperature<br>[Temperature]                     |                                                                                                                                                                                                                                                                                                                                                                                                             |
| — | Volume flow<br>[Volume flow]                     |                                                                                                                                                                                                                                                                                                                                                                                                             |

|   | Value                                                    | Value description                                                                                                                                                                                                                                                                                                                                                                |
|---|----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Reference density<br>[Reference density]                 | Sets Batch display select 1 – 4.<br>The default value for Batch display select 1 is Batch quantity.<br>None is not available for Batch display select 1.<br>The default value for Batch display select 2 is Batch upward value.<br>The default value for Batch display select 3 is Total batch quantity.<br>The default value for Batch display select 4 is Batch counter value. |
| – | Corrected volume flow<br>[Corrected volume flow]         |                                                                                                                                                                                                                                                                                                                                                                                  |
| – | Pressure<br>[Pressure]                                   |                                                                                                                                                                                                                                                                                                                                                                                  |
| – | Tag<br>[Tag]                                             |                                                                                                                                                                                                                                                                                                                                                                                  |
| – | Long Tag<br>[Long Tag]                                   |                                                                                                                                                                                                                                                                                                                                                                                  |
| Ⓢ | Net mass flow 1<br>[Net mass flow 1]                     |                                                                                                                                                                                                                                                                                                                                                                                  |
| Ⓢ | Net mass flow 2<br>[Net mass flow 2 ]                    |                                                                                                                                                                                                                                                                                                                                                                                  |
| Ⓢ | Net volume flow 1<br>[Net volume flow 1]                 |                                                                                                                                                                                                                                                                                                                                                                                  |
| Ⓢ | Net volume flow 2<br>[Net volume flow 2]                 |                                                                                                                                                                                                                                                                                                                                                                                  |
| Ⓢ | Net corrected volume flow<br>[Net corrected volume flow] |                                                                                                                                                                                                                                                                                                                                                                                  |

### Display format batch

Ⓢ [Device root menu] ► [Easy setup wizard] ► [Batch 1 function] ► [Batch 1 setting] ► [Display format batch]

This parameter can be set in the following menu/menus:

- *Basic setup* [► 375]
- *Detailed setup* [► 566]

Sets the decimal format of batch relevant values which are set in *Display format batch* 1 – 4.

|   | Value                            | Description                                                              |
|---|----------------------------------|--------------------------------------------------------------------------|
| – | Auto<br>[Auto]<br>[Auto]         | Position is automatically adjusted according to value.<br>Default value. |
| – | 0 digit<br>[0digit]<br>[0 digit] | 0 digit from right.                                                      |
| – | 1 digit<br>[1digit]<br>[1 digit] | 1 digit from right.                                                      |

|   | Value                 | Description         |
|---|-----------------------|---------------------|
|   | 2 digit               |                     |
| – | [2digit]<br>[2 digit] | 2 digit from right. |
|   | 3 digit               |                     |
| – | [3digit]<br>[3 digit] | 3 digit from right. |
|   | 4 digit               |                     |
| – | [4digit]<br>[4 digit] | 4 digit from right. |
|   | 5 digit               |                     |
| – | [5digit]<br>[5 digit] | 5 digit from right. |

## 5.6 Basic setup

*Basic setup* is a subset of for the most common functions in the advanced setup.

Most of the menu items and values are available for all devices. Exceptions are marked with corresponding symbols.

Tab. 31: Explanation of symbols used in the menu description

| Sym-bols | Description                                                                                           |
|----------|-------------------------------------------------------------------------------------------------------|
| Ⓛ        | Menu item or menu path is available via display.                                                      |
| Ⓜ        | Menu item or menu path is available via the [Modbus] configuration tool.                              |
| Ⓢ        | Menu item is optional. It is available only if a transmitter with the corresponding function is used. |
| —        | No restrictions.                                                                                      |

The following overview shows the selectable menu items within the submenu *Basic setup*.

|        | Full name                  | Display name | [Modbus] name                | Page    |
|--------|----------------------------|--------------|------------------------------|---------|
| Ⓜ      | Installation configuration | —            | [Installation configuration] | [▶ 323] |
| Ⓜ      | Mass flow                  | —            | [Mass flow]                  | [▶ 326] |
| Ⓜ      | Density                    | —            | [Density]                    | [▶ 328] |
| Ⓜ      | Temperature                | —            | [Temperature]                | [▶ 330] |
| Ⓜ      | Volume flow                | —            | [Volume flow]                | [▶ 331] |
| Ⓜ      | Analog output              | —            | [Analog output]              | [▶ 334] |
| Ⓜ      | Pulse/Status outputs       | —            | [Pulse/Status outputs]       | [▶ 337] |
| Ⓜ      | Totalizer                  | —            | [Totalizer]                  | [▶ 352] |
| Ⓜ      | Display select             | —            | [Display select]             | [▶ 356] |
| Ⓜ      | Date/Time                  | —            | [Date/Time]                  | [▶ 359] |
| Ⓜ      | Events/Alarms acknowledge  | —            | [Events/Alarms acknowledge]  | [▶ 361] |
| Ⓜ<br>Ⓢ | Batch function             | —            | [Batch function]             | [▶ 364] |

### 5.6.1 Installation configuration

Menu for configuring installation information via Modbus communication.

This submenu is also available in additional menus. The values can be set in each of these menus:

- *Easy setup wizard* [▶ 269]
- *Basic setup* [▶ 323]
- *Detailed setup* [▶ 378]

The following menus/settings are available:

|   | Full name                  | Display name | [Modbus] name                | Page    |
|---|----------------------------|--------------|------------------------------|---------|
| Ⓜ | Installation orientation   | —            | [Installation orientation]   | [▶ 324] |
| Ⓜ | Density offset orientation | —            | [Density offset orientation] | [▶ 324] |
| Ⓜ | Flow direction             | —            | [Flow direction]             | [▶ 325] |
| Ⓜ | Pressure fixed value       | —            | [Pressure fixed value]       | [▶ 325] |

### Installation orientation

Ⓜ [Device root menu] ▶ [Basic setup] ▶ [Installation configuration] ▶ [Installation orientation]

Sets the installation orientation of the device.

|   | Value                                          | Description                    |
|---|------------------------------------------------|--------------------------------|
| Ⓜ | Vertical<br>[Vertical]                         | The default value is Vertical. |
| Ⓜ | Horizontal bend down<br>[Horizontal bend down] |                                |
| Ⓜ | Horizontal bend up<br>[Horizontal bend up]     |                                |

### Density offset orientation

Ⓜ [Device root menu] ▶ [Basic setup] ▶ [Installation configuration] ▶ [Density offset orientation]

Sets the density offset value to compensate for the gravitational effect when the device is installed horizontally. This value is added to the originally measured density value.

|   | Value          | Description                                                                                                                                                  |
|---|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓜ | Numeric digits | The value is automatically converted based on the unit setting.<br>When Vertical is selected in the <i>Installation orientation</i> , this value is ignored. |

| Meter size | Default value in kg/l |
|------------|-----------------------|
| Nano 06    | 5.25e-03              |
| Nano 08    | 2.70e-03              |
| Nano 10    | 1.80e-03              |
| Nano 15    | 2.00e-03              |
| Nano 20    | 6.00e-04              |
| Supreme 34 | 9.00e-04              |
| Supreme 36 | 3.50e-04              |
| Supreme 38 | 0                     |
| Supreme 39 | 0                     |
| Giga 1F    | 0                     |
| Giga 2H    | 0                     |
| Intense 34 | 9.00e-04              |



| Meter size  | Default value in kg/l |
|-------------|-----------------------|
| Intense 36  | 3.50e-04              |
| Intense 38  | 0                     |
| Prime 25    | 1.70e-04              |
| Prime 40    | 1.30e-04              |
| Prime 50    | 7.00e-05              |
| Prime 80    | 1.50e-04              |
| Hygienic 25 | 1.70e-04              |
| Hygienic 40 | 1.30e-04              |
| Hygienic 50 | 7.00e-05              |
| Hygienic 80 | 1.50e-04              |

**Flow direction**

Ⓜ [Device root menu] ► [Basic setup] ► [Installation configuration] ► [Flow direction]

Sets the flow direction of the device.

|   | Value                | Description                                                                      |
|---|----------------------|----------------------------------------------------------------------------------|
| Ⓜ | Forward<br>[Forward] | The direction of flow is same as the arrow mark on the sensor.<br>Default value. |
| Ⓜ | Reverse<br>[Reverse] | Opposite direction.                                                              |

**Pressure fixed value**

Ⓜ [Device root menu] ► [Basic setup] ► [Installation configuration] ► [Pressure fixed value]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [► 271]
- *Basic setup* [► 325]
- Detailed setup
  - *Pressure* [► 404]
  - *Installation configuration* [► 379]

Sets the average static line pressure to compensate for the effect of the line pressure on mass flow and density. In case of gas measurement, no setting is required.

|   | Value          | Description                                                                                                                                                                                                                                                                  |
|---|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓜ | Numeric digits | The value is automatically converted based on the unit setting.<br>The default value is 0.<br>When the value of the parameter Analog input function is not Pressure compensation and the device is not in simulation mode, this value is used for the pressure compensation. |

**5.6.2 Mass flow**

Menu for configuring the mass flow measurement via Modbus communication.

The following menus/settings are available:

|   | Full name         | Display name | [Modbus] name       | Page   |
|---|-------------------|--------------|---------------------|--------|
| Ⓜ | Mass flow unit    | —            | [Mass flow unit]    | [ 326] |
| Ⓜ | Mass flow LRV     | —            | [Mass flow LRV]     | [ 327] |
| Ⓜ | Mass flow URV     | —            | [Mass flow URV]     | [ 327] |
| Ⓜ | Mass flow damping | —            | [Mass flow damping] | [ 327] |

**Mass flow unit**

Ⓜ [Device root menu] ► [Basic setup] ► [Mass flow] ► [Mass flow unit]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [ 273]
- *Basic setup* [ 326]
- *Detailed setup* [ 381]

Sets the unit for mass flow.



The unit displayed on the LCD may vary depending on the setting of the parameter *Display unit selection*. During Modbus communication, the actually displayed unit may vary depending on the Modbus tool. For details, refer to *Units of the parameters* [ 819].

|   | Value       | Description                                                                                                                                |
|---|-------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓜ | g/s         | Sets the displayed Mass flow unit.<br>The default value is kg/h.<br>This parameter depends on the parameter of the Display unit selection. |
| Ⓜ | g/min       |                                                                                                                                            |
| Ⓜ | g/h         |                                                                                                                                            |
| Ⓜ | kg/s        |                                                                                                                                            |
| Ⓜ | kg/min      |                                                                                                                                            |
| Ⓜ | kg/h        |                                                                                                                                            |
| Ⓜ | kg/d        |                                                                                                                                            |
| Ⓜ | t/min       |                                                                                                                                            |
| Ⓜ | t/h         |                                                                                                                                            |
| Ⓜ | t/d         |                                                                                                                                            |
| Ⓜ | ton(US)/min |                                                                                                                                            |
| Ⓜ | ton(US)/h   |                                                                                                                                            |
| Ⓜ | ton(US)/d   |                                                                                                                                            |
| Ⓜ | ton(UK)/min |                                                                                                                                            |
| Ⓜ | ton(UK)/h   |                                                                                                                                            |
| Ⓜ | ton(UK)/d   |                                                                                                                                            |
| Ⓜ | lb/s        |                                                                                                                                            |
| Ⓜ | lb/min      |                                                                                                                                            |
| Ⓜ | lb/h        |                                                                                                                                            |
| Ⓜ | lb/d        |                                                                                                                                            |
| Ⓜ | User unit   |                                                                                                                                            |

**Mass flow LRV**

Ⓜ [Device root menu] ► [Basic setup] ► [Mass flow] ► [Mass flow LRV]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [► 274]
- *Basic setup* [► 327]
- *Detailed setup* [► 382]

Sets the lower range value, 0 %, for scaling the analog, frequency and pulse outputs during mass flow measurement.

|   | Value          | Description                                                                                                                                                                                                                 |
|---|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | Default value is 0.0.<br>Settings must satisfy the following conditions:<br>$URV \neq LRV$<br>$LRV \leq Q_{max}$<br>$LRV \geq -Q_{max}$<br>For the $Q_{max}$ value refer to the General Specification (GS) of each product. |

**Mass flow URV**

Ⓜ [Device root menu] ► [Basic setup] ► [Mass flow] ► [Mass flow URV]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [► 274]
- *Basic setup* [► 327]
- *Detailed setup* [► 382]

Sets the upper range value, 100 %, for scaling the analog, frequency and pulse outputs during mass flow measurement.

|   | Value          | Description                                                                                                                                                                                                                     |
|---|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | Default value is 10000.0.<br>Settings must satisfy the following conditions:<br>$URV \leq Q_{max}$<br>$URV \geq -Q_{max}$<br>$URV \neq LRV$<br>For the $Q_{max}$ value refer to the General Specification (GS) of each product. |

**Mass flow damping**

Ⓜ [Device root menu] ► [Basic setup] ► [Mass flow] ► [Mass flow damping]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [► 275]
- *Basic setup* [► 327]
- *Detailed setup* [► 383]

Sets the damping constant for mass flow measurement. The value is the time it takes for this value to become 63.2 % of the total amount of change.

|   | Value          | Description                                                  |
|---|----------------|--------------------------------------------------------------|
| Ⓜ | Numeric digits | Setting range: 0.0 – 200.0 s.<br>The default value is 3.0 s. |

**5.6.3 Density**

Menu for configuring the density measurement via Modbus communication.



Density measurement is only reliable if there is no gas in the liquid.

The following menus/settings are available:

|   | Full name       | Display name | [Modbus] name     | Page   |
|---|-----------------|--------------|-------------------|--------|
| Ⓜ | Density unit    | —            | [Density unit]    | [ 328] |
| Ⓜ | Density LRV     | —            | [Density LRV]     | [ 328] |
| Ⓜ | Density URV     | —            | [Density URV]     | [ 329] |
| Ⓜ | Density damping | —            | [Density damping] | [ 329] |

**Density unit**

Ⓜ [Device root menu] ► [Basic setup] ► [Density] ► [Density unit]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [ 276]
- *Basic setup* [ 328]
- *Detailed setup* [ 387]

Sets the unit for density.



The unit displayed on the LCD may vary depending on the setting of the parameter *Display unit selection*. During Modbus communication, the actually displayed unit may vary depending on the Modbus tool. For details, refer to *Units of the parameters* [ 819].

| Value                | Description                                                |
|----------------------|------------------------------------------------------------|
| — g/mL               | Sets the displayed Density unit.<br>Default value is g/ml. |
| — kg/L               |                                                            |
| — kg/cm <sup>3</sup> |                                                            |
| — kg/dm <sup>3</sup> |                                                            |
| — kg/m <sup>3</sup>  |                                                            |
| — lb/gal             |                                                            |
| — lb/ft <sup>3</sup> |                                                            |
| — g/cm <sup>3</sup>  |                                                            |
| — g/cc               |                                                            |
| — g/L                |                                                            |
| — User unit          |                                                            |

**Density LRV**

Ⓜ [Device root menu] ► [Basic setup] ► [Density] ► [Density LRV]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [ 276]
- *Basic setup* [ 328]
- *Detailed setup* [ 388]

Sets the lower range value, 0 %, for the scaling of frequency output during density measurement.

|   | Value          | Description                                                                    |
|---|----------------|--------------------------------------------------------------------------------|
| Ⓢ | Numeric digits | Default value is 0.<br>Setting must satisfy the following condition: URV ≠ LRV |

**Density URV**

Ⓢ [Device root menu] ► [Basic setup] ► [Density] ► [Density URV]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [► 277]
- *Basic setup* [► 329]
- *Detailed setup* [► 388]

Sets the upper range value, 100 %, for scaling the analog and frequency output during density measurement.

|   | Value          | Description                                                                          |
|---|----------------|--------------------------------------------------------------------------------------|
| – | Numeric digits | Default value is 1.5.<br>Settings must satisfy the following condition:<br>URV ≠ LRV |

**Density damping**

Ⓢ [Device root menu] ► [Basic setup] ► [Density] ► [Density damping]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [► 277]
- *Basic setup* [► 329]
- *Detailed setup* [► 388]

Sets the damping constant for density measurement. The value is the time it takes for this value to become 63.2 % of the total amount of change.

|   | Value          | Description                                              |
|---|----------------|----------------------------------------------------------|
| – | Numeric digits | Default value is 3.0 s.<br>Setting range: 0.0 – 200.0 s. |

### 5.6.4 Temperature

*Temperature* is a menu for configuring the temperature measurement via Modbus communication.

The following overview shows the selectable menu items within the submenu *Temperature*.

|   | Full name           | Display name | [Modbus] name         | Page    |
|---|---------------------|--------------|-----------------------|---------|
| Ⓜ | Temperature unit    |              | [Temperature unit]    | [▶ 330] |
| Ⓜ | Temperature LRV     |              | [Temperature LRV]     | [▶ 330] |
| Ⓜ | Temperature URV     |              | [Temperature URV]     | [▶ 331] |
| Ⓜ | Temperature damping |              | [Temperature damping] | [▶ 331] |

#### Temperature unit

Ⓜ [Device root menu] ▶ [Basic setup] ▶ [Temperature] ▶ [Temperature unit]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [▶ 278]
- *Basic setup* [▶ 330]
- *Detailed setup* [▶ 392]

Sets the unit for temperature.



The unit displayed on the LCD may vary depending on the setting of the parameter *Display unit selection*. During Modbus communication, the actually displayed unit may vary depending on the Modbus tool. For details, refer to *Units of the parameters* [▶ 819].

|   | Value | Description                                                    |
|---|-------|----------------------------------------------------------------|
| Ⓜ | degC  | Sets the displayed Temperature unit.<br>Default value is degC. |
| Ⓜ | degF  |                                                                |
| Ⓜ | degR  |                                                                |
| Ⓜ | K     |                                                                |

#### Temperature LRV

Ⓜ [Device root menu] ▶ [Basic setup] ▶ [Temperature] ▶ [Temperature LRV]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [▶ 278]
- *Basic setup* [▶ 330]
- *Detailed setup* [▶ 393]

Sets the lower range value, 0 %, for scaling the analog and frequency output during temperature measurement.

|   | Value          | Description                                                                                                                                                             |
|---|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | Default value is 0.0.<br>Settings must satisfy the following conditions:<br>URV ≠ LRV<br>LRV ≥ Temperature Lower Limit [▶ 587]<br>LRV ≤ Temperature Upper Limit [▶ 587] |

**Temperature URV**

Ⓜ [Device root menu] ► [Basic setup] ► [Temperature] ► [Temperature URV]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [► 279]
- *Basic setup* [► 331]
- *Detailed setup* [► 393]

Sets the upper range value, 100 %, for scaling the analog and frequency output during temperature measurement.

|   | Value          | Description                                                                                                                                                               |
|---|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | Default value is 150.0.<br>Settings must satisfy the following conditions:<br>URV ≠ LRV<br>URV ≥ Temperature lower limit [► 587]<br>URV ≤ Temperature upper limit [► 587] |

**Temperature damping**

Ⓜ [Device root menu] ► [Basic setup] ► [Temperature] ► [Temperature damping]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [► 279]
- *Basic setup* [► 331]
- *Detailed Setup* [► 394]

Sets the damping constant for temperature measurement. The value is the time it takes for this value to become 63.2 % of the total amount of change.

|   | Value          | Description                                               |
|---|----------------|-----------------------------------------------------------|
| Ⓜ | Numeric digits | Setting range: 0.0 – 200.0 s.<br>Default value is 10.0 s. |

**5.6.5 Volume flow**

*Volume flow* is a menu for configuring the volume flow measurement via Modbus communication.



Volume flow is derived from the density and the mass flow measurement. Errors in density measurement, e.g. from gas bubbles, affect the accuracy of the volume flow. For liquids it is therefore recommended that mass flow be used wherever possible.

The following overview shows the selectable menu items within the submenu *Volume flow*.

|   | Full name           | Display name | [Modbus] name         | Page    |
|---|---------------------|--------------|-----------------------|---------|
| Ⓜ | Volume flow unit    | –            | [Volume flow unit]    | [► 332] |
| Ⓜ | Volume flow LRV     | –            | [Volume flow LRV]     | [► 333] |
| Ⓜ | Volume flow URV     | –            | [Volume flow URV]     | [► 333] |
| Ⓜ | Volume flow damping | –            | [Volume flow damping] | [► 333] |

## Volume flow unit

Ⓜ [Device root menu] ► [Basic setup] ► [Volume flow] ► [Volume flow unit]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [▶ 280]
- *Basic setup* [▶ 332]
- *Detailed setup* [▶ 397]

Sets the unit for volume flow.



The unit displayed on the LCD may vary depending on the setting of the parameter *Display unit selection*. During Modbus communication, the actually displayed unit may vary depending on the Modbus tool. For details, refer to *Units of the parameters* [▶ 819].

|   | Value                | Description                                                                 |
|---|----------------------|-----------------------------------------------------------------------------|
| Ⓜ | cm <sup>3</sup> /s   | Sets the displayed Volume flow unit.<br>Default value is m <sup>3</sup> /h. |
| Ⓜ | cm <sup>3</sup> /min |                                                                             |
| Ⓜ | cm <sup>3</sup> /h   |                                                                             |
| Ⓜ | L/s                  |                                                                             |
| Ⓜ | L/min                |                                                                             |
| Ⓜ | L/h                  |                                                                             |
| Ⓜ | L/d                  |                                                                             |
| Ⓜ | m <sup>3</sup> /s    |                                                                             |
| Ⓜ | m <sup>3</sup> /min  |                                                                             |
| Ⓜ | m <sup>3</sup> /h    |                                                                             |
| Ⓜ | m <sup>3</sup> /d    |                                                                             |
| Ⓜ | gal/s                |                                                                             |
| Ⓜ | gal/min              |                                                                             |
| Ⓜ | gal/h                |                                                                             |
| Ⓜ | gal/d                |                                                                             |
| Ⓜ | ft <sup>3</sup> /s   |                                                                             |
| Ⓜ | ft <sup>3</sup> /min |                                                                             |
| Ⓜ | ft <sup>3</sup> /h   |                                                                             |
| Ⓜ | ft <sup>3</sup> /d   |                                                                             |
| Ⓜ | bbl/s                |                                                                             |
| Ⓜ | bbl/min              |                                                                             |
| Ⓜ | bbl/h                |                                                                             |
| Ⓜ | bbl/d                |                                                                             |
| Ⓜ | Impgal/s             |                                                                             |
| Ⓜ | Impgal/min           |                                                                             |
| Ⓜ | Impgal/h             |                                                                             |
| Ⓜ | Impgal/d             |                                                                             |
| Ⓜ | User unit            |                                                                             |



**Volume flow LRV**

Ⓜ [Device root menu] ► [Basic setup] ► [Volume flow] ► [Volume flow LRV]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [► 281]
- *Basic setup* [► 333]
- *Detailed Setup* [► 398]

Sets the lower range value, 0 %, for scaling the analog, frequency and pulse output during volume flow measurement.

|   | Value          | Description                                                                         |
|---|----------------|-------------------------------------------------------------------------------------|
| Ⓜ | Numeric digits | Default value is 0.<br>Settings must satisfy the following conditions:<br>URV ≠ LRV |

**Volume flow URV**

Ⓜ [Device root menu] ► [Basic setup] ► [Volume flow] ► [Volume flow URV]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [► 282]
- *Basic setup* [► 333]
- *Detailed setup* [► 399]

Sets the upper range value, 100 %, for scaling the analog, frequency and pulse output during volume flow measurement.

|   | Value          | Description                                                                          |
|---|----------------|--------------------------------------------------------------------------------------|
| Ⓜ | Numeric digits | Default value is 10.<br>Settings must satisfy the following conditions:<br>URV ≠ LRV |

**Volume flow damping**

Ⓜ [Device root menu] ► [Basic setup] ► [Volume flow] ► [Volume flow damping]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [► 282]
- *Basic setup* [► 333]
- *Detailed setup* [► 399]

Sets the damping constant for volume flow measurement. The value is the time it takes for this value to become 63.2 % of the total amount of change.

|   | Value          | Description                                              |
|---|----------------|----------------------------------------------------------|
| Ⓜ | Numeric digits | Setting range: 0.0 – 200.0 s.<br>Default value is 3.0 s. |

**5.6.6 Analog output**

Menu for configuring the Analog output via Modbus communication.

The following menus/settings are available:

|   | Full name                  | Display name | [Modbus] name                | Page    |
|---|----------------------------|--------------|------------------------------|---------|
| Ⓜ | Analog output select       |              | [Analog output select]       | [▶ 334] |
| Ⓜ | Analog output low limit    |              | [Analog output low limit]    | [▶ 335] |
| Ⓜ | Analog output high limit   |              | [Analog output high limit]   | [▶ 336] |
| Ⓜ | Analog output alarm output |              | [Analog output alarm output] | [▶ 336] |

**Analog output select**

Ⓜ [Device root menu] ▶ [Basic setup] ▶ [Analog output] ▶ [Analog output select]

This parameter is also available in additional menus. The values can be set in each of these menus:

- *Easy setup wizard* [▶ 283]
- *Detailed setup* [▶ 471]

|   | Value                                    | Description                                                                       |
|---|------------------------------------------|-----------------------------------------------------------------------------------|
| Ⓜ | None<br>[None]                           | Sets the Analog output value.<br>The default value of Analog output is Mass flow. |
| Ⓜ | Mass flow<br>[Mass flow]                 |                                                                                   |
| Ⓜ | Density<br>[Density]                     |                                                                                   |
| Ⓜ | Temperature<br>[Temperature]             |                                                                                   |
| Ⓜ | Pressure<br>[Pressure]                   |                                                                                   |
| Ⓜ | Volume flow<br>[Volume flow]             |                                                                                   |
| Ⓜ | Reference density<br>[Reference density] |                                                                                   |
| Ⓜ | Relative density<br>[Relative density]   |                                                                                   |

|        | Value                                                    | Description                                                                       |
|--------|----------------------------------------------------------|-----------------------------------------------------------------------------------|
| Ⓜ      | Corrected volume flow<br>[Corrected volume flow]         | Sets the Analog output value.<br>The default value of Analog output is Mass flow. |
| Ⓜ      | Concentration<br>[Concentration]                         |                                                                                   |
| Ⓜ      | Net mass flow 1<br>[Net mass flow 1]                     |                                                                                   |
| Ⓜ      | Net mass flow 2<br>[Net mass flow 2]                     |                                                                                   |
| Ⓜ      | Net volume flow 1<br>[Net volume flow 1]                 |                                                                                   |
| Ⓜ      | Net volume flow 2<br>[Net volume flow 2]                 |                                                                                   |
| Ⓜ      | Net corrected volume flow<br>[Net corrected volume flow] |                                                                                   |
| Ⓜ<br>Ⓜ | Batch<br>[Batch]                                         |                                                                                   |
| Ⓜ<br>Ⓜ | Viscosity<br>[Visc]                                      |                                                                                   |
| Ⓜ      | Drive current<br>[Drv curr]                              |                                                                                   |

Analog output low limit

|   |                                                                                  |
|---|----------------------------------------------------------------------------------|
| Ⓜ | [Device root menu] ► [Basic setup] ► [Analog output] ► [Analog output low limit] |
|---|----------------------------------------------------------------------------------|

This parameter is also available in additional menus. The values can be set in each of these menus:

- *Easy setup wizard* [► 285]
- *Detailed setup* [► 472]

*Analog output low limit* sets the lower limit of the current for Analog output during normal operation.



This parameter depends on the parameter of NE43 opt. If NE43 opt is set to NE43, the value of this parameter must be set to 3.8 mA.

|   | Value          | Description                                               |
|---|----------------|-----------------------------------------------------------|
| Ⓜ | Numeric digits | Setting range: 2.4 – 21.6 mA<br>Default value is 2.40 mA. |

**Analog output  
high limit**

Ⓜ [Device root menu] ► [Basic setup] ► [Analog output] ► [Analog output high limit]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [▶ 285]
- *Detailed setup* [▶ 473]

Sets the higher limit current of Analog output during normal operation.



This parameter depends on the parameter of NE43 opt. If NE43 opt is set to NE43, the value of this parameter must be set to 20.50 mA.

|   | Value          | Description                                                 |
|---|----------------|-------------------------------------------------------------|
| Ⓜ | Numeric digits | Setting range: 2.4 – 21.6 mA.<br>Default value is 21.60 mA. |

**Analog output  
alarm output**

Ⓜ [Device root menu] ► [Basic setup] ► [Analog output] ► [Analog output alarm output]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [▶ 286]
- *Detailed setup* [▶ 473]

Sets the value of the current value for Analog output during an alarm state.

|   | Value                              | Description                                                                           |
|---|------------------------------------|---------------------------------------------------------------------------------------|
| Ⓜ | < 2.4 mA<br>[< 2.4 mA]             | Sets the value of Analog output during an alarm state.<br>Default value is > 21.6 mA. |
| Ⓜ | 4 mA<br>[4 mA]                     |                                                                                       |
| Ⓜ | > 21.6 mA<br>[> 21.6 mA]           |                                                                                       |
| Ⓜ | Measured value<br>[Measured value] |                                                                                       |
| Ⓜ | Hold<br>[Hold]                     |                                                                                       |

### 5.6.7 Pulse/Status outputs

Menu for configuring the pulse/status output.

The following menus/settings are available:

|   | Full name                      | Display name | [Modbus] name                    | Page    |
|---|--------------------------------|--------------|----------------------------------|---------|
| Ⓜ | Pulse/Status output type       |              | [Pulse/Status output type]       | [▶ 337] |
| Ⓜ | Pulse/Status output 1 – 2 mode |              | [Pulse/Status output 1 – 2 mode] | [▶ 337] |
| Ⓜ | Pulse output 1 – 2             |              | [Pulse output 1 – 2]             | [▶ 338] |
| Ⓜ | Frequency output 1 – 2         |              | [Frequency output 1 – 2]         | [▶ 344] |
| Ⓜ | Status output 1 – 2            |              | [Status output 1 – 2]            | [▶ 346] |
| Ⓜ | Double pulse output            |              | [Double pulse output]            | [▶ 348] |

#### Pulse/Status output type

Ⓜ [Device root menu] ▶ [Basic setup] ▶ [Pulse/Status outputs] ▶ [Pulse/Status output type]

This parameter is also available in additional menus. The value can be set in each of these menus:

- *Easy setup wizard* [▶ 287]
- *Detailed setup* [▶ 474]

Sets the pulse signal type of the Pulse/Status signal.

When this parameter has just been changed, the output signal of pulse/status is not exact.

|   | Value                          | Description                                                                                         |
|---|--------------------------------|-----------------------------------------------------------------------------------------------------|
| Ⓜ | Single pulse<br>[Single pulse] | No synchronization. Output 1 – 2 is individual.<br>Default value.                                   |
| Ⓜ | Double pulse<br>[Double pulse] | Pulse/status Output 1 – 2 are set to frequency mode and provide a synchronized double pulse signal. |

#### Pulse/Status output 1 – 2 mode

Ⓜ [Device root menu] ▶ [Basic setup] ▶ [Pulse/Status outputs] ▶ [Pulse/Status output 1 – 2 mode]

This parameter is also available in additional menus. The value can be set in each of these menus:

- *Easy setup wizard* [▶ 288]
- *Detailed setup* [▶ 475]

Sets the pulse signal mode of Pulse/Status output 1 – 2.

If Pulse/Status output 1 – 2 mode has just been changed, the output signal of pulse/status is not exact.

|   | Value                                      | Description                                                                                                                              |
|---|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓜ | No function<br>[No function]               | Pulse signal or status signal is not available.<br>Default value.<br>Output signal level depends on the Status output 1 – 2 active mode. |
| Ⓜ | Fixed pulse output<br>[Fixed pulse output] | Pulse signal with fixed pulse width, duty ratio changes. Status signal is not available.                                                 |

|   | Value                                  | Description                                                                              |
|---|----------------------------------------|------------------------------------------------------------------------------------------|
| Ⓜ | Frequency output<br>[Frequency output] | Pulse signal with fixed duty ratio, pulse width changes. Status signal is not available. |
| Ⓜ | Status output<br>[Status output]       | Status pulse signal. Pulse or frequency signal is not available.                         |

### Pulse output 1 – 2

Menu for configuring pulse signal via Modbus communication. This is available when Fixed pulse output has been selected in the parameter *Pulse/Status output 1 – 2 mode*.

The following menus/settings are available:

|   | Full name                               | Display name | [Modbus] name                             | Page   |
|---|-----------------------------------------|--------------|-------------------------------------------|--------|
| Ⓜ | Pulse output 1 – 2 select               | –            | [Pulse output 1 – 2 select]               | [ 338] |
| Ⓜ | Pulse output 1 – 2 unit select          | –            | [Pulse output 1 – 2 unit select]          | [ 339] |
| Ⓜ | Pulse output 1 – 2 width                | –            | [Pulse output 1 – 2 width]                | [ 342] |
| Ⓜ | Pulse output 1 – 2 rate                 | –            | [Pulse output 1 – 2 rate]                 | [ 343] |
| Ⓜ | Pulse output 1 – 2 alarm action         | –            | [Pulse output 1 – 2 alarm action]         | [ 343] |
| Ⓜ | Pulse output 1 – 2 user set alarm value | –            | [Pulse output 1 – 2 user set alarm value] | [ 343] |

### Pulse output 1 – 2 select

Ⓜ [Device root menu] ► [Basic setup] ► [Pulse/Status outputs] ► [Pulse output 1 – 2] ► [Pulse output 1 – 2 select]

This parameter is also available in additional menus. The value can be set in each of these menus:

- *Easy setup wizard* [ 289]
- *Detailed setup* [ 476]

Assigns a process variable to pulse output 1 – 2.

|        | Value                                                    | Description                                                                                                                                    |
|--------|----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓜ      | Mass flow<br>[Mass flow]                                 | Sets the Pulse output 1 – 2 value.<br>The default value of Pulse output 1 is Mass flow.<br>The default value of Pulse output 2 is Volume flow. |
| Ⓜ      | Volume flow<br>[Volume flow]                             |                                                                                                                                                |
| Ⓜ      | Corrected volume flow<br>[Corrected volume flow]         |                                                                                                                                                |
| Ⓜ      | Energy<br>[Energy]                                       |                                                                                                                                                |
| Ⓜ<br>Ⓜ | Net mass flow 1<br>[Net mass flow 1]                     |                                                                                                                                                |
| Ⓜ<br>Ⓜ | Net mass flow 2<br>[Net mass flow 2]                     |                                                                                                                                                |
| Ⓜ<br>Ⓜ | Net volume flow 1<br>[Net volume flow 1]                 |                                                                                                                                                |
| Ⓜ<br>Ⓜ | Net volume flow 2<br>[Net volume flow 2]                 |                                                                                                                                                |
| Ⓜ<br>Ⓜ | Net corrected volume flow<br>[Net corrected volume flow] |                                                                                                                                                |

### Pulse output 1 – 2 unit select

Ⓜ [Device root menu] ► [Basic setup] ► [Pulse/Status outputs] ► [Pulse output 1 – 2] ► [Pulse output 1 – 2 unit select]

This parameter is also available in additional menus. The value can be set in each of these menus:

- *Easy setup wizard* [► 290]
- *Detailed setup* [► 477]

It can be selected and set for the following process variables. The available units change depending on the process variables that are assigned to the output. The default value for Pulse output 1 is kg/P, and Pulse output 2 is cm<sup>3</sup>/P.



The unit displayed on the LCD may vary depending on the setting of the parameter *Display unit selection*. During Modbus communication, the actually displayed unit may vary depending on the Modbus tool. For details, refer to *Units of the parameters* [► 819].

|   | Process variables                                               | Available units                                                                                                                                                                                                                                                                                                                                                            |
|---|-----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓜ | For<br><b>Mass flow 1 – 2 :</b><br>[Mass flow 1 – 2]:           | <ul style="list-style-type: none"> <li>▪ g/P</li> <li>▪ kg/P</li> <li>▪ t/P</li> <li>▪ ton(US)/P</li> <li>▪ ton(UK)/P</li> <li>▪ lb/P</li> <li>▪ P/g</li> <li>▪ P/kg</li> <li>▪ P/t</li> <li>▪ P/ton(US)</li> <li>▪ P/ton(UK)</li> <li>▪ P/lb</li> </ul>                                                                                                                   |
| Ⓜ | For<br><b>Net mass flow 1 – 2:</b><br>[Net mass flow<br>1 – 2]: | <ul style="list-style-type: none"> <li>▪ g/P</li> <li>▪ kg/P</li> <li>▪ t/P</li> <li>▪ ton(US)/P</li> <li>▪ ton(UK)/P</li> <li>▪ lb/P</li> <li>▪ P/g</li> <li>▪ P/kg</li> <li>▪ P/t</li> <li>▪ P/ton(US)</li> <li>▪ P/ton(UK)</li> <li>▪ P/lb</li> </ul>                                                                                                                   |
| Ⓜ | For<br><b>Volume flow 1 – 2 :</b><br>[Volume flow 1 –<br>2]:    | <ul style="list-style-type: none"> <li>▪ Cucm/P</li> <li>▪ L/P</li> <li>▪ Cum/P</li> <li>▪ gal/P</li> <li>▪ kgal/P</li> <li>▪ Cuft/P</li> <li>▪ bbl/P</li> <li>▪ Impgal/P</li> <li>▪ kImpgal/P</li> <li>▪ P/Cucm</li> <li>▪ P/L</li> <li>▪ P/Cum</li> <li>▪ P/gal</li> <li>▪ P/kgal</li> <li>▪ P/Cuft</li> <li>▪ P/bbl</li> <li>▪ P/Impgal</li> <li>▪ P/kImpgal</li> </ul> |



|   | Process variables                                                                  | Available units                                                                                                                                                                                                                                                                                                                                                            |
|---|------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ④ | <p>For<br/>Net volume flow 1 – 2:<br/>[Net volume flow<br/>1 – 2]:</p>             | <ul style="list-style-type: none"> <li>▪ Cucm/P</li> <li>▪ L/P</li> <li>▪ Cum/P</li> <li>▪ gal/P</li> <li>▪ kgal/P</li> <li>▪ Cuft/P</li> <li>▪ bbl/P</li> <li>▪ Impgal/P</li> <li>▪ kImpgal/P</li> <li>▪ P/Cucm</li> <li>▪ P/L</li> <li>▪ P/Cum</li> <li>▪ P/gal</li> <li>▪ P/kgal</li> <li>▪ P/Cuft</li> <li>▪ P/bbl</li> <li>▪ P/Impgal</li> <li>▪ P/kImpgal</li> </ul> |
| ④ | <p>For<br/>Corrected volume<br/>flow :<br/>[Corrected volume<br/>flow]:</p>        | <ul style="list-style-type: none"> <li>▪ Nml L/P</li> <li>▪ NmlCum/P</li> <li>▪ Std L/P</li> <li>▪ StdCuft/P</li> <li>▪ StdCum/P</li> <li>▪ P/Nml L</li> <li>▪ P/NmlCum</li> <li>▪ P/StdL</li> <li>▪ P/StdCuft</li> <li>▪ P/StdCum</li> </ul>                                                                                                                              |
| ④ | <p>For<br/>Net corrected volume<br/>flow:<br/>[Net corrected<br/>volume flow]:</p> | <ul style="list-style-type: none"> <li>▪ Nml L/P</li> <li>▪ NmlCum/P</li> <li>▪ Std L/P</li> <li>▪ StdCuft/P</li> <li>▪ StdCum/P</li> <li>▪ P/Nml L</li> <li>▪ P/NmlCum</li> <li>▪ P/StdL</li> <li>▪ P/StdCuft</li> <li>▪ P/StdCum</li> </ul>                                                                                                                              |
| ④ | <p>For<br/>Energy:<br/>[Energy]:</p>                                               | <ul style="list-style-type: none"> <li>▪ MJ/P</li> <li>▪ Btu/P</li> <li>▪ P/MJ</li> <li>▪ P/Btu</li> </ul>                                                                                                                                                                                                                                                                 |

**Pulse output 1 – 2 width**

Ⓜ [Device root menu] ► [Basic setup] ► [Pulse/Status outputs] ► [Pulse output 1 – 2] ► [Pulse output 1 – 2 width]

This parameter is also available in additional menus. The value can be set in each of these menus:

- *Easy setup wizard* [▶ 292]
- *Detailed setup* [▶ 480]

Sets the pulse width, this means the duration of the active state.

|   | Value                | Description                                                           |
|---|----------------------|-----------------------------------------------------------------------|
| Ⓜ | 0.05 ms<br>[0.05 ms] | Sets the pulse width.<br>Default value of Pulse output 1 – 2 is 1 ms. |
| Ⓜ | 0.1 ms<br>[0.1 ms]   |                                                                       |
| Ⓜ | 0.5 ms<br>[0.5 ms]   |                                                                       |
| Ⓜ | 1 ms<br>[1 ms]       |                                                                       |
| Ⓜ | 5 ms<br>[5 ms]       |                                                                       |
| Ⓜ | 10 ms<br>[10 ms]     |                                                                       |
| Ⓜ | 20 ms<br>[20 ms]     |                                                                       |
| Ⓜ | 33 ms<br>[33 ms]     |                                                                       |
| Ⓜ | 50 ms<br>[50 ms]     |                                                                       |
| Ⓜ | 100 ms<br>[100 ms]   |                                                                       |
| Ⓜ | 200 ms<br>[200 ms]   |                                                                       |
| Ⓜ | 330 ms<br>[330 ms]   |                                                                       |
| Ⓜ | 500 ms<br>[500 ms]   |                                                                       |
| Ⓜ | 1000 ms<br>[1000 ms] |                                                                       |
| Ⓜ | 2000 ms<br>[2000 ms] |                                                                       |

**Pulse output 1 – 2 rate**

Ⓜ [Device root menu] ► [Basic setup] ► [Pulse/Status outputs] ► [Pulse output 1 – 2] ► [Pulse output 1 – 2 rate]

This parameter is also available in additional menus. The value can be set in each of these menus:

- *Easy setup wizard* [► 294]
- *Detailed setup* [► 482]

Parameter for defining the number of units of the assigned process variable for 1 pulse of Pulse output 1 – 2.

|   | Value          | Description                                                                                                                                                                                                                                   |
|---|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓜ | Numeric digits | <p>Setting range: 0 – no check.<br/>Default value is 1.0.</p> <p>The unit for this value is defined in the parameter Pulse output 1 – 2 unit.</p> <p>This value depends on the parameter of Pulse output 1 – 2 width and on maximum flow.</p> |

**Pulse output 1 – 2 alarm action**

Ⓜ [Device root menu] ► [Basic setup] ► [Pulse/Status outputs] ► [Pulse output 1 – 2] ► [Pulse output 1 – 2 alarm action]

This parameter is also available in an additional menu. The values can also be set in the following menu:

*Detailed setup* [► 482]

Defines pulse output 1 – 2 when an alarm occurs.

|   | Value                              | Description                                                                                  |
|---|------------------------------------|----------------------------------------------------------------------------------------------|
| Ⓜ | 0.0 pulse<br>[0.0 pulse]           | <p>Pulse signal is stopped.</p> <p>Default value.</p>                                        |
| Ⓜ | Measured value<br>[Measured value] | Pulse output at measured value.                                                              |
| Ⓜ | Hold<br>[Hold]                     | Pulse output before an alarm occurs is held.                                                 |
| Ⓜ | User set value<br>[User set value] | Pulse output that has been set in the parameter Pulse output 1 – 2 user-defined alarm value. |

**Pulse output 1 – 2 user set alarm value**

Ⓜ [Device root menu] ► [Basic setup] ► [Pulse/Status outputs] ► [Pulse output 1 – 2] ► [Pulse output 1 – 2 user set alarm value]

This parameter is also available in an additional menu. The values can also be set in the following menu:

*Detailed setup* [► 482]

*Pulse output 1 – 2 user set alarm value* sets the frequency value of Fixed pulse when an alarm occurs, if the parameter Pulse output 1 – 2 alarm action is set to User set value.

|   | Value          | Description                                                                 |
|---|----------------|-----------------------------------------------------------------------------|
| Ⓜ | Numeric digits | <p>Setting range: 0.0 – 10000.0 P/s.</p> <p>Default value is 0.0 pulse.</p> |

**Frequency output 1 – 2**

Menu for configuring frequency signal via Modbus communication. It is available when Frequency output has been selected in the parameter Pulse/Status output 1 – 2 mode.

The following menus/settings are available:

|   | Full name                                   | Display name | [Modbus] name                                 | Page    |
|---|---------------------------------------------|--------------|-----------------------------------------------|---------|
| Ⓜ | Frequency output 1 – 2 select               | –            | [Frequency output 1 – 2 select]               | [▶ 344] |
| Ⓜ | Max frequency 1 – 2                         | –            | [Max frequency 1 – 2]                         | [▶ 345] |
| Ⓜ | Min frequency 1 – 2                         | –            | [Min frequency 1 – 2]                         | [▶ 345] |
| Ⓜ | Frequency output 1 – 2 alarm action         | –            | [Frequency output 1 – 2 alarm action]         | [▶ 346] |
| Ⓜ | Frequency output 1 – 2 user set alarm value | –            | [Frequency output 1 – 2 user set alarm value] | [▶ 346] |

**Frequency output 1 – 2 select**

Ⓜ [Device root menu] ▶ [Basic setup] ▶ [Pulse/Status outputs] ▶ [Frequency output 1 – 2] ▶ [Frequency output 1 – 2 select]

This parameter is also available in additional menus. The values can be set in each of these menus:

- *Easy setup wizard* [▶ 294]
- *Detailed setup* [▶ 485]

Assigns a process variable to Frequency output 1 – 2.

|   | Value                                            | Description                                                                                                                                                |
|---|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓜ | Mass flow<br>[Mass flow]                         | Sets variables for Frequency output 1 – 2.<br>The default value of Frequency output 1 is Mass flow.<br>The default value of Frequency output 2 is Density. |
| Ⓜ | Density<br>[Density]                             |                                                                                                                                                            |
| Ⓜ | Temperature<br>[Temperature]                     |                                                                                                                                                            |
| Ⓜ | Pressure<br>[Pressure]                           |                                                                                                                                                            |
| Ⓜ | Volume flow<br>[Volume flow]                     |                                                                                                                                                            |
| Ⓜ | Reference density<br>[Reference density]         |                                                                                                                                                            |
| Ⓜ | Relative density<br>[Relative density]           |                                                                                                                                                            |
| Ⓜ | Corrected volume flow<br>[Corrected volume flow] |                                                                                                                                                            |

|   | Value                       | Description                                                                                                                                                |
|---|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓜ | Concentration               | Sets variables for Frequency output 1 – 2.<br>The default value of Frequency output 1 is Mass flow.<br>The default value of Frequency output 2 is Density. |
| Ⓜ | [Concentration]             |                                                                                                                                                            |
| Ⓜ | Net mass flow 1             |                                                                                                                                                            |
| Ⓜ | [Net mass flow 1]           |                                                                                                                                                            |
| Ⓜ | Net mass flow 2             |                                                                                                                                                            |
| Ⓜ | [Net mass flow 2]           |                                                                                                                                                            |
| Ⓜ | Net volume flow 1           |                                                                                                                                                            |
| Ⓜ | [Net volume flow 1]         |                                                                                                                                                            |
| Ⓜ | Net volume flow 2           |                                                                                                                                                            |
| Ⓜ | [Net volume flow 2]         |                                                                                                                                                            |
| Ⓜ | Net corrected volume flow   |                                                                                                                                                            |
| Ⓜ | [Net corrected volume flow] |                                                                                                                                                            |
| Ⓜ | Viscosity                   |                                                                                                                                                            |
| Ⓜ | [Visc]                      |                                                                                                                                                            |
| Ⓜ | Drive current               |                                                                                                                                                            |
| Ⓜ | [Drv curr]                  |                                                                                                                                                            |

### Max frequency 1 – 2

Ⓜ [Device root menu] ► [Basic setup] ► [Pulse/Status outputs] ► [Frequency output 1 – 2] ► [Max frequency 1 – 2]

This parameter is also available in additional menus. The values can be set in each of these menus:

- *Easy setup wizard* [► 296]
- *Detailed setup* [► 486]

Sets the frequency value when the process value that is assigned to the Frequency output is the upper range value, 100 %.

|   | Value          | Description                                                         |
|---|----------------|---------------------------------------------------------------------|
| Ⓜ | Numeric digits | Setting range: 0.0001 – 10000.0 Hz.<br>Default value is 10000.0 Hz. |

### Min frequency 1 – 2

Ⓜ [Device root menu] ► [Basic setup] ► [Pulse/Status outputs] ► [Frequency output 1 – 2] ► [Min frequency 1 – 2]

This parameter is also available in additional menus. The values can be set in each of these menus:

- *Easy setup wizard* [► 296]
- *Detailed setup* [► 486]

Sets the frequency value when the process value that is assigned to the Frequency output is the lower range value, 0 %.

|   | Value          | Description                                                  |
|---|----------------|--------------------------------------------------------------|
| Ⓜ | Numeric digits | Setting range: 0.0 – 10000.0 Hz.<br>Default value is 0.0 Hz. |

**Frequency output  
1 – 2 alarm action**

④ [Device root menu] ► [Basic setup] ► [Pulse/Status outputs] ►  
[Frequency output 1 – 2] ► [Frequency output 1 – 2 alarm action]

This parameter is also available in an additional menu. The values can also be set in the following menu:

*Detailed setup* [► 487]

Sets the frequency output when an alarm occurs.

|   | Value                              | Description                                                                             |
|---|------------------------------------|-----------------------------------------------------------------------------------------|
| ④ | 0.0 Hz<br>[0.0 Hz]                 | Frequency becomes 0.0 Hz.<br>Default value.                                             |
| ④ | Measured value<br>[Measured value] | Frequency at measured value.                                                            |
| ④ | Hold<br>[Hold]                     | Frequency before an alarm occurs is held.                                               |
| ④ | User set value<br>[User set value] | Frequency that is set in the parameter Frequency output 1 – 2 user-defined alarm value. |

**Frequency output  
1 – 2 user set  
alarm value**

④ [Device root menu] ► [Basic setup] ► [Pulse/Status outputs] ►  
[Frequency output 1 – 2] ► [Frequency output 1 – 2 user set alarm  
value]

This parameter is also available in an additional menu. The values can also be set in the following menu:

*Detailed setup* [► 487]

Sets the frequency value when an alarm occurs, if the parameter Frequency output 1 – 2 alarm action has been set to User set value.

|   | Value          | Description                                                 |
|---|----------------|-------------------------------------------------------------|
| ④ | Numeric digits | Setting range: 0.0 – 15000.0 Hz<br>Default value is 0.0 Hz. |

**Status output 1...2**

Set of menus for configuring Status output functions via Modbus communication.

**Status output 1 – 2  
function**

④ [Device root menu] ► [Basic setup] ► [Pulse/Status outputs] ► [Status  
output 1 – 2] ► [Status output 1 – 2 function]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [► 297]
- *Detailed setup* [► 488]

Set of menus for configuring Status output functions. These menus are available when Status output is selected in the parameter *Pulse/Status output 1 – 2 mode*.

Concentration high low alarm, Net mass flow 1 – 2 high low alarm, Net volume flow 1 – 2 high low alarm and Net corrected volume flow high low alarm can only be selected if the concentration function is available in the device.

|   | Value        | Description                                                       |
|---|--------------|-------------------------------------------------------------------|
| ④ | Off<br>[Off] | Not used. Status signal does not become active.<br>Default value. |

|   | Value                                                                           | Description                                                                                                       |
|---|---------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Ⓜ | <b>Flow direction</b><br>[Flow direction]                                       | The signal becomes inactive when flow direction is forward and active when flow direction is reverse.             |
| Ⓜ | <b>Total limit 1 – 6</b><br>[Total limit 1 – 6]                                 | Signal becomes active when the value of Totalizer 1 – 6 exceeds the value of the parameter Total 1 – 6 set point. |
| Ⓜ | <b>F category</b><br>[F category]                                               | Signal becomes active when an alarm that is categorized as F on NE107 occurs.                                     |
| Ⓜ | <b>S,C,M category</b><br>[S,C,M category]                                       | Signal becomes active when an alarm that is categorized as S, C or M on NE107 occurs.                             |
| Ⓜ | <b>F + S,C,M category</b><br>[F + S,C,M category]                               | Signal becomes active when an alarm that is categorized as F, S, C or M on NE107 occurs.                          |
| Ⓜ | <b>Slug detection</b><br>[Slug detection]                                       | Signal becomes active when a Slug alarm occurs.                                                                   |
| Ⓜ | <b>Empty pipe</b><br>[Empty pipe]                                               | Signal becomes active when an Empty alarm occurs.                                                                 |
| Ⓜ | <b>Corrosion detection</b><br>[Corrosion detection]                             | Signal becomes active when a Corrosion detection alarm occurs.                                                    |
| Ⓜ | <b>Mass flow high / low alarm</b><br>[Mass flow high low alarm]                 | Signal becomes active when a Mass flow high or low alarm occurs.                                                  |
| Ⓜ | <b>Density high / low alarm</b><br>[Density high low alarm]                     | Signal becomes active when a Density high or low alarm occurs.                                                    |
| Ⓜ | <b>Reference density high / low alarm</b><br>[Reference density high low alarm] | Signal becomes active when a Reference density high or low alarm occurs.                                          |
| Ⓜ | <b>Relative density high / low alarm</b><br>[Relative density high low alarm]   | Signal becomes active when a Relative density high or low alarm occurs.                                           |
| Ⓜ | <b>Temperature high / low alarm</b><br>[Temperature high low alarm]             | Signal becomes active when a Temperature high or low alarm occurs.                                                |
| Ⓜ | <b>Pressure high / low alarm</b><br>[Pressure high low alarm]                   | Signal becomes active when a Pressure high or low alarm occurs.                                                   |
| Ⓜ | <b>Volume flow high / low alarm</b><br>[Volume flow high low alarm]             | Signal becomes active when a Volume high or low alarm occurs.                                                     |

|        | Value                                                                                    | Description                                                                      |
|--------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| Ⓜ<br>ⓔ | Corrected volume flow high / low alarm<br>[Corrected volume flow high low alarm]         | Signal becomes active when a Corrected volume flow high or low alarm occurs.     |
| Ⓜ<br>ⓔ | Concentration high / low alarm<br>[Concentration high low alarm]                         | Signal becomes active when a Concentration high or low alarm occurs.             |
| Ⓜ<br>ⓔ | Net mass flow 1 high / low alarm<br>[Net mass flow 1 high low alarm]                     | Signal becomes active when a Net mass flow 1 high or low alarm occurs.           |
| Ⓜ<br>ⓔ | Net mass flow 2 high / low alarm<br>[Net mass flow 2 high low alarm]                     | Signal becomes active when a Net mass flow 2 high or low alarm occurs.           |
| Ⓜ<br>ⓔ | Net volume flow 1 high / low alarm<br>[Net volume flow 1 high low alarm]                 | Signal becomes active when a Net volume flow 1 high or low alarm occurs.         |
| Ⓜ<br>ⓔ | Net volume flow 2 high / low alarm<br>[Net volume flow 2 high low alarm]                 | Signal becomes active when a Net volume flow 2 high or low alarm occurs.         |
| Ⓜ<br>ⓔ | Corrected net volume flow high / low alarm<br>[Corrected net volume flow high low alarm] | Signal becomes active when a Net corrected volume flow high or low alarm occurs. |
|        | Batch function<br>[Batch function]                                                       | Need to be set when a Batch function is used.                                    |
|        | Viscosity high low alarm<br>[Viscosity high low alarm]                                   | Signal becomes active when a Viscosity high or low alarm occurs.                 |

### Double pulse output

Menu for configuring the Double pulse output via Modbus communication.

The following menus/settings are available:

|   | Full name                       | Display name | [Modbus] name                     | Page   |
|---|---------------------------------|--------------|-----------------------------------|--------|
| Ⓜ | Frequency output 1 select       | —            | [Frequency output 1 select]       | [ 349] |
| Ⓜ | Double pulse phase shift mode   | —            | [Double pulse phase shift mode]   | [ 350] |
| Ⓜ | Max frequency 1                 | —            | [Max frequency 1]                 | [ 350] |
| Ⓜ | Min frequency 1                 | —            | [Min frequency 1]                 | [ 351] |
| Ⓜ | Frequency output 1 alarm action | —            | [Frequency output 1 alarm action] | [ 351] |



|   |                                         |   |                                           |         |
|---|-----------------------------------------|---|-------------------------------------------|---------|
| ④ | Frequency output 1 user set alarm value | — | [Frequency output 1 user set alarm value] | [▶ 351] |
|---|-----------------------------------------|---|-------------------------------------------|---------|

### Frequency output 1 select

|   |                                                                                                                   |
|---|-------------------------------------------------------------------------------------------------------------------|
| ④ | [Device root menu] ▶ [Basic setup] ▶ [Pulse/Status outputs] ▶ [Double pulse output] ▶ [Frequency output 1 select] |
|---|-------------------------------------------------------------------------------------------------------------------|

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [▶ 300]
- *Detailed setup* [▶ 492]

Assigns a process variable to double pulse output.

Concentration, Net mass flow 1 – 2, Net volume flow 1 – 2 and Net corrected volume flow can only be selected, if the concentration function is available on the device.

|        | Value                                            | Description                                                          |
|--------|--------------------------------------------------|----------------------------------------------------------------------|
| ④      | Mass flow<br>[Mass flow]                         | Sets the displayed process variables.<br>Default value is Mass flow. |
| ④      | Density<br>[Density]                             |                                                                      |
| ④      | Temperature<br>[Temperature]                     |                                                                      |
| ④      | Pressure<br>[Pressure]                           |                                                                      |
| ④      | Volume flow<br>[Volume flow]                     |                                                                      |
| ④      | Reference density<br>[Reference density]         |                                                                      |
| ④      | Relative density<br>[Relative density]           |                                                                      |
| ④      | Corrected volume flow<br>[Corrected volume flow] |                                                                      |
| ④<br>ⓕ | Concentration<br>[Concentration]                 |                                                                      |
| ④<br>ⓕ | Net mass flow 1<br>[Net mass flow 1]             |                                                                      |
| ④<br>ⓕ | Net mass flow 2<br>[Net mass flow 2]             |                                                                      |

|        | Value                                                    | Description                                                          |
|--------|----------------------------------------------------------|----------------------------------------------------------------------|
| Ⓜ<br>Ⓜ | Net volume flow 1<br>[Net volume flow 1]                 | Sets the displayed process variables.<br>Default value is Mass flow. |
| Ⓜ<br>Ⓜ | Net volume flow 2<br>[Net volume flow 2]                 |                                                                      |
| Ⓜ<br>Ⓜ | Net corrected volume flow<br>[Net corrected volume flow] |                                                                      |
| Ⓜ      | Viscosity<br>[Viscosity]                                 |                                                                      |
| Ⓜ      | Drive current<br>[Drive current]                         |                                                                      |

### Double pulse phase shift mode

Ⓜ [Device root menu] ► [Basic setup] ► [Pulse/Status outputs] ► [Double pulse output] ► [Double pulse phase shift mode]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [► 301]
- *Detailed setup* [► 493]

Sets the pulse shift mode of double pulse.

Directly after changing the shift mode, the output signal of pulse/status is not exact.

|   | Value                      | Description                                                                                                                                                                                            |
|---|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓜ | 0 degrees<br>[0 deg]       | No phase shift between pulse signal 1 and 2.                                                                                                                                                           |
| Ⓜ | 180 degrees<br>[180 deg]   | The phase shift between pulse signal 1 and 2 is 180 degrees.                                                                                                                                           |
| Ⓜ | -90 degrees<br>[-90 deg]   | Pulse 2 signal is shifted -90 degrees from pulse 1 signal.                                                                                                                                             |
| Ⓜ | +90 degrees<br>[+90 deg]   | Pulse 2 signal is shifted +90 degrees from pulse 1 signal.                                                                                                                                             |
| Ⓜ | Quadrature<br>[Quadrature] | When the flow direction is forward, the pulse 2 signal is shifted +90 degrees from the pulse 1 signal. When the flow direction is reverse, pulse 2 is shifted -90 degrees from pulse 1. Default value. |

### Max frequency 1

Ⓜ [Device root menu] ► [Basic setup] ► [Pulse/Status outputs] ► [Double pulse output] ► [Max frequency 1]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [► 302]
- *Detailed setup* [► 494]

Sets the frequency value when the process value that is assigned to Double pulse output is the upper range value, 100 %.

|   | Value          | Description                                                         |
|---|----------------|---------------------------------------------------------------------|
| ⊕ | Numeric digits | Setting range: 0.0001 – 10000.0 Hz.<br>Default value is 10000.0 Hz. |

**Min frequency 1**

⊕ [Device root menu] ► [Basic setup] ► [Pulse/Status outputs] ► [Double pulse output] ► [Min frequency 1]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [► 302]
- *Detailed setup* [► 494]

Sets the frequency value when the process value that is assigned to Double pulse output is the lower range value, 0 %.

|   | Value          | Description                                                  |
|---|----------------|--------------------------------------------------------------|
| ⊕ | Numeric digits | Setting range: 0.0 – 10000.0 Hz.<br>Default value is 0.0 Hz. |

**Frequency output 1 alarm action**

⊕ [Device root menu] ► [Basic setup] ► [Pulse/Status outputs] ► [Double pulse output] ► [Frequency output 1 alarm action]

This parameter can be set in the following menu/menus:

*Detailed setup* [► 494]

Sets the frequency output of double pulse when an alarm occurs.

|   | Value                              | Description                                                                                 |
|---|------------------------------------|---------------------------------------------------------------------------------------------|
| ⊕ | 0.0 Hz<br>[0.0 Hz]                 | Frequency becomes 0.0 Hz.<br>Default value.                                                 |
| ⊕ | Measured value<br>[Measured value] | Frequency at measured value.                                                                |
| ⊕ | Hold<br>[Hold]                     | The frequency before an alarm occurs is held.                                               |
| ⊕ | User set value<br>[User set value] | The frequency that is set in the parameter Frequency output 1 – 2 user-defined alarm value. |

**Frequency output 1 user set alarm value**

⊕ [Device root menu] ► [Basic setup] ► [Pulse/Status outputs] ► [Double pulse output] ► [Frequency output 1 user set alarm value]

This parameter can be set in the following menu/menus:

*Detailed setup* [► 495]

Sets the frequency value of double pulse when an alarm occurs, if User set value has been set in the parameter *Frequency output 1 – 2 alarm action*.

|   | Value          | Description                                                 |
|---|----------------|-------------------------------------------------------------|
| ⊕ | Numeric digits | Setting range: 0.0 – 15000.0 Hz<br>Default value is 0.0 Hz. |

**5.6.8 Totalizer**

*Totalizer* is a menu for configuring Totalizers.

**Totalizer 1 – 3**

*Totalizer 1 – 3* is a set of menus for configuring Totalizers.

The following overview shows the selectable menu items within the submenu *Totalizer 1 – 3*.

|   | Full name                  | Display name | [Modbus] name                | Page    |
|---|----------------------------|--------------|------------------------------|---------|
| Ⓜ | Total 1 – 3 channel        | –            | [Total 1 – 3 channel]        | [▶ 352] |
| Ⓜ | Total 1 – 3 unit           | –            | [Total 1 – 3 unit]           | [▶ 353] |
| Ⓜ | Total 1 – 3 failure option | –            | [Total 1 – 3 failure option] | [▶ 354] |
| Ⓜ | Total 1 – 3 start/stop     | –            | [Total 1 – 3 start/stop]     | [▶ 355] |

**Total 1 – 3 channel**

Ⓜ [Device root menu] ▶ [Basic setup] ▶ [Totalizer] ▶ [Totalizer 1 – 3] ▶ [Total 1 – 3 channel]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [▶ 303]
- *Detailed setup* [▶ 503]

Sets the process value for Totalizer 1 – 3.

Net mass flow 1 – 2, Net volume flow 1 – 2 and Net corrected volume flow can only be selected if the concentration function is available on the device.

|        | Value                                                    | Description                                                                                                                                                                                      |
|--------|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓜ      | Mass flow<br>[Mass flow]                                 | Sets the displayed process variables.<br>The default value for Total 1 is Mass flow.<br>The default value for Total 2 is Volume flow.<br>The default value for Total 3 is Corrected volume flow. |
| Ⓜ      | Volume flow<br>[Volume flow]                             |                                                                                                                                                                                                  |
| Ⓜ      | Corrected volume flow<br>[Corrected volume flow]         |                                                                                                                                                                                                  |
| Ⓜ      | Energy<br>[Energy]                                       |                                                                                                                                                                                                  |
| Ⓜ<br>Ⓢ | Net mass flow 1<br>[Net mass flow 1]                     |                                                                                                                                                                                                  |
| Ⓜ<br>Ⓢ | Net mass flow 2<br>[Net mass flow 2]                     |                                                                                                                                                                                                  |
| Ⓜ<br>Ⓢ | Net volume flow 1<br>[Net volume flow 1]                 |                                                                                                                                                                                                  |
| Ⓜ<br>Ⓢ | Net volume flow 2<br>[Net volume flow 2]                 |                                                                                                                                                                                                  |
| Ⓜ<br>Ⓢ | Net corrected volume flow<br>[Net corrected volume flow] |                                                                                                                                                                                                  |
| Ⓜ      | Off<br>[Off]                                             |                                                                                                                                                                                                  |

Total 1 – 3 unit

|   |                                                                                           |
|---|-------------------------------------------------------------------------------------------|
| Ⓜ | [Device root menu] ▶ [Basic setup] ▶ [Totalizer] ▶ [Totalizer 1 – 3] ▶ [Total 1 – 3 unit] |
|---|-------------------------------------------------------------------------------------------|

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [▶ 304]
- *Detailed setup* [▶ 504]

Sets the unit for Total 1 – 3.



The unit displayed on the LCD may vary depending on the setting of the parameter *Display unit selection*. During Modbus communication, the actually displayed unit may vary depending on the Modbus tool. For details, refer to *Units of the parameters* [▶ 819].

|   | Value                     | Description                                                                                                                                                                         |
|---|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓜ | g                         | Sets the unit for Total 1 – 3.<br>The default value for Total 1 is kg.<br>The default value for Total 2 is m <sup>3</sup> .<br>The default value for Total 3 is Stdm <sup>3</sup> . |
| Ⓜ | kg                        |                                                                                                                                                                                     |
| Ⓜ | t                         |                                                                                                                                                                                     |
| Ⓜ | ton(US)                   |                                                                                                                                                                                     |
| Ⓜ | ton(UK)                   |                                                                                                                                                                                     |
| Ⓜ | lb                        |                                                                                                                                                                                     |
| Ⓜ | cm <sup>3</sup>           |                                                                                                                                                                                     |
| Ⓜ | L                         |                                                                                                                                                                                     |
| Ⓜ | m <sup>3</sup>            |                                                                                                                                                                                     |
| Ⓜ | gal                       |                                                                                                                                                                                     |
| Ⓜ | kgal                      |                                                                                                                                                                                     |
| Ⓜ | ft <sup>3</sup>           |                                                                                                                                                                                     |
| Ⓜ | bbl                       |                                                                                                                                                                                     |
| Ⓜ | Impgal                    |                                                                                                                                                                                     |
| Ⓜ | kImpgal                   |                                                                                                                                                                                     |
| Ⓜ | L(normal)                 |                                                                                                                                                                                     |
| Ⓜ | m <sup>3</sup> (normal)   |                                                                                                                                                                                     |
| Ⓜ | L(Standard)               |                                                                                                                                                                                     |
| Ⓜ | Stdft <sup>3</sup>        |                                                                                                                                                                                     |
| Ⓜ | MMscuft                   |                                                                                                                                                                                     |
| Ⓜ | m <sup>3</sup> (Standard) |                                                                                                                                                                                     |
| Ⓜ | MJ                        |                                                                                                                                                                                     |
| Ⓜ | Btu                       |                                                                                                                                                                                     |
| Ⓜ | User unit                 |                                                                                                                                                                                     |

### Total 1 – 3 failure option

Ⓜ [Device root menu] ► [Basic setup] ► [Totalizer] ► [Totalizer 1 – 3]  
► [Total 1 – 3 failure option]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [► 305]
- *Detailed setup* [► 505]

Defines the behavior of the totalizers when an alarm occurs.

|   | Value                                  | Description                                                                  |
|---|----------------------------------------|------------------------------------------------------------------------------|
| Ⓜ | Run<br>[Run]                           | Totalizer accumulates assigned process value anyway.<br>Default value.       |
| Ⓜ | Hold<br>[Hold]                         | Totalizer stops accumulating the process value.                              |
| Ⓜ | Last Valid Value<br>[Last valid value] | Totalizer accumulates the value that was measured before the alarm occurred. |

**Total 1 – 3 start/stop**

Ⓜ [Device root menu] ▶ [Basic setup] ▶ [Totalizer] ▶ [Totalizer 1 – 3] ▶ [Total 1 – 3 start/stop]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [▶ 305]
- *Detailed setup* [▶ 506]

Starts or stops Totalizer 1 – 3 and shows its status.

|   | Value            | Description                                                                                                                                         |
|---|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓜ | Stop<br>[Stop]   | Totalizer 1 – 3 stops accumulation of the assigned process value. When accumulation is stopped, the value is kept.                                  |
| Ⓜ | Start<br>[Start] | Totalizer 1 – 3 starts accumulation of the assigned process value. If the value of the Totalizer is not 0, the accumulation starts from that value. |

## 5.6.9 Display select

*Display select* is a menu for assigning process variables to display.

Display select  
1 – 4

④ [Device root menu] ► [Basic setup] ► [Display select] ► [Display select 1 – 4]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [► 306]
- *Detailed setup* [► 516]

Assigns process variables to display lines 1, 2, 3 and 4 of the LCD display. On display, Display measurement mode can be selected and Batch display select 1 – 4 or Logging select 1 – 4 can be selected based on the selection of Display measurement mode.

|   | Value                                            | Description                                                                                                                                                                                                                                                                                                     |
|---|--------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ④ | None<br>[None]                                   | Sets Display select 1 – 4.<br><br>The default value for Display select 1 is Mass flow.<br>None is not available for Display select 1.<br>The default value for Display select 2 is Density.<br>The default value for Display select 3 is Temperature.<br>The default value for Display select 4 is Volume flow. |
| ④ | Mass flow<br>[Mass flow]                         |                                                                                                                                                                                                                                                                                                                 |
| ④ | Density<br>[Dens]                                |                                                                                                                                                                                                                                                                                                                 |
| ④ | Temperature<br>[Temp]                            |                                                                                                                                                                                                                                                                                                                 |
| ④ | Volume flow<br>[Vol flo]                         |                                                                                                                                                                                                                                                                                                                 |
| ④ | Reference density<br>[Reference density]         |                                                                                                                                                                                                                                                                                                                 |
| ④ | Relative density<br>[Relative density]           |                                                                                                                                                                                                                                                                                                                 |
| ④ | Corrected volume flow<br>[Corrected volume flow] |                                                                                                                                                                                                                                                                                                                 |
| ④ | Pressure<br>[Pressure]                           |                                                                                                                                                                                                                                                                                                                 |
| ④ | Totalizer 1<br>[Totalizer 1]                     |                                                                                                                                                                                                                                                                                                                 |
| ④ | Totalizer 2<br>[Totalizer 2]                     |                                                                                                                                                                                                                                                                                                                 |
| ④ | Totalizer 3<br>[Totalizer 3]                     |                                                                                                                                                                                                                                                                                                                 |
| ④ | Totalizer 4<br>[Totalizer 4]                     |                                                                                                                                                                                                                                                                                                                 |



|   | Value                                                                   | Description                                                                                                                                                                                                                                                                                                                   |
|---|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓜ | <b>Totalizer 5</b><br>[Totalizer 5]                                     | <p>Sets Display select 1 – 4.</p> <p>The default value for Display select 1 is Mass flow.<br/>None is not available for Display select 1.</p> <p>The default value for Display select 2 is Density.<br/>The default value for Display select 3 is Temperature.<br/>The default value for Display select 4 is Volume flow.</p> |
| Ⓜ | <b>Totalizer 6</b><br>[Totalizer 6]                                     |                                                                                                                                                                                                                                                                                                                               |
| Ⓜ | <b>Mass flow % graph</b><br>[Mass flow % graph]                         |                                                                                                                                                                                                                                                                                                                               |
| Ⓜ | <b>Volume flow % graph</b><br>[Volume flow % graph]                     |                                                                                                                                                                                                                                                                                                                               |
| Ⓜ | <b>Corrected volume flow % graph</b><br>[Corrected volume flow % graph] |                                                                                                                                                                                                                                                                                                                               |
| Ⓜ | <b>Tag</b><br>[Tag]                                                     |                                                                                                                                                                                                                                                                                                                               |
| Ⓜ | <b>Long tag</b><br>[Long tag]                                           |                                                                                                                                                                                                                                                                                                                               |
| Ⓜ | <b>Velocity</b><br>[Velocity]                                           |                                                                                                                                                                                                                                                                                                                               |
| Ⓜ | <b>Concentration</b><br>[Concentration]                                 |                                                                                                                                                                                                                                                                                                                               |
| Ⓜ | <b>Net mass flow 1</b><br>[Net mass flow 1]                             |                                                                                                                                                                                                                                                                                                                               |
| Ⓜ | <b>Net mass flow 2</b><br>[Net mass flow 2]                             |                                                                                                                                                                                                                                                                                                                               |
| Ⓜ | <b>Net volume flow 1</b><br>[Net volume flow 1]                         |                                                                                                                                                                                                                                                                                                                               |
| Ⓜ | <b>Net volume flow 2</b><br>[Net volume flow 2]                         |                                                                                                                                                                                                                                                                                                                               |
| Ⓜ | <b>Net corrected volume flow</b><br>[Net corrected volume flow]         |                                                                                                                                                                                                                                                                                                                               |

|   |                                                                    |                                                                                                                  |
|---|--------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| Ⓕ | Viscosity<br>[Viscosity]                                           | Sets Display select 1 – 4.<br>The default value for Display select 1 is Mass flow.                               |
| Ⓖ | Drive current<br>[Drive current]                                   | None is not available for Display select 1.<br>The default value for Display select 2 is Density.                |
| – | 24hours totalizer 1<br>[24hours<br>totalizer 1]                    | The default value for Display select 3 is Temperature.<br>The default value for Display select 4 is Volume flow. |
| – | 24hours totalizer 2<br>[24hours<br>totalizer 2]                    |                                                                                                                  |
| – | 24hours totalizer 3<br>[24hours<br>totalizer 3]                    |                                                                                                                  |
| – | Gas void fraction<br>[Gas void<br>fraction]                        |                                                                                                                  |
| – | Display unit mass<br>flow dual<br>[Display unit<br>mass flow dual] |                                                                                                                  |
| – | Display unit density<br>dual<br>[Display unit<br>density dual]     |                                                                                                                  |

**5.6.10 Date/Time**

The following overview shows the selectable menu items within the submenu *Date/Time*.

|   | Full name        | Display name | [Modbus] name      | Page    |
|---|------------------|--------------|--------------------|---------|
| Ⓜ | Current Date     | —            | [Current Date]     | [▶ 359] |
| Ⓜ | Current Time     | —            | [Current Time]     | [▶ 359] |
| Ⓜ | Set current date | —            | [Set current date] | [▶ 359] |
| Ⓜ | Set current time | —            | [Set current time] | [▶ 360] |

**Current Date**

Ⓜ [Device root menu] ▶ [Basic setup] ▶ [Date/Time] ▶ [Current Date]

This parameter is also available in additional menus. The values can be shown in each of these menus:

- *Diag/Service* [▶ 146]
- *Easy setup wizard* [▶ 309]

Shows the current date on the device.

|   | Value | Description                                                                                   |
|---|-------|-----------------------------------------------------------------------------------------------|
| Ⓜ | Date  | Shows the actual current date, if the date was set correctly when the device started running. |

**Current Time**

Ⓜ [Device root menu] ▶ [Basic setup] ▶ [Date/Time] ▶ [Current Time]

This parameter is also available in additional menus. The values can be shown in each of these menus:

- *Diag/Service* [▶ 146]
- *Easy setup wizard* [▶ 309]

Shows the current time on the device.

|   | Value | Description                                                                                   |
|---|-------|-----------------------------------------------------------------------------------------------|
| Ⓜ | Time  | Shows the actual current time, if the time was set correctly when the device started running. |

**Set current date**

Ⓜ [Device root menu] ▶ [Basic setup] ▶ [Date/Time] ▶ [Set current date]

This parameter is also available in additional menus. The values can be set in each of these menus:

- *Easy setup wizard* [▶ 310]
- *Detailed setup* [▶ 547]

Sets the date.

|   | Value | Description                                                                                                                                          |
|---|-------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓜ | Date  | The date format on the LCD is defined in the parameter Display format date.<br>The format in [Modbus] is MM/DD/YYYY.<br>Default value is 01/01/2015. |

Set current time

Ⓜ [Device root menu] ▶ [Basic setup] ▶ [Date/Time] ▶ [Set current time]

This parameter is also available in additional menus. The values can be set in each of these menus:

- *Easy setup wizard* [▶ 310]
- *Detailed setup* [▶ 548]

Sets the time.

|   | Value | Description                  |
|---|-------|------------------------------|
| Ⓜ | Time  | The time format is hh:mm:ss. |

### 5.6.11 Events/Alarms acknowledge

Menu for displaying device statuses and setting the acknowledge for Events/Alarms via Modbus communication.

#### Events/Alarms acknowledge

Ⓜ [Device root menu] ► [Basic setup] ► [Events/Alarms acknowledge]

This parameter can be set in the following menu/menus:

*Diag/Service* [► 120]

The following table shows parameters in the *Events/Alarms acknowledge* menu and corresponding events.

|   | Display parameter                  | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓜ | Status group 0<br>[Status group 0] | Status of the following events: <ul style="list-style-type: none"> <li>▪ 101:Resonance frequency failure</li> <li>▪ 102:Signal failure</li> <li>▪ 103 – 104:Pick off 1 failure</li> <li>▪ 105 – 106:Pick off 2 failure</li> <li>▪ 107 – 108:Temperature failure</li> </ul>                                                                                                                                                                                                           |
| Ⓜ | Status group 1<br>[Status group 1] | Status of the following events: <ul style="list-style-type: none"> <li>▪ 121 – 122:Mainboard failure</li> </ul>                                                                                                                                                                                                                                                                                                                                                                      |
| Ⓜ | Status group 2<br>[Status group 2] | Status of the following events: <ul style="list-style-type: none"> <li>▪ 123:Parameter restore incomplete</li> <li>▪ 124 – 125:Sensor board failure</li> <li>▪ 126:Sensor communication error</li> <li>▪ 127 – 129:Option board failure</li> <li>▪ 130 – 132:Indicator board failure</li> <li>▪ 133:Indicator board mismatch</li> <li>▪ 134:Indicator communication error</li> <li>▪ 135:microSD card failure</li> </ul>                                                             |
| Ⓜ | Status group 3<br>[Status group 3] | Status of the following events: <ul style="list-style-type: none"> <li>▪ 201:Slug detection</li> <li>▪ 202:Empty pipe detection</li> <li>▪ 203:Corrosion detection</li> <li>▪ 204 – 206:Autozero failure</li> <li>▪ 210 – 212:NOC failure</li> </ul>                                                                                                                                                                                                                                 |
| Ⓜ | Status group 4<br>[Status group 4] | Status of the following events: <ul style="list-style-type: none"> <li>▪ 221:Analog input failure</li> <li>▪ 222:Mass flow high high low low alarm</li> <li>▪ 223:Density high high low low alarm</li> <li>▪ 224:Temperature high high low low alarm</li> <li>▪ 225:Pressure high high low low alarm</li> <li>▪ 226:Volume flow high high low low alarm</li> <li>▪ 227:Corrected volume flow high high low low alarm</li> <li>▪ 228:Concentration high high low low alarm</li> </ul> |

|   | Display parameter                    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓜ | Status group 5<br>[Status group 5]   | Status of the following events: <ul style="list-style-type: none"> <li>▪ 229:Net mass flow 1 high high low low alarm</li> <li>▪ 230:Net mass flow 2 high high low low alarm</li> <li>▪ 231:Net volume flow 1 high high low low alarm</li> <li>▪ 232:Net volume flow 2 high high low low alarm</li> <li>▪ 233:Corrected Net Volume Flow high high low low Alarm.</li> <li>▪ 234:Relative density high high low low alarm</li> <li>▪ 235:Reference density high high low low alarm</li> <li>▪ 236:Viscosity high high low low alarm</li> </ul> |
| Ⓜ | Status group 14<br>[Status group 14] | Status of the following events: <ul style="list-style-type: none"> <li>▪ 241:Totalizer 1 threshold exceeded</li> <li>▪ 242:Totalizer 2 threshold exceeded</li> <li>▪ 243:Totalizer 3 threshold exceeded</li> <li>▪ 244:Totalizer 4 threshold exceeded</li> <li>▪ 245:Totalizer 5 threshold exceeded</li> <li>▪ 246:Totalizer 6 threshold exceeded</li> </ul>                                                                                                                                                                                 |
| Ⓜ | Status group 15<br>[Status group 15] | Status of the following events: <ul style="list-style-type: none"> <li>▪ 301 – 320:Process variables configuration error</li> <li>▪ 322: Analog output configuration error</li> <li>▪ 323 – 325:Pulse/Status output 1 configuration error</li> <li>▪ 326 – 329:Pulse/Status output 2 configuration error</li> <li>▪ 330:Double pulse output configuration error</li> </ul>                                                                                                                                                                   |
| Ⓜ | Status group 16<br>[Status group 16] | Status of the following events: <ul style="list-style-type: none"> <li>▪ 333:Analog input configuration error</li> <li>▪ 335 – 340:Totalizer configuration error</li> <li>▪ 341:Batch configuration error</li> <li>▪ 342:Data logging not started</li> <li>▪ 343:Option function mismatch</li> </ul>                                                                                                                                                                                                                                         |
| Ⓜ | Status group 17<br>[Status group 17] | Status of the following events: <ul style="list-style-type: none"> <li>▪ 702:Analog output fixed</li> <li>▪ 703:Density fixed</li> <li>▪ 704:Temperature fixed</li> <li>▪ 705:Pressure fixed</li> <li>▪ 706:Reference density fixed</li> <li>▪ 707:Calorific value fixed</li> <li>▪ 708:Process variable simulation</li> </ul>                                                                                                                                                                                                               |
| Ⓜ | Status group 18<br>[Status group 18] | Status of the following events: <ul style="list-style-type: none"> <li>▪ 709:Analog output simulation</li> <li>▪ 710:Pulse output simulation</li> <li>▪ 711:Status output simulation</li> <li>▪ 715:Process variable trimming</li> </ul>                                                                                                                                                                                                                                                                                                     |

|   | Display parameter                    | Description                                                                                                                                                                                                                                                                                                                                                                                        |
|---|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓜ | Status group 19<br>[Status group 19] | Status of the following events: <ul style="list-style-type: none"> <li>▪ 717:Analog output saturated</li> <li>▪ 718:Pulse output 1 saturated</li> <li>▪ 719:Pulse output 2 saturated</li> <li>▪ 720:Double pulse output saturated</li> <li>▪ 721:Autozero running</li> <li>▪ 722:Tube health check execution error</li> <li>▪ 723:Date/Time not set</li> <li>▪ 724:Display over warning</li> </ul> |
| Ⓜ | Status group 20<br>[Status group 20] | Status of the following events: <ul style="list-style-type: none"> <li>▪ 725:microSD card size warning</li> <li>▪ 726:microSD card mismatch</li> <li>▪ 728:microSD card removal procedure error</li> <li>▪ 729:Parameter backup incomplete</li> <li>▪ 730:Parameter restore running</li> <li>▪ 732:Batch progress indication</li> </ul>                                                            |
| Ⓜ | Status group 21<br>[Status group 21] | Status of the following event: <ul style="list-style-type: none"> <li>▪ 733, 734:Viscosity warning</li> <li>▪ 735:Autozero warning</li> </ul>                                                                                                                                                                                                                                                      |
| Ⓜ | Status group 22<br>[Status group 22] | Status of the following events: <ul style="list-style-type: none"> <li>▪ 901:Device configuration locked</li> <li>▪ 902:Device configuration not locked</li> <li>▪ 903:Parameter backup running</li> <li>▪ 904:Data logging running</li> <li>▪ 905:Tube health check running</li> <li>▪ 906:Batch running</li> <li>▪ 907:Batch hold</li> </ul>                                                     |
| Ⓜ | Status group 23<br>[Status group 23] | Status of the following event:<br>909:Maintenance mode running                                                                                                                                                                                                                                                                                                                                     |

### Event acknowledge

Ⓜ [Device root menu] ► [Basic setup] ► [Events/Alarms acknowledge] ► [Event acknowledge]

This parameter is also available in additional menus. The values can be set in each of these menus:

- *Diag/Service* [► 120]
- *Parameter description* [► 106]

If *Acknowledge* or *Monitor + acknowledge* is selected in the event setting parameters, it is necessary to acknowledge the event to reset the event status. For additional information, see chapter *Event setting* [► 55].

|   | Value                          | Description                                                                                                                           |
|---|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| Ⓜ | Acknowledged<br>[Acknowledged] | Status whereby a generated event is acknowledged. When the event is acknowledged, its status automatically reverts to Unacknowledged. |

|        | Value                              | Description                                                        |
|--------|------------------------------------|--------------------------------------------------------------------|
| Ⓜ<br>Ⓢ | Unacknowledged<br>[Unacknowledged] | An event was not generated, or if it was, it was not acknowledged. |

### 5.6.12 Batch function

The following overview shows the selectable menu items within the submenu Batch function.

|        | Full name                  | Display name | [Modbus] name                | Page    |
|--------|----------------------------|--------------|------------------------------|---------|
| Ⓜ<br>Ⓢ | Batch mode                 | —            | [Batch mode]                 | [▶ 364] |
| Ⓜ<br>Ⓢ | Batch select               | —            | [Batch select]               | [▶ 364] |
| Ⓜ<br>Ⓢ | Pulse/Status output 1 mode | —            | [Pulse/Status output 1 mode] | [▶ 365] |
| Ⓜ<br>Ⓢ | Batch start/stop           | —            | [Batch start/stop]           | [▶ 365] |
| Ⓜ<br>Ⓢ | Batch reset                | —            | [Batch reset]                | [▶ 366] |
| Ⓜ<br>Ⓢ | Batch 1                    | —            | [Batch 1]                    | [▶ 366] |
| Ⓜ<br>Ⓢ | Batch status output        | —            | [Batch status output]        | [▶ 369] |
| Ⓜ<br>Ⓢ | Batch display              | —            | [Batch display]              | [▶ 372] |

#### Batch mode

Ⓜ [Device root menu] ▶ [Basic setup] ▶ [Batch function] ▶ [Batch mode]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [▶ 311]
- *Detailed setup* [▶ 550]

Activates the Batch function.

|   | Value        | Description    |
|---|--------------|----------------|
| — | No<br>[No]   | Default value. |
| — | Yes<br>[Yes] |                |

#### Batch select

Ⓜ [Device root menu] ▶ [Basic setup] ▶ [Batch function] ▶ [Batch select]

This parameter can be set in the following menu/menus:

- *Detailed setup* [▶ 551]

Sets the used batch setting in Batch 1 – 5.



|   | Value                | Description                   |
|---|----------------------|-------------------------------|
| – | Batch 1<br>[Batch 1] | The default value is Batch 1. |
|   | Batch 2<br>[Batch 2] |                               |
|   | Batch 3<br>[Batch 3] |                               |
|   | Batch 4<br>[Batch 4] |                               |
| – | Batch 5<br>[Batch 5] |                               |

### Pulse/Status output 1 mode

④ [Device root menu] ► [Basic setup] ► [Batch function] ► [Pulse/Status output 1 mode]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [► 318]
- *Detailed setup* [► 562]

*Pulse/Status output 1 mode* sets the pulse signal mode of Pulse/Status output 1.

If Pulse/Status output 1 mode has just been changed, the output signal of pulse/status is not exact.

|   | Value                                      | Description                                                                                                                          |
|---|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| – | No function<br>[No function]               | Pulse signal or status signal is not available.<br>Default value.<br>Output signal level depends on the Status output 1 active mode. |
| – | Fixed pulse output<br>[Fixed pulse output] | Pulse signal with fixed pulse width, duty ratio changes. Status signal is not available.                                             |
| – | Frequency output<br>[Frequency output]     | Pulse signal with fixed duty ratio, pulse width changes. Status signal is not available.                                             |
| – | Status output<br>[Status output]           | Status signal. Pulse or frequency signal is not available.                                                                           |

### Batch start/stop

④ [Device root menu] ► [Basic setup] ► [Batch function] ► [Batch start/stop]

This parameter can be set in the following menu/menus:

- *Diag/Service* [► 157]
- *Detailed setup* [► 506]

Sets batch operation in Start, Stop, Hold or Resume.

|   | Value              | Description                |
|---|--------------------|----------------------------|
| — | Stop<br>[Stop]     | The default value is Stop. |
| — | Start<br>[Start]   |                            |
| — | Hold<br>[Hold]     |                            |
| — | Resume<br>[Resume] |                            |

**Batch reset**

Ⓜ [Device root menu] ► [Basic setup] ► [Batch function] ► [Batch reset]

This parameter can be set in the following menu/menus:

- *Detailed setup* [▶ 553]

Sets batch operation in Start, Stop, Hold or Resume.

|   | Value            | Description              |
|---|------------------|--------------------------|
| — | No<br>[No]       | The default value is No. |
| — | Reset<br>[Reset] |                          |

**Batch 1**

Menu for configuring the Batch function.

The following menus/settings are available:

|        | Full name                   | Display name | [Modbus] name                 | Page    |
|--------|-----------------------------|--------------|-------------------------------|---------|
| Ⓜ<br>ⓔ | Batch variable select 1     | —            | [Batch variable select 1]     | [▶ 366] |
| Ⓜ<br>ⓔ | Batch unit 1                | —            | [Batch unit 1]                | [▶ 367] |
| Ⓜ<br>ⓔ | Batch quantity 1            | —            | [Batch quantity 1]            | [▶ 368] |
| Ⓜ<br>ⓔ | Batch primary valve close 1 | —            | [Batch primary valve close 1] | [▶ 368] |
| Ⓜ<br>ⓔ | Fixed compensation value 1  | —            | [Fixed compensation value 1]  | [▶ 368] |
| Ⓜ<br>ⓔ | Batch end judgment value 1  | —            | [Batch end judgment value 1]  | [▶ 369] |
| Ⓜ<br>ⓔ | Max batch quantity 1        | —            | [Max batch quantity 1]        | [▶ 369] |

**Batch variable select 1**

Ⓜ [Device root menu] ► [Basic setup] ► [Batch function] ► [Batch 1] ► [Batch variable select 1]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [▶ 311]

- *Detailed setup* [▶ 554]

Sets the Process variable which is used in Batch function.

|   | Value                                                    | Value description               |
|---|----------------------------------------------------------|---------------------------------|
| — | Mass flow<br>[Mass flow]                                 | The default value is Mass flow. |
| — | Volume flow<br>[Volume flow]                             |                                 |
| — | Corrected volume flow<br>[Corrected volume flow]         |                                 |
| Ⓢ | Net mass flow 1<br>[Net mass flow 1]                     |                                 |
| Ⓢ | Net mass flow 2<br>[Net mass flow 2]                     |                                 |
| Ⓢ | Net volume flow 1<br>[Net volume flow 1]                 |                                 |
| Ⓢ | Net volume flow 2<br>[Net volume flow 2]                 |                                 |
| Ⓢ | Net corrected volume flow<br>[Net corrected volume flow] |                                 |

Batch unit 1

Ⓜ [Device root menu] ▶ [Basic setup] ▶ [Batch function] ▶ [Batch 1] ▶ [Batch unit 1]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [▶ 313]
- *Detailed setup* [▶ 556]

Sets the unit for Batch.

| Value                        | Description                                          |
|------------------------------|------------------------------------------------------|
| – g                          | Sets the unit for Batch.<br>The default value is kg. |
| – kg                         |                                                      |
| – t                          |                                                      |
| – ton(US)                    |                                                      |
| – ton(UK)                    |                                                      |
| – cm <sup>3</sup>            |                                                      |
| – L                          |                                                      |
| – m <sup>3</sup>             |                                                      |
| – gal                        |                                                      |
| – kgal                       |                                                      |
| – ft <sup>3</sup>            |                                                      |
| – bbl                        |                                                      |
| – Impgal                     |                                                      |
| – kImpgal                    |                                                      |
| – N(normal)                  |                                                      |
| – m <sup>3</sup> (normal)    |                                                      |
| – L(standard)                |                                                      |
| – ft <sup>3</sup> (standard) |                                                      |
| – Mmscft                     |                                                      |
| – m <sup>3</sup> (standard)  |                                                      |
| – User unit                  |                                                      |

**Batch quantity 1**

Ⓜ [Device root menu] ► [Basic setup] ► [Batch function] ► [Batch 1] ► [Batch quantity 1]

This parameter can be set in the following menu/menus:

- *Easy setup* [► 314]
- *Detailed setup* [► 555]

Sets the quantity for the Batch function.

| Value            | Description                |
|------------------|----------------------------|
| – Numeric digits | Default value is 100.0 kg. |

**Batch primary valve close 1**

Ⓜ [Device root menu] ► [Basic setup] ► [Batch function] ► [Batch 1] ► [Batch primary valve close 1]

This parameter can be set in the following menu/menus:

- *Detailed setup* [► 556]

Shows the quantity when the primary valve is closed.

Setting of valve control function is set by the Status output 1 – 3 function.

| Value            | Description             |
|------------------|-------------------------|
| – Numeric digits | Default value is 0.0 kg |

**Fix compensation value 1**

Ⓜ [Device root menu] ► [Basic setup] ► [Batch function] ► [Batch 1 setting] ► [Fix compensation value 1]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [▶ 314]
- *Detailed setup* [▶ 557]

Sets the leakage compensation value.

Valve is closed when quantity reaches Batch qty - Fix comp val.

|   | Value          | Description              |
|---|----------------|--------------------------|
| – | Numeric digits | Default value is 0.0 kg. |

### Batch end judgment value 1

Ⓜ [Device root menu] ▶ [Basic setup] ▶ [Batch function] ▶ [Batch 1 setting] ▶ [Batch end judgment value 1]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [▶ 315]
- *Detailed setup* [▶ 557]

Sets the judgment value of leakage value. The unit is depend on Process variable which is selected by Batch variable select.

|   | Value          | Description           |
|---|----------------|-----------------------|
| – | Numeric digits | Default value 5 kg/h. |

### Max batch quantity 1

Ⓜ [Device root menu] ▶ [Basic setup] ▶ [Batch function] ▶ [Batch 1 setting] ▶ [Max batch quantity 1]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [▶ 315]
- *Detailed setup* [▶ 557]

Sets threshold value of maximum flow.

When the flow rate for batch operation is bigger than the parameter value, 208:Batch overrun/underrun alarm occurs.

If this value is set to 0, this threshold is not active.

|   | Value          | Description              |
|---|----------------|--------------------------|
| – | Numeric digits | Default value is 0.0 kg. |

### Batch status output

*Batch status output* is a menu for configuring the Batch function.

The following overview shows the selectable menu items within the submenu *Batch status output*.

|        | Full name                | Display name | [Modbus] name              | Page    |
|--------|--------------------------|--------------|----------------------------|---------|
| Ⓜ      | Status output 1 function | –            | [Status output 1 function] | [▶ 369] |
| Ⓜ<br>ⓔ | Batch status output 1    | –            | [Batch status output 1]    | [▶ 371] |

### Status output 1 function

Ⓜ [Device root menu] ▶ [Basic setup] ▶ [Batch function] ▶ [Batch status output] ▶ [Status output 1 function]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [▶ 315]

▪ *Detailed setup* [▶ 488]

Set of menus for configuring Status output functions. These menus are available when Status output is selected in the parameter *Pulse/Status output 1 – 2 mode*.

Concentration high low alarm, Net mass flow 1 – 2 high low alarm, Net volume flow 1 – 2 high low alarm and Net corrected volume flow high low alarm can only be selected if the concentration function is available in the device.

|   | Value                                                                  | Description                                                                                                 |
|---|------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| – | Off<br>[Off]                                                           | Not used. Status signal does not become active.                                                             |
| – | Flow direction<br>[Flow direction]                                     | Signal becomes active, when the flow direction is forward. It becomes not active, when the flow is reverse. |
| – | Total limit 1 – 6<br>[Total limit 1 – 6]                               | Signal becomes active, when value of Totalizer 1 – 6 reaches value of parameter Total 1 – 6 set point.      |
| – | F category<br>[F category]                                             | Signal becomes active, when an alarm which is categorized as F on NE107 occurs.                             |
| – | S,C,M category<br>[S,C,M category]                                     | Signal becomes active, when an alarm which is categorized as S, C or M on NE107 occurs.                     |
| – | F + S,C,M category<br>[F + S,C,M category]                             | Signal becomes active, when an alarm which is categorized as F, S, C or M on NE107 occurs.                  |
| – | Slug detection<br>[Slug detection]                                     | Signal becomes active, when Slug alarm occurs.                                                              |
| – | Empty pipe<br>[Slug detection]                                         | Signal becomes active, when Empty alarm occurs.                                                             |
| – | Corrosion detection<br>[Slug detection]                                | Signal becomes active, when Corrosion detection alarm occurs.                                               |
| – | Mass flow high low alarm<br>[Mass flow high low alarm]                 | Signal becomes active, when Mass flow high or low alarm occurs.                                             |
| – | Density high low alarm<br>[Density high low alarm]                     | Signal becomes active, when Density high or low alarm occurs.                                               |
| – | Reference density high low alarm<br>[Reference density high low alarm] | Signal becomes active, when Reference density high or low alarm occurs.                                     |
| – | Relative density high low alarm<br>[Relative density high low alarm]   | Signal becomes active, when Relative density high or low alarm occurs.                                      |
| – | Temperature high low alarm<br>[Temperature high low alarm]             | Signal becomes active, when Temperature high or low alarm occurs.                                           |

|   | Value                                                                                  | Description                                                                      |
|---|----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| — | Pressure high low alarm<br>[Pressure high low alarm]                                   | Signal becomes active, when Pressure high or low alarm occurs.                   |
| — | Volume flow high low alarm<br>[Volume flow high low alarm]                             | Signal becomes active, when Volume high or low alarm occurs.                     |
| — | Corrected volume flow high low alarm<br>[Corrected volume flow high low alarm]         | Signal becomes active, when Corrected volume flow high or low alarm occurs.      |
| Ⓔ | Concentration high low alarm<br>[Concentration high low alarm]                         | Signal becomes active, when Concentration high or low alarm occurs.              |
| Ⓔ | Net mass flow 1 high low alarm<br>[Net mass flow 1 high low alarm]                     | Signal becomes active, when Net mass flow 1 high or low alarm occurs.            |
| Ⓔ | Net mass flow 2 high low alarm<br>[Net mass flow 2 high low alarm]                     | Signal becomes active, when Net mass flow 2 high or low alarm occurs.            |
| Ⓔ | Net volume flow 1 high low alarm<br>[Net volume flow 1 high low alarm]                 | Signal becomes active, when Net volume flow 1 high or low alarm occurs.          |
| Ⓔ | Net volume flow 2 high low alarm<br>[Net volume flow 2 high low alarm]                 | Signal becomes active, when Net volume flow 2 high or low alarm occurs.          |
| Ⓔ | Net corrected volume flow high low alarm<br>[Net corrected volume flow high low alarm] | Signal becomes active when a Net corrected volume flow high or low alarm occurs. |
| Ⓔ | Batch function<br>[Batch function]                                                     | Need to be set when a Batch function is used.                                    |
| Ⓔ | Viscosity high low alarm<br>[Viscosity high low alarm]                                 | Signal becomes active when a Viscosity high or low alarm occurs.                 |

### Batch status output 1

Ⓔ [Device root menu] ► [Basic setup] ► [Batch function] ► [Batch status output] ► [Batch status output 1]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [► 318]
- *Detailed setup* [► 562]

Sets the Status output function for Batch.

|   | Value                                                | Description                       |
|---|------------------------------------------------------|-----------------------------------|
| – | No function<br>[No function]                         | The default value is No function. |
| – | Primary valve control<br>[Primary valve control]     |                                   |
| – | Secondary valve control<br>[Secondary valve control] |                                   |
| – | Batch running<br>[Batch running]                     |                                   |
| – | Batch ended<br>[Batch ended]                         |                                   |

### Batch display

*Batch display* is a menu to configure display for Batch function.

The following overview shows the selectable menu items within the submenu Batch display.

|        | Full name                  | Display name | [Modbus] name                | Page    |
|--------|----------------------------|--------------|------------------------------|---------|
| Ⓜ      | Display measurement mode   | –            | [Display measurement mode]   | [▶ 372] |
| Ⓜ<br>Ⓜ | Batch display select 1 – 4 | –            | [Batch display select 1 – 4] | [▶ 373] |
| Ⓜ<br>Ⓜ | Display format batch       | –            | [Display format batch]       | [▶ 375] |

### Display measurement mode

Ⓜ [Device root menu] ▶ [Basic setup] ▶ [Batch] ▶ [Batch display] ▶ [Display measurement mode]

This parameter can be set in the following menu/menus:

- *Diag/Service* [▶ 263]
- *Easy setup wizard* [▶ 319]
- *Basic setup* [▶ 372]
- Detailed setup
  - *Display* [▶ 516]
  - *Batch function* [▶ 563]

Sets the display mode for logging data on the LCD display of the Indicator.

|   | Value              | Description                            |
|---|--------------------|----------------------------------------|
| – | Normal<br>[Normal] | Default value.<br>Normal display mode. |



|   | Value                            | Description                                                                                                                                                                                                                                                                                                                 |
|---|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| — | Trend online<br>[Trend online]   | Real-time trend chart of process values which were specified in parameters, Logging 1 – 4 select. Trend chart of one of four process values is displayed. By using Up/Down operation on the Indicator, the process values to be shown as a trend chard can be changed when the Display scroll parameters are set to Manual. |
| Ⓢ | Batch control<br>[Batch control] | Batch specific mode to indicate/operate batch.                                                                                                                                                                                                                                                                              |

Batch display  
select 1

Ⓢ [Device root menu] ▶ [Basic setup] ▶ [Batch function] ▶ [Batch display] ▶ [Batch display select 1 - 4]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [▶ 319]
- *Detailed setup* [▶ 564]

Sets Display select for batch, if batch variables are shown on Indicator. This is available when Batch control is selected in Display measurement mode.

|   | Value                                            | Value description                                                                                                                                                                                                                                                                                                                                                                                           |
|---|--------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| — | None<br>[None]                                   | <p>Sets Batch display select 1 – 4.</p> <p>The default value for Batch display select 1 is Batch quantity.</p> <p>None is not available for Batch display select 1.</p> <p>The default value for Batch display select 2 is Batch upward value.</p> <p>The default value for Batch display select 3 is Total batch quantity.</p> <p>The default value for Batch display select 4 is Batch counter value.</p> |
| Ⓢ | Batch quantity<br>[Batch quantity]               |                                                                                                                                                                                                                                                                                                                                                                                                             |
| Ⓢ | Batch upwards value<br>[Batch upwards value]     |                                                                                                                                                                                                                                                                                                                                                                                                             |
| Ⓢ | Batch downwards value<br>[Batch downwards value] |                                                                                                                                                                                                                                                                                                                                                                                                             |
| Ⓢ | Batch total quantity<br>[Batch total quantity]   |                                                                                                                                                                                                                                                                                                                                                                                                             |
| Ⓢ | Batch counter value<br>[Batch counter value]     |                                                                                                                                                                                                                                                                                                                                                                                                             |
| Ⓢ | Batch select<br>[Batch select]                   |                                                                                                                                                                                                                                                                                                                                                                                                             |
| Ⓢ | Batch variable select<br>[Batch variable select] |                                                                                                                                                                                                                                                                                                                                                                                                             |
| Ⓢ | Compensation value<br>[Compensation value]       |                                                                                                                                                                                                                                                                                                                                                                                                             |
| Ⓢ | Internal close point<br>[Internal close point]   |                                                                                                                                                                                                                                                                                                                                                                                                             |
| Ⓢ | Batch time<br>[Batch time]                       |                                                                                                                                                                                                                                                                                                                                                                                                             |
| — | Mass flow<br>[Mass flow]                         |                                                                                                                                                                                                                                                                                                                                                                                                             |
| — | Density<br>[Density]                             |                                                                                                                                                                                                                                                                                                                                                                                                             |
| — | Temperature<br>[Temperature]                     |                                                                                                                                                                                                                                                                                                                                                                                                             |
| — | Volume flow<br>[Volume flow]                     |                                                                                                                                                                                                                                                                                                                                                                                                             |

|   | Value                                                    | Value description                                                                                                                                                                                                                                                                                                                                                                |
|---|----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Reference density<br>[Reference density]                 | Sets Batch display select 1 – 4.<br>The default value for Batch display select 1 is Batch quantity.<br>None is not available for Batch display select 1.<br>The default value for Batch display select 2 is Batch upward value.<br>The default value for Batch display select 3 is Total batch quantity.<br>The default value for Batch display select 4 is Batch counter value. |
| – | Corrected volume flow<br>[Corrected volume flow]         |                                                                                                                                                                                                                                                                                                                                                                                  |
| – | Pressure<br>[Pressure]                                   |                                                                                                                                                                                                                                                                                                                                                                                  |
| – | Tag<br>[Tag]                                             |                                                                                                                                                                                                                                                                                                                                                                                  |
| – | Long Tag<br>[Long Tag]                                   |                                                                                                                                                                                                                                                                                                                                                                                  |
| Ⓢ | Net mass flow 1<br>[Net mass flow 1]                     |                                                                                                                                                                                                                                                                                                                                                                                  |
| Ⓢ | Net mass flow 2<br>[Net mass flow 2 ]                    |                                                                                                                                                                                                                                                                                                                                                                                  |
| Ⓢ | Net volume flow 1<br>[Net volume flow 1]                 |                                                                                                                                                                                                                                                                                                                                                                                  |
| Ⓢ | Net volume flow 2<br>[Net volume flow 2]                 |                                                                                                                                                                                                                                                                                                                                                                                  |
| Ⓢ | Net corrected volume flow<br>[Net corrected volume flow] |                                                                                                                                                                                                                                                                                                                                                                                  |

### Display format batch

Ⓢ [Device root menu] ► [Basic setup] ► [Batch function] ► [Batch display] ► [Display format batch]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [► 321]
- *Detailed setup* [► 566]

Sets the decimal format of batch relevant values which are set in *Display format batch* 1 – 4.

|   | Value                | Description                                                              |
|---|----------------------|--------------------------------------------------------------------------|
| – | Auto<br>[Auto]       | Position is automatically adjusted according to value.<br>Default value. |
| – | 0 digit<br>[0 digit] | 0 digit from right.                                                      |
| – | 1 digit<br>[1 digit] | 1 digit from right.                                                      |
| – | 2 digit<br>[2 digit] | 2 digit from right.                                                      |
| – | 3 digit<br>[3 digit] | 3 digit from right.                                                      |

|   | Value                | Description         |
|---|----------------------|---------------------|
| – | 4 digit<br>[4 digit] | 4 digit from right. |
| – | 5 digit<br>[5 digit] | 5 digit from right. |

## 5.7 Detailed setup

Menu for setting up the details of the configuration.

Most of the menu items and values are available for all devices. Exceptions are marked with corresponding symbols.

Tab. 32: Explanation of symbols used in the menu description

| Sym-bols | Description                                                                                           |
|----------|-------------------------------------------------------------------------------------------------------|
| Ⓐ        | Menu item or menu path is available via display.                                                      |
| Ⓜ        | Menu item or menu path is available via the [Modbus] configuration tool.                              |
| Ⓢ        | Menu item is optional. It is available only if a transmitter with the corresponding function is used. |
| —        | No restrictions.                                                                                      |

The following menus/settings are available:

|   | Full name                  | Display name   | [Modbus] name                | Page    |
|---|----------------------------|----------------|------------------------------|---------|
| — | Installation configuration | [Install cfg]  | [Installation configuration] | [▶ 378] |
| — | Process variables          | [Pro var]      | [Process variables]          | [▶ 380] |
| — | Analog output              | [AO]           | [Analog output]              | [▶ 470] |
| — | Pulse/Status outputs       | [Pls/Sts out]  | [Pulse/status outputs]       | [▶ 474] |
| — | Analog input               | [AI]           | [Analog input]               | [▶ 500] |
| — | Totalizer                  | [Ttl]          | [Totalizer]                  | [▶ 502] |
| — | Display                    | [Disp]         | [Display]                    | [▶ 514] |
| — | Date/Time                  | [Date/Time]    | [Date/Time]                  | [▶ 547] |
| — | User access configuration  | [Access cfg]   | [User access configuration]  | [▶ 548] |
| Ⓢ | Batch function             | [Batch]        | [Batch function]             | [▶ 550] |
| — | Proving                    | [Proving]      | [Auto proving setting]       | [▶ 569] |
| — | Sensor constants           | [Snsr cnst]    | [Sensor constants]           | [▶ 570] |
| — | Compensation               | [Compensation] | [Compensation]               | [▶ 573] |
| — | Device information         | [Dev info]     | [Device information]         | [▶ 577] |
| — | Write protect              | [Protect]      | [Write protect]              | [▶ 599] |
| — | Others                     | [Others]       | [Others]                     | [▶ 601] |

**5.7.1 Installation configuration**

Menu of parameters for configuring the installation information.

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [▶ 269]
- *Basic setup* [▶ 323]
- *Detailed setup* [▶ 378]

The following menus/settings are available:

|   | Full name                  | Display name     | [Modbus] name                | Page    |
|---|----------------------------|------------------|------------------------------|---------|
| – | Installation orientation   | [Install orient] | [Installation orientation]   | [▶ 378] |
| – | Density offset orientation | [Dens offset]    | [Density offset orientation] | [▶ 378] |
| – | Flow direction             | [Flow dir]       | [Flow direction]             | [▶ 379] |
| Ⓜ | Pressure fixed value       | –                | [Pressure fixed value]       | [▶ 379] |

**Installation orientation**

Ⓛ [Detailed setup] ▶ [Install cfg] ▶ [Install orient]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Installation configuration] ▶ [Installation orientation]

Sets the installation orientation of the device.

|   | Value                                                                | Description                |
|---|----------------------------------------------------------------------|----------------------------|
| – | Vertical<br>[Vertical]<br>[Vertical]                                 | Default value is Vertical. |
| – | Horizontal bend down<br>[Hrzntl bend down]<br>[Horizontal bend down] |                            |
| – | Horizontal bend up<br>[Hrzntl bend up]<br>[Horizontal bend up]       |                            |

**Density offset orientation**

Ⓛ [Detailed setup] ▶ [Install cfg] ▶ [Dens offset]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Installation configuration] ▶ [Density offset orientation]

Sets the density offset value to compensate for the gravitational effect when the device is installed horizontally. This value is added to the originally measured density value.

|   | Value          | Description                                                                                                                                                  |
|---|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | The value is automatically converted based on the unit setting.<br>When Vertical is selected in the <i>Installation orientation</i> , this value is ignored. |

| Meter size  | Default value in kg/l |
|-------------|-----------------------|
| Nano 06     | 5.25e-03              |
| Nano 08     | 2.70e-03              |
| Nano 10     | 1.80e-03              |
| Nano 15     | 2.00e-03              |
| Nano 20     | 6.00e-04              |
| Supreme 34  | 9.00e-04              |
| Supreme 36  | 3.50e-04              |
| Supreme 38  | 0                     |
| Supreme 39  | 0                     |
| Giga 1F     | 0                     |
| Giga 2H     | 0                     |
| Intense 34  | 9.00e-04              |
| Intense 36  | 3.50e-04              |
| Intense 38  | 0                     |
| Prime 25    | 1.70e-04              |
| Prime 40    | 1.30e-04              |
| Prime 50    | 7.00e-05              |
| Prime 80    | 1.50e-04              |
| Hygienic 25 | 1.70e-04              |
| Hygienic 40 | 1.30e-04              |
| Hygienic 50 | 7.00e-05              |
| Hygienic 80 | 1.50e-04              |

**Flow direction**

① [Detailed setup] ► [Install cfg] ► [Flow dir]

⑧ [Device root menu] ► [Detailed setup] ► [Installation configuration]  
► [Flow direction]

Sets the flow direction of the device.

|   | Value                             | Description                                                                          |
|---|-----------------------------------|--------------------------------------------------------------------------------------|
| – | Forward<br>[Forward]<br>[Forward] | The direction of flow is the same as the arrow mark on the sensor.<br>Default value. |
| – | Reverse<br>[Reverse]<br>[Reverse] | Opposite direction.                                                                  |

**Pressure fixed value**

⑧ [Device root menu] ► [Detailed setup] ► [Installation configuration]  
► [Pressure fixed value]

This parameter can be set in the following menu/menus:

- Easy setup wizard [► 271]
- Basic setup [► 325]
- Detailed setup
  - Pressure [► 404]
  - Installation configuration [► 379]

Sets the average static line pressure to compensate for the effect of the line pressure on mass flow and density. In case of gas measurement, no setting is required.

|   | Value          | Description                                                                                                                                                                                                                                                              |
|---|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓜ | Numeric digits | The value is automatically converted based on the unit setting.<br>Default value is 0.<br>When the value of the parameter Analog input function is not Pressure compensation and the device is not in simulation mode, this value is used for the pressure compensation. |

### 5.7.2 Process variables

Menu for configuring parameters that are related to process variables.

The following menus/settings are available:

|   | Full name                               | Display name            | [Modbus] name                             | Page    |
|---|-----------------------------------------|-------------------------|-------------------------------------------|---------|
| – | Process variables additional parameters | [Pro var add]           | [Process variables additional parameters] | [▶ 380] |
| – | Mass flow                               | [Mass]                  | [Mass flow]                               | [▶ 381] |
| – | Density                                 | [Dens]                  | [Density]                                 | [▶ 387] |
| – | Temperature                             | [Temp]                  | [Temperature]                             | [▶ 392] |
| – | Volume flow                             | [Vol]                   | [Volume flow]                             | [▶ 397] |
| – | Pressure                                | [Pres]                  | [Pressure]                                | [▶ 402] |
| – | Reference density                       | [Ref dens]              | [Reference density]                       | [▶ 408] |
| – | Relative density                        | [Rel dens]              | [Relative density]                        | [▶ 412] |
| – | Corrected volume flow                   | [Corr vol]              | [Corrected volume flow]                   | [▶ 416] |
| – | Calorific value                         | [Cal]                   | [Calorific value]                         | [▶ 421] |
| – | Velocity                                | [Vel]                   | [Velocity]                                | [▶ 424] |
| Ⓜ | Concentration                           | [Conc]                  | [Concentration]                           | [▶ 424] |
| Ⓜ | Net mass flow 1 – 2                     | [Net mass 1 – 2]        | [Net mass flow 1 – 2]                     | [▶ 450] |
| Ⓜ | Net volume flow 1 – 2                   | [Net volume flow 1 – 2] | [Net volume flow 1 – 2]                   | [▶ 455] |
| Ⓜ | Net corrected volume flow               | [Net corr vol]          | [Net corrected volume flow]               | [▶ 461] |
| Ⓜ | Viscosity                               | [Visc]                  | [Viscosity]                               | [▶ 466] |
| – | Drive current                           | [Drv curr]              | [Drive current]                           | [▶ 469] |

#### Process variables additional parameters

Ⓜ [Detailed setup] ▶ [Pro var] ▶ [Pro var add]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Process variables] ▶ [Process variables additional parameters]

*Process variables additional parameters* enables or disables the menu for accessing parameters that are located under the *Additional function* menu of each process variables. To access the parameters, this parameter must be set to "Apply" to allow access to "additional function" that require further configuration.

|   | Value                       | Description                                                             |
|---|-----------------------------|-------------------------------------------------------------------------|
| – | Apply<br>[Apply]<br>[Apply] | The menu for Additional parameters of each process variable is enabled. |



|   | Value                                   | Description                                                                                |
|---|-----------------------------------------|--------------------------------------------------------------------------------------------|
| – | Not Apply<br>[Not apply]<br>[Not Apply] | The menu for Additional parameters of each process variable is disabled.<br>Default value. |

### Mass flow

Menu for configuring the mass flow measurement.

The following menus/settings are available:

|   | Full name           | Display name | [Modbus] name         | Page    |
|---|---------------------|--------------|-----------------------|---------|
| – | Mass flow unit      | [Unit]       | [Mass flow unit]      | [▶ 381] |
| – | Mass flow LRV       | [LRV]        | [Mass flow LRV]       | [▶ 382] |
| – | Mass flow URV       | [URV]        | [Mass flow URV]       | [▶ 382] |
| – | Mass flow damping   | [Damp]       | [Mass flow damping]   | [▶ 383] |
| – | Additional function | [Add func]   | [Additional function] | [▶ 383] |

### Mass flow unit

Ⓛ [Detailed setup] ▶ [Pro var] ▶ [Mass] ▶ [Unit]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Process variables] ▶ [Mass flow] ▶ [Mass flow unit]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [▶ 273]
- *Basic setup* [▶ 326]
- *Detailed setup* [▶ 381]

Sets the unit for mass flow.



The unit displayed on the LCD may vary depending on the setting of the parameter *Display unit selection*. During Modbus communication, the actually displayed unit may vary depending on the Modbus tool. For details, refer to *Units of the parameters* [▶ 819].

| Value         | Description                                                  |
|---------------|--------------------------------------------------------------|
| – g/s         | Sets the displayed Mass flow unit.<br>Default value is kg/h. |
| – g/min       |                                                              |
| – g/h         |                                                              |
| – kg/s        |                                                              |
| – kg/min      |                                                              |
| – kg/h        |                                                              |
| – kg/d        |                                                              |
| – t/min       |                                                              |
| – t/h         |                                                              |
| – t/d         |                                                              |
| – ton(US)/min |                                                              |
| – ton(US)/h   |                                                              |
| – ton(US)/d   |                                                              |
| – ton(UK)/min |                                                              |
| – ton(UK)/h   |                                                              |
| – ton(UK)/d   |                                                              |
| – lb/s        |                                                              |
| – lb/min      |                                                              |
| – lb/h        |                                                              |
| – lb/d        |                                                              |
| – User unit   |                                                              |

## Mass flow LRV

Ⓐ [Detailed setup] ► [Pro var] ► [Mass] ► [LRV]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Mass flow] ► [Mass flow LRV]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [ 274]
- *Basic setup* [ 327]
- *Detailed setup* [ 382]

Sets the lower range value, 0 %, for scaling the analog, frequency and pulse outputs during mass flow measurement.

| Value            | Description                                                                                                                                                                                                            |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – Numeric digits | Default value is 0.0.<br>Settings must satisfy the following conditions:<br>URV ≠ LRV<br>$LRV \leq Q_{max}$<br>$LRV \geq -Q_{max}$<br>For the $Q_{max}$ value refer to the General Specification (GS) of each product. |

## Mass flow URV

Ⓐ [Detailed setup] ► [Pro var] ► [Mass] ► [URV]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Mass flow] ► [Mass flow URV]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [▶ 274]
- *Basic setup* [▶ 327]
- *Detailed setup* [▶ 382]

Sets the upper range value, 100 %, for scaling the analog, frequency and pulse outputs during mass flow measurement.

|   | Value          | Description                                                                                                                                                                                                                                                                                       |
|---|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | <p>Default value is 10000.0.</p> <p>Settings must satisfy the following conditions:</p> $\text{URV} \leq Q_{\text{max}}$ $\text{URV} \geq -Q_{\text{max}}$ $\text{URV} \neq \text{LRV}$ <p>For the <math>Q_{\text{max}}</math> value refer to the General Specification (GS) of each product.</p> |

## Mass flow damping

Ⓛ [Detailed setup] ▶ [Pro var] ▶ [Mass] ▶ [Damp]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Process variables] ▶ [Mass flow] ▶ [Mass flow damping]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [▶ 275]
- *Basic setup* [▶ 327]
- *Detailed setup* [▶ 383]

Sets the damping constant for mass flow measurement. The value is the time it takes for this value to become 63.2 % of the total amount of change.

|   | Value          | Description                                                             |
|---|----------------|-------------------------------------------------------------------------|
| Ⓜ | Numeric digits | <p>Setting range: 0.0 – 200.0 s.</p> <p>The default value is 3.0 s.</p> |

## Additional function

Menu for configuring the Mass flow measurement in detail. Access to this menu and the parameters below is available if Apply has been set in the parameter *Process variables additional parameters*, see *Process variables* [▶ 380].

The following menus/settings are available:

|   | Full name                             | Display name        | [Modbus] name                           | Page    |
|---|---------------------------------------|---------------------|-----------------------------------------|---------|
| – | Mass flow low cut                     | [Lowcut]            | [Mass flow lowcut]                      | [▶ 384] |
| – | Mass flow user unit                   | [User unit]         | [Mass flow user unit]                   | [▶ 384] |
| – | Mass flow user unit conversion factor | [Conv factor]       | [Mass flow user unit conversion factor] | [▶ 384] |
| – | Mass flow bi-directional mode         | [Bi-dir mode]       | [Mass flow bi-directional mode]         | [▶ 384] |
| – | Mass flow damping pulse/total         | [Damp pls/ttl]      | [Mass flow damping pulse/total]         | [▶ 385] |
| – | Mass flow trim select                 | [Trim sel]          | [Mass flow trim select]                 | [▶ 385] |
| – | Mass flow trim offset                 | [Trim offset]       | [Mass flow trim offset]                 | [▶ 385] |
| – | Mass flow trim gain                   | [Trim gain]         | [Mass flow trim gain]                   | [▶ 385] |
| – | Display unit mass flow dual           | [Display Unit dual] | [Display unit mass flow dual]           | [▶ 386] |

**Mass flow  
low cut**

Ⓐ [Detailed setup] ► [Pro var] ► [Mass] ► [Add func] ► [Lowcut]

Ⓜ [Detailed setup] ► [Process variables] ► [Mass flow] ► [Additional function] ► [Mass flow lowcut]

Sets the mass flow low cut-off.

|   | Value          | Description                                                                                                                                                                                                                                                                                                                                                                                                       |
|---|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | <p>Selects the mass flow value below which output is set to zero, to prevent the Totalizer from accumulating values when the valves are closed.</p> <p>Settings must satisfy the following condition:<br/> <math> \text{Mass flow low cut}  \leq Q_{\text{nom}} * 0.2</math><br/>           For the value of <math>Q_{\text{nom}}</math>, refer to the General Specifications (GS) of the particular product.</p> |

**Mass flow  
user unit**

Ⓐ [Detailed setup] ► [Pro var] ► [Mass] ► [Add func] ► [User unit]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Mass flow] ► [Additional function] ► [Mass flow user unit]

The mass flow can be displayed in custom user-defined units. This parameter sets the user-defined unit name.

Mass flow unit is effective when *Mass flow unit* is set to User-defined unit.

|   | Value            | Description                     |
|---|------------------|---------------------------------|
| – | ASCII characters | Maximum length is 8 characters. |

**Mass flow  
user unit  
conversion factor**

Ⓐ [Detailed setup] ► [Pro var] ► [Mass] ► [Add func] ► [Conv factor]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Mass flow] ► [Additional function] ► [Mass flow user unit conversion factor]

Sets the conversion factor for the mass flow user-defined unit.

|   | Value          | Description                                                                     |
|---|----------------|---------------------------------------------------------------------------------|
| – | Numeric digits | Conversion factor for calculating the user-defined unit from the standard unit. |

**Mass flow  
bi-directional  
mode**

Ⓐ [Detailed setup] ► [Pro var] ► [Mass] ► [Add func] ► [Bi-dir mode]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Mass flow] ► [Additional function] ► [Mass flow bi-directional mode]

Sets the direction of the mass flow for setting Analog or Frequency output.

|   | Value                                      | Description                                                                             |
|---|--------------------------------------------|-----------------------------------------------------------------------------------------|
| – | Not active<br>[Not active]<br>[Not active] | <p>Sets the direction of the mass flow to a single direction.</p> <p>Default value.</p> |

|   | Value                       | Description                                                                                                      |
|---|-----------------------------|------------------------------------------------------------------------------------------------------------------|
| – | <b>[Active]</b><br>[Active] | Sets the direction of the mass flow to bi-directional.<br>Mass flow URV and Mass flow LRV must be the same sign. |

### Mass flow damping pulse/total

① [Detailed setup] ► [Pro var] ► [Mass] ► [Add func] ► [Damp pls/ttl]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Mass flow] ► [Additional function] ► [Mass flow damping pulse/total]

Sets the damping constant for the mass flow value in pulse output and total.

The value is the time it takes for the output value to become 63.2 % of the total amount of change.

|   | Value          | Description                                              |
|---|----------------|----------------------------------------------------------|
| – | Numeric digits | Setting range: 0.0 – 200.0 s.<br>Default value is 0.0 s. |

### Mass flow trim select

① [Detailed setup] ► [Pro var] ► [Mass] ► [Add func] ► [Trim sel]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Mass flow] ► [Additional function] ► [Mass flow trim select]

Enables or disables the mass flow trim.

|   | Value                         | Description                                    |
|---|-------------------------------|------------------------------------------------|
| – | <b>[Inhibit]</b><br>[Inhibit] | Disables the mass flow trim.<br>Default value. |
| – | <b>[Enable]</b><br>[Enable]   | Enables the mass flow trim.                    |

### Mass flow trim offset

① [Detailed setup] ► [Pro var] ► [Mass] ► [Add func] ► [Trim offset]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Mass flow] ► [Additional function] ► [Mass flow trim offset]

Sets the mass flow zero offset value.

|   | Value          | Description                                                           |
|---|----------------|-----------------------------------------------------------------------|
| – | Numeric digits | Value that is added to the mass flow.<br>Default value is 0.000e+000. |

### Mass flow trim gain

① [Detailed setup] ► [Pro var] ► [Mass] ► [Add func] ► [Trim gain]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Mass flow] ► [Additional function] ► [Mass flow trim gain]

Sets the mass flow span offset value.

Only effective if *Mass flow trim select* is set to Enable.

|   | Value          | Description                                                                                         |
|---|----------------|-----------------------------------------------------------------------------------------------------|
| – | Numeric digits | Factor for manually adjusting a scaling error by Rotamass Total Insight.<br>Default value is 1.000. |

**Display unit mass flow dual**

Ⓐ [Detailed setup] ► [Pro var] ► [Mass] ► [Add func] ► [Display Unit dual]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Mass flow] ► [Additional function] ► [Display unit mass flow dual]

Sets the unit for mass flow to display on Indicator when Display unit mass flow dual is selected in Display select 1 – 20.



The unit displayed on the LCD may vary depending on the setting of the parameter *Display unit selection*. During Modbus communication, the actually displayed unit may vary depending on the Modbus tool. For details, refer to *Units of the parameters* [▶ 819].

|   | Value       | Description                                                  |
|---|-------------|--------------------------------------------------------------|
| – | g/s         | Sets the displayed Mass flow unit.<br>Default value is kg/h. |
| – | g/min       |                                                              |
| – | g/h         |                                                              |
| – | kg/s        |                                                              |
| – | kg/min      |                                                              |
| – | kg/h        |                                                              |
| – | kg/d        |                                                              |
| – | t/min       |                                                              |
| – | t/h         |                                                              |
| – | t/d         |                                                              |
| – | ton(US)/min |                                                              |
| – | ton(US)/h   |                                                              |
| – | ton(US)/d   |                                                              |
| – | ton(UK)/min |                                                              |
| – | ton(UK)/h   |                                                              |
| – | ton(UK)/d   |                                                              |
| – | lb/s        |                                                              |
| – | lb/min      |                                                              |
| – | lb/h        |                                                              |
| – | lb/d        |                                                              |
| – | User unit   |                                                              |

**Density**

Menu for configuring the density measurement.



Density measurement is only reliable if there is no gas in the liquid.

The following menus/settings are available:

|   | Full name           | Display name | [Modbus] name         | Page    |
|---|---------------------|--------------|-----------------------|---------|
| – | Density unit        | [Unit]       | [Density unit]        | [▶ 387] |
| – | Density LRV         | [LRV]        | [Density LRV]         | [▶ 388] |
| – | Density URV         | [URV]        | [Density URV]         | [▶ 388] |
| – | Density damping     | [Damp]       | [Density damping]     | [▶ 388] |
| – | Additional function | [Add func]   | [Additional function] | [▶ 389] |

**Density unit**

⌚ [Detailed setup] ▶ [Pro var] ▶ [Dens] ▶ [Unit]

⊕ [Device root menu] ▶ [Detailed setup] ▶ [Process variables] ▶ [Density] ▶ [Density unit]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [▶ 276]
- *Basic setup* [▶ 328]
- *Detailed setup* [▶ 387]

Sets the unit for density.



The unit displayed on the LCD may vary depending on the setting of the parameter *Display unit selection*. During Modbus communication, the actually displayed unit may vary depending on the Modbus tool. For details, refer to *Units of the parameters* [▶ 819].

|   | Value              | Description                                                |
|---|--------------------|------------------------------------------------------------|
| – | g/mL               | Sets the displayed Density unit.<br>Default value is g/ml. |
| – | kg/L               |                                                            |
| – | kg/cm <sup>3</sup> |                                                            |
| – | kg/dm <sup>3</sup> |                                                            |
| – | kg/m <sup>3</sup>  |                                                            |
| – | lb/gal             |                                                            |
| – | lb/ft <sup>3</sup> |                                                            |
| – | g/cm <sup>3</sup>  |                                                            |
| – | g/cc               |                                                            |
| – | g/L                |                                                            |
| – | User unit          |                                                            |

**Density LRV**

Ⓐ [Detailed setup] ► [Pro var] ► [Dens] ► [LRV]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Density] ► [Density LRV]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [ 276]
- *Basic setup* [ 328]
- *Detailed setup* [ 388]

Sets the lower range value, 0 %, for the scaling of frequency output during density measurement.

|   | Value          | Description                                                                    |
|---|----------------|--------------------------------------------------------------------------------|
| Ⓜ | Numeric digits | Default value is 0.<br>Setting must satisfy the following condition: URV ≠ LRV |

**Density URV**

Ⓐ [Detailed setup] ► [Pro var] ► [Dens] ► [URV]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Density] ► [Density URV]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [ 277]
- *Basic setup* [ 329]
- *Detailed setup* [ 388]

Sets the upper range value, 100 %, for scaling the analog and frequency output during density measurement.

|   | Value          | Description                                                                       |
|---|----------------|-----------------------------------------------------------------------------------|
| – | Numeric digits | Default value is 1.5.<br>Settings must satisfy the following condition: URV ≠ LRV |

**Density damping**

Ⓐ [Detailed setup] ► [Pro var] ► [Dens] ► [Damp]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Density] ► [Mass flow damping]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [ 277]
- *Basic setup* [ 329]
- *Detailed setup* [ 388]

Sets the damping constant for density measurement. The value is the time it takes for this value to become 63.2 % of the total amount of change.

|   | Value          | Description                                              |
|---|----------------|----------------------------------------------------------|
| – | Numeric digits | Default value is 3.0 s.<br>Setting range: 0.0 – 200.0 s. |



**Additional function**

Menu for configuring the Density measurement in detail. Access to this menu and the parameters below is available if Apply has been set in the parameter *Process variables additional parameters*, see *Process variables* [▶ 380].

The following menus/settings are available:

|   | Full name                           | Display name        | [Modbus] name                         | Page    |
|---|-------------------------------------|---------------------|---------------------------------------|---------|
| – | Density low cut                     | [Lowcut]            | [Density lowcut]                      | [▶ 389] |
| – | Density user unit                   | [User unit]         | [Density user unit]                   | [▶ 389] |
| – | Density user unit conversion factor | [Conv factor]       | [Density user unit conversion factor] | [▶ 389] |
| – | Density value select                | [Val sel]           | [Density value select]                | [▶ 390] |
| – | Density fixed value                 | [Fix val]           | [Density fixed value]                 | [▶ 390] |
| – | Density trim select                 | [Trim sel]          | [Density trim select]                 | [▶ 391] |
| – | Density trim offset                 | [Trim offset]       | [Density trim offset]                 | [▶ 391] |
| – | Density trim gain                   | [Trim gain]         | [Density trim gain]                   | [▶ 391] |
| – | Display unit density dual           | [Display Unit dual] | [Display unit density dual]           | [▶ 392] |

**Density lowcut**

① [Detailed setup] ▶ [Pro var] ▶ [Dens] ▶ [Add func] ▶ [Lowcut]

⑧ [Device root menu] ▶ [Detailed setup] ▶ [Process variables] ▶ [Density] ▶ [Additional function] ▶ [Density lowcut]

Sets the density low cut-off.

|   | Value          | Description                                                                                                                                              |
|---|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | Value of the density measurement below which the density is set to zero.<br>Settings must satisfy the following conditions:<br>Density low cut ≤ 0.5kg/l |

**Density user unit**

① [Detailed setup] ▶ [Pro var] ▶ [Dens] ▶ [Add func] ▶ [User unit]

⑧ [Device root menu] ▶ [Detailed setup] ▶ [Process variables] ▶ [Density] ▶ [Additional function] ▶ [Density user unit]

Density can be displayed in custom user-defined units. This parameter sets the user-defined unit name.

This parameter is effective when *Density unit* is set to User-defined unit.

|   | Value            | Description                     |
|---|------------------|---------------------------------|
| – | ASCII characters | Maximum length is 8 characters. |

**Density user unit conversion factor**

① [Detailed setup] ▶ [Pro var] ▶ [Dens] ▶ [Add func] ▶ [Conv factor]

⑧ [Device root menu] ▶ [Detailed setup] ▶ [Process variables] ▶ [Density] ▶ [Additional function] ▶ [Density user unit conversion factor]

Sets the conversion factor for the density user-defined unit.

|   | Value          | Description                                                                                            |
|---|----------------|--------------------------------------------------------------------------------------------------------|
| – | Numeric digits | Conversion factor for calculating the user-defined unit from the standard unit.<br>Default value is 1. |

### Density value select

⌚ [Detailed setup] ► [Pro var] ► [Dens] ► [Add func] ► [Val sel]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Density] ► [Additional function] ► [Density value select]

Sets whether to use a measured density value, a preset fixed density value or a calculated density value.

It is recommended to set either Fixed Value or Calculated value for gas measurement.

|   | Value                                                | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---|------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Measured value<br>[Meas val]<br>[Measured value]     | Measured density value is used.<br>Default value.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| – | Fixed value<br>[Fix val]<br>[Fixed value]            | Preset fixed density value is used.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| – | Calculated value<br>[Calc val]<br>[Calculated value] | Available for gas measurement only and Liquid gas select [ 582] must be set to Gas.<br>Calculated value $\rho_m$ is calculated from the following formula.<br>$\rho_m = \rho_{comp} \times \frac{(273.15 + t_{comp})}{(273.15 + t_m)} \times \frac{P_m}{P_{comp}}$ <p>The following parameters have to be appropriately configured to use this function. The pressure value must be the absolute pressure.</p> <ul style="list-style-type: none"> <li>▪ <math>\rho_{comp}</math>: Reference density fixed value [ 411]</li> <li>▪ <math>t_{comp}</math>: Reference temperature [ 409]</li> <li>▪ <math>t_m</math>: Measured temperature of fluid</li> <li>▪ <math>P_{comp}</math>: Reference pressure (abs) [ 411]</li> <li>▪ <math>P_m</math>: Pressure of fluid (abs) <ul style="list-style-type: none"> <li>– If the Analog input function [ 500] is set to Pressure compensation and the Absolute/Gauge selection [ 405] is set to Absolute, this is the measured pressure value of the fluid.</li> <li>– If not, it is the value of the gas density pressure [ 405]</li> </ul> </li> </ul> |

### Density fixed value

⌚ [Detailed setup] ► [Pro var] ► [Dens] ► [Add func] ► [Fix val]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Density] ► [Additional function] ► [Density fixed value]

Sets a fixed density value.

For gas measurement, input the actual density to output the volume flow.

For liquid measurement, enter the actual density if anything prevents the density measurement from being performed.

Please note, *density low cut* [▶ 389] affects also fixed density value. Make sure density low-cut value is below density fixed value.

|   | Value          | Description         |
|---|----------------|---------------------|
| – | Numeric digits | Default value is 1. |

### Density trim select

① [Detailed setup] ▶ [Pro var] ▶ [Dens] ▶ [Add func] ▶ [Trim sel]

② [Device root menu] ▶ [Detailed setup] ▶ [Process variables] ▶ [Density] ▶ [Additional function] ▶ [Density trim select]

Enables or disables the density trim.

|   | Value                             | Description                              |
|---|-----------------------------------|------------------------------------------|
| – | Inhibit<br>[Inhibit]<br>[Inhibit] | Disables density trim.<br>Default value. |
| – | Enable<br>[Enable]<br>[Enable]    | Enables density trim.                    |

### Density trim offset

① [Detailed setup] ▶ [Pro var] ▶ [Dens] ▶ [Add func] ▶ [Trim offset]

② [Device root menu] ▶ [Detailed setup] ▶ [Process variables] ▶ [Density] ▶ [Additional function] ▶ [Density trim offset]

Sets the density zero offset value.

|   | Value          | Value description                                                   |
|---|----------------|---------------------------------------------------------------------|
| – | Numeric digits | Value that is added to the density.<br>Default value is 0.000e+000. |

### Density trim gain

① [Detailed setup] ▶ [Pro var] ▶ [Dens] ▶ [Add func] ▶ [Trim gain]

② [Device root menu] ▶ [Detailed setup] ▶ [Process variables] ▶ [Density] ▶ [Additional function] ▶ [Density trim gain]

Sets the density span offset value.

Only effective if *Density trim select* is set to Enable.

|   | Value          | Description                                                                                         |
|---|----------------|-----------------------------------------------------------------------------------------------------|
| – | Numeric digits | Factor for manually adjusting a scaling error by Rotamass Total Insight.<br>Default value is 1.000. |

**Display unit density dual**

Ⓛ [Detailed setup] ► [Pro var] ► [Dens] ► [Add func] ► [Dens (dual)]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Density] ► [Additional function] ► [Display unit density dual]

Sets the unit for density to display on Indicator when Display unit density dual is selected in Display select 1 – 20.



The unit displayed on the LCD may vary depending on the setting of the parameter *Display unit selection*. During Modbus communication, the actually displayed unit may vary depending on the Modbus tool. For details, refer to *Units of the parameters* [▶ 819].

| Value                | Description                                                |
|----------------------|------------------------------------------------------------|
| – g/ml               | Sets the displayed Density unit.<br>Default value is g/ml. |
| – kg/L               |                                                            |
| – kg/cm <sup>3</sup> |                                                            |
| – kg/dm <sup>3</sup> |                                                            |
| – kg/m <sup>3</sup>  |                                                            |
| – lb/gal             |                                                            |
| – lb/ft <sup>3</sup> |                                                            |
| – g/cm <sup>3</sup>  |                                                            |
| – g/cc               |                                                            |
| – g/L                |                                                            |
| – User unit          |                                                            |

**Temperature**

Menu for configuring the temperature measurement.

The following menus/settings are available:

|   | Full name           | Display name | [Modbus] name         | Page    |
|---|---------------------|--------------|-----------------------|---------|
| – | Temperature unit    | [Unit]       | [Temperature unit]    | [▶ 392] |
| – | Temperature LRV     | [LRV]        | [Temperature LRV]     | [▶ 393] |
| – | Temperature URV     | [URV]        | [Temperature URV]     | [▶ 393] |
| – | Temperature damping | [Damp]       | [Temperature damping] | [▶ 394] |
| – | Additional function | [Add func]   | [Additional function] | [▶ 394] |

**Temperature unit**

Ⓛ [Detailed setup] ► [Pro var] ► [Temp] ► [Unit]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Temperature] ► [Temperature unit]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [▶ 278]
- *Basic setup* [▶ 330]
- *Detailed setup* [▶ 392]

Sets the unit for temperature.



The unit displayed on the LCD may vary depending on the setting of the parameter *Display unit selection*. During Modbus communication, the actually displayed unit may vary depending on the Modbus tool. For details, refer to *Units of the parameters* [▶ 819].

|   | Value | Description                                                    |
|---|-------|----------------------------------------------------------------|
| – | degC  | Sets the displayed Temperature unit.<br>Default value is degC. |
| – | degF  |                                                                |
| – | degR  |                                                                |
| – | K     |                                                                |

## Temperature LRV

① [Detailed setup] ▶ [Pro var] ▶ [Temp] ▶ [LRV]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Process variables] ▶ [Temperature] ▶ [Temperature LRV]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [▶ 278]
- *Basic setup* [▶ 330]
- *Detailed setup* [▶ 393]

Sets the lower range value, 0 %, for scaling the analog and frequency output during temperature measurement.

|   | Value          | Description                                                                                                                                                             |
|---|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | Default value is 0.0.<br>Settings must satisfy the following conditions:<br>URV ≠ LRV<br>LRV ≥ Temperature Lower Limit [▶ 587]<br>LRV ≤ Temperature Upper Limit [▶ 587] |

## Temperature URV

① [Detailed setup] ▶ [Pro var] ▶ [Temp] ▶ [URV]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Process variables] ▶ [Temperature] ▶ [Temperature URV]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [▶ 279]
- *Basic setup* [▶ 331]
- *Detailed setup* [▶ 393]

Sets the upper range value, 100 %, for scaling the analog and frequency output during temperature measurement.

|   | Value          | Description                                                                                                                                                               |
|---|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | Default value is 150.0.<br>Settings must satisfy the following conditions:<br>URV ≠ LRV<br>URV ≥ Temperature lower limit [▶ 587]<br>URV ≤ Temperature upper limit [▶ 587] |

**Temperature damping**

Ⓐ [Detailed setup] ► [Pro var] ► [Temp] ► [Damp]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Temperature] ► [Temperature damping]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [► 279]
- *Basic setup* [► 331]
- *Detailed Setup* [► 394]

Sets the damping constant for temperature measurement. The value is the time it takes for this value to become 63.2 % of the total amount of change.

|   | Value          | Description                                               |
|---|----------------|-----------------------------------------------------------|
| – | Numeric digits | Setting range: 0.0 – 200.0 s.<br>Default value is 10.0 s. |

**Additional function**

Menu for configuring temperature measurement in detail. Access to this menu and the parameters below is available if Apply has been set in the parameter *Process variables additional parameters*, see *Process variables* [► 380].

The following menus/settings are available:

|   | Full name                     | Display name  | [Modbus] name                   | Page    |
|---|-------------------------------|---------------|---------------------------------|---------|
| – | Temperature function select   | [Func sel]    | [Temperature function select]   | [► 394] |
| – | Temperature fixed value       | [Fix val]     | [Temperature fixed value]       | [► 395] |
| – | Analog input temperature unit | [AI unit]     | [Analog input temperature unit] | [► 395] |
| – | Analog input temperature LRV  | [AI LRV]      | [Analog input temperature LRV]  | [► 395] |
| – | Analog input temperature URV  | [AI URV]      | [Analog input temperature URV]  | [► 396] |
| – | Temperature trim select       | [Trim sel]    | [Temperature trim select]       | [► 396] |
| – | Temperature trim offset       | [Trim offset] | [Temperature trim offset]       | [► 397] |
| – | Temperature trim gain         | [Trim gain]   | [Temperature trim gain]         | [► 397] |

**Temperature function select**

Ⓐ [Detailed setup] ► [Pro var] ► [Temp] ► [Add func] ► [Func sel]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Temperature] ► [Additional function] ► [Temperature function select]

Sets whether to use a measured temperature value or a preset fixed temperature value.

If the device is equipped with a function for analog input to a remote terminal and Temperature for compensation is set to analog input, the measured temperature is used for this setting regardless of the analog input.

|   | Value                                             | Description                         |
|---|---------------------------------------------------|-------------------------------------|
| – | Internal value<br>[Inter val]<br>[Internal value] | Measured temperature value is used. |

|   | Value                                     | Description                                                                                            |
|---|-------------------------------------------|--------------------------------------------------------------------------------------------------------|
| – | Fixed value<br>[Fix val]<br>[Fixed value] | Preset fixed temperature value is used, but only if the temperature sensor does not function properly. |

### Temperature fixed value

① [Detailed setup] ► [Pro var] ► [Temp] ► [Add func] ► [Fix val]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Temperature] ► [Additional function] ► [Temperature fixed value]

Sets a fixed temperature value.

If a temperature error due to a temperature sensor fault occurs, that error can be reset by setting the *Temperature function select* to a Fixed value. The preset fixed value is the displayed and output as the temperature measurement value. Changing the temperature value of the application is recommended. In this case, the temperature is not measured correctly and may be outside the accuracy range.

|   | Value          | Description                                                           |
|---|----------------|-----------------------------------------------------------------------|
| – | Numeric digits | Fixed temperature that is to be displayed.<br>Default value is 30 °C. |

### Analog input temperature unit

① [Detailed setup] ► [Pro var] ► [Temp] ► [Add func] ► [AI unit]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Temperature] ► [Additional function] ► [Analog input temperature unit]

Sets the unit of the temperature displayed from the analog input signal.

It is effective if the device is equipped with a function for analog input to a remote terminal and Temperature for compensation is set to the analog input function.



The unit displayed on the LCD may vary depending on the setting of the parameter *Display unit selection*. During Modbus communication, the actually displayed unit may vary depending on the Modbus tool. For details, refer to *Units of the parameters* [▶ 819].

|   | Value | Description                                                       |
|---|-------|-------------------------------------------------------------------|
| – | degC  | Sets the Analog input temperature unit.<br>Default value is degC. |
| – | degF  |                                                                   |
| – | degR  |                                                                   |
| – | K     |                                                                   |

### Analog input temperature LRV

① [Detailed setup] ► [Pro var] ► [Temp] ► [Add func] ► [AI LRV]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Temperature] ► [Additional function] ► [Analog input temperature LRV]

Sets the temperature to the equivalent of the 4 mA analog input signal.

It is effective if the device is equipped with a function for analog input to a remote terminal and Temperature for compensation is set to the analog input function.

|   | Value          | Description                                                                                                                                                                                 |
|---|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | Default value is 0.0 degC.<br>Settings must satisfy the following conditions:<br>URV $\neq$ LRV<br>LRV $\geq$ Temperature lower limit [▶ 587]<br>LRV $\leq$ Temperature upper limit [▶ 587] |

### Analog input temperature URV

Ⓐ [Detailed setup] ▶ [Pro var] ▶ [Temp] ▶ [Add func] ▶ [AI URV]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Process variables] ▶ [Temperature] ▶ [Additional function] ▶ [Analog input temperature URV]

Sets the temperature to the equivalent of the 20 mA analog input signal.

It is effective if the device is equipped with a function for analog input to a remote terminal and Temperature for compensation is set to the analog input function.

|   | Value          | Description                                                                                                                                                                                   |
|---|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | Default value is 150.0 degC.<br>Settings must satisfy the following conditions:<br>URV $\neq$ LRV<br>URV $\geq$ Temperature lower limit [▶ 587]<br>URV $\leq$ Temperature upper limit [▶ 587] |

### Temperature trim select

Ⓐ [Detailed setup] ▶ [Pro var] ▶ [Temp] ▶ [Add func] ▶ [Trim sel]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Process variables] ▶ [Temperature] ▶ [Additional function] ▶ [Temperature trim select]

Enables or disables the temperature trim.



The temperature trim function can be used to correct the temperature measurement of the Rotamass Total Insight system by adjusting the offset and the slope of the temperature sensor. It is not recommended that this function be used unless correct measurement across the entire process temperature range can be confirmed. It is not sufficient to prove correct measurement at one temperature or in a very narrow temperature range, unless the process operates exclusively within that range.

|   | Value                             | Description                                      |
|---|-----------------------------------|--------------------------------------------------|
| – | Inhibit<br>[Inhibit]<br>[Inhibit] | Disables the temperature trim.<br>Default value. |
| – | Enable<br>[Enable]<br>[Enable]    | Enables the temperature trim.                    |



**Temperature trim offset**

① [Detailed setup] ► [Pro var] ► [Temp] ► [Add func] ► [Trim offset]

② [Device root menu] ► [Detailed setup] ► [Process variables] ► [Temperature] ► [Additional function] ► [Temperature trim offset]

Sets the temperature zero offset value.

Only effective if *Temperature trim select* is set to Enable.

|   | Value          | Description                                                                      |
|---|----------------|----------------------------------------------------------------------------------|
| – | Numeric digits | Value that is added to the measured temperature.<br>Default value is 0.000e+000. |

**Temperature trim gain**

① [Detailed setup] ► [Pro var] ► [Temp] ► [Add func] ► [Trim gain]

② [Device root menu] ► [Detailed setup] ► [Process variables] ► [Temperature] ► [Additional function] ► [Temperature trim gain]

Sets the temperature span offset value.

Only effective if *Temperature trim select* is set to Enable.

|   | Value          | Description                                                                                         |
|---|----------------|-----------------------------------------------------------------------------------------------------|
| – | Numeric digits | Factor for manually adjusting a scaling error by Rotamass Total Insight.<br>Default value is 1.000. |

**Volume flow**

Menu for configuring the Volume flow measurement.

The following menus/settings are available:



Volume flow is derived from the density and the mass flow measurement. Errors in density measurement, e.g. from gas bubbles, affect the accuracy of the volume flow. For liquids it is therefore recommended that mass flow be used wherever possible.

|   | Full name           | Display name | [Modbus] name         | Page    |
|---|---------------------|--------------|-----------------------|---------|
| – | Volume flow unit    | [Unit]       | [Volume flow unit]    | [▶ 397] |
| – | Volume flow LRV     | [LRV]        | [Volume flow LRV]     | [▶ 398] |
| – | Volume flow URV     | [URV]        | [Volume flow URV]     | [▶ 399] |
| – | Volume flow damping | [Damp]       | [Volume flow damping] | [▶ 399] |
| – | Additional function | [Add func]   | [Additional function] | [▶ 400] |

**Volume flow unit**

① [Detailed setup] ► [Pro var] ► [Vol] ► [Unit]

② [Device root menu] ► [Detailed setup] ► [Process variables] ► [Volume flow] ► [Volume flow unit]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [▶ 280]
- *Basic setup* [▶ 332]

- *Detailed setup* [▶ 397]

Sets the unit for volume flow.



The unit displayed on the LCD may vary depending on the setting of the parameter *Display unit selection*. During Modbus communication, the actually displayed unit may vary depending on the Modbus tool. For details, refer to *Units of the parameters* [▶ 819].

| Value                  | Description                                                                 |
|------------------------|-----------------------------------------------------------------------------|
| – cm <sup>3</sup> /s   | Sets the displayed Volume flow unit.<br>Default value is m <sup>3</sup> /h. |
| – cm <sup>3</sup> /min |                                                                             |
| – cm <sup>3</sup> /h   |                                                                             |
| – L/s                  |                                                                             |
| – L/min                |                                                                             |
| – L/h                  |                                                                             |
| – L/d                  |                                                                             |
| – m <sup>3</sup> /s    |                                                                             |
| – m <sup>3</sup> /min  |                                                                             |
| – m <sup>3</sup> /h    |                                                                             |
| – m <sup>3</sup> /d    |                                                                             |
| – gal/s                |                                                                             |
| – gal/min              |                                                                             |
| – gal/h                |                                                                             |
| – gal/d                |                                                                             |
| – ft <sup>3</sup> /s   |                                                                             |
| – ft <sup>3</sup> /min |                                                                             |
| – ft <sup>3</sup> /h   |                                                                             |
| – ft <sup>3</sup> /d   |                                                                             |
| – bbl/s                |                                                                             |
| – bbl/min              |                                                                             |
| – bbl/h                |                                                                             |
| – bbl/d                |                                                                             |
| – Impgal/s             |                                                                             |
| – Impgal/min           |                                                                             |
| – Impgal/h             |                                                                             |
| – Impgal/d             |                                                                             |
| – User unit            |                                                                             |

## Volume flow LRV

Ⓐ [Detailed setup] ▶ [Pro var] ▶ [Vol] ▶ [LRV]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Process variables] ▶ [Volume flow] ▶ [Volume flow LRV]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [▶ 281]
- *Basic setup* [▶ 333]
- *Detailed Setup* [▶ 398]

Sets the lower range value, 0 %, for scaling the analog, frequency and pulse output during volume flow measurement.

|   | Value          | Description                                                                              |
|---|----------------|------------------------------------------------------------------------------------------|
| – | Numeric digits | Default value is 0.<br>Settings must satisfy the following conditions:<br>URV $\neq$ LRV |

### Volume flow URV

⌚ [Detailed setup] ► [Pro var] ► [Vol] ► [URV]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Volume flow] ► [Volume flow URV]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [► 282]
- *Basic setup* [► 333]
- *Detailed setup* [► 399]

Sets the upper range value, 100 %, for scaling the analog, frequency and pulse output during volume flow measurement.

|   | Value          | Description                                                                               |
|---|----------------|-------------------------------------------------------------------------------------------|
| – | Numeric digits | Default value is 10.<br>Settings must satisfy the following conditions:<br>URV $\neq$ LRV |

### Volume flow damping

⌚ [Detailed setup] ► [Pro var] ► [Vol] ► [Damp]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Volume flow] ► [Volume flow damping]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [► 282]
- *Basic setup* [► 333]
- *Detailed setup* [► 399]

Sets the damping constant for volume flow measurement. The value is the time it takes for this value to become 63.2 % of the total amount of change.

|   | Value          | Description                                              |
|---|----------------|----------------------------------------------------------|
| – | Numeric digits | Setting range: 0.0 – 200.0 s.<br>Default value is 3.0 s. |

**Additional function**

Menu for configuring the volume flow measurement in detail. Access to this menu and the parameters below is available if Apply has been set in the parameter *Process variables additional parameters*, see *Process variables* [▶ 380].

The following menus/settings are available:

|   | Full name                               | Display name   | [Modbus] name                             | Page    |
|---|-----------------------------------------|----------------|-------------------------------------------|---------|
| – | Volume flow low cut                     | [Lowcut]       | [Volume flow lowcut]                      | [▶ 400] |
| – | Volume flow user unit                   | [User unit]    | [Volume flow user unit]                   | [▶ 400] |
| – | Volume flow user unit conversion factor | [Conv factor]  | [Volume flow user unit conversion factor] | [▶ 400] |
| – | Volume flow bi-directional mode         | [Bi-dir mode]  | [Volume flow bi-directional mode]         | [▶ 401] |
| – | Volume flow damping pulse/total         | [Damp pls/ttl] | [Volume flow damping pulse/total]         | [▶ 401] |
| – | Volume flow trim select                 | [Trim sel]     | [Volume flow trim select]                 | [▶ 401] |
| – | Volume flow trim offset                 | [Trim offset]  | [Volume flow trim offset]                 | [▶ 401] |
| – | Volume flow trim gain                   | [Trim gain]    | [Volume flow trim gain]                   | [▶ 402] |

**Volume flow low cut**

⌚ [Detailed setup] ▶ [Pro var] ▶ [Vol] ▶ [Add func] ▶ [Lowcut]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Process variables] ▶ [Volume flow] ▶ [Additional function] ▶ [Volume flow lowcut]

Sets the volume flow low cut-off.

|   | Value          | Description                                                   |
|---|----------------|---------------------------------------------------------------|
| – | Numeric digits | Value below which the volume flow is set to zero by Rotamass. |

**Volume flow user unit**

⌚ [Detailed setup] ▶ [Pro var] ▶ [Vol] ▶ [Add func] ▶ [User unit]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Process variables] ▶ [Volume flow] ▶ [Additional function] ▶ [Volume flow user unit]

Sets the user-defined unit name.

Only effective when Volume flow unit is set to User-defined unit.

|   | Value            | Description                     |
|---|------------------|---------------------------------|
| – | ASCII characters | Maximum length is 8 characters. |

**Volume flow user unit conversion factor**

⌚ [Detailed setup] ▶ [Pro var] ▶ [Vol] ▶ [Add func] ▶ [Conv factor]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Process variables] ▶ [Volume flow] ▶ [Additional function] ▶ [Volume flow user unit conversion factor]

Sets the conversion factor for the volume flow user-defined unit.

|   | Value          | Description         |
|---|----------------|---------------------|
| – | Numeric digits | Default value is 1. |

**Volume flow bi-directional mode**

① [Detailed setup] ► [Pro var] ► [Vol] ► [Add func] ► [Bi-dir mode]

④ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Volume flow] ► [Additional function] ► [Volume flow bi-directional mode]

Sets the direction of the volume flow when setting the analog or frequency output.

|   | Value                                      | Description                                                                                                    |
|---|--------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| – | Not active<br>[Not active]<br>[Not active] | Sets direction of volume flow to single direction.<br>Default value.                                           |
| – | Active<br>[Active]<br>[Active]             | Sets direction of volume flow to bi-directional.<br>Volume flow URV and Volume flow LRV must be the same sign. |

**Volume flow damping pulse/total**

① [Detailed setup] ► [Pro var] ► [Vol] ► [Add func] ► [Damp pls/ttl]

④ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Volume flow] ► [Additional function] ► [Volume flow damping pulse/total]

Sets the damping constant for the volume flow value for pulse output and total.

The value is the time it takes for the output value to become 63.2 % of the total amount of change.

|   | Value          | Description                                              |
|---|----------------|----------------------------------------------------------|
| – | Numeric digits | Setting range: 0.0 – 200.0 s.<br>Default value is 0.0 s. |

**Volume flow trim select**

① [Detailed setup] ► [Pro var] ► [Vol] ► [Add func] ► [Trim sel]

④ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Volume flow] ► [Additional function] ► [Volume flow trim select]

Enables or disables the volume flow trim.

|   | Value                             | Description                                      |
|---|-----------------------------------|--------------------------------------------------|
| – | Inhibit<br>[Inhibit]<br>[Inhibit] | Disables the volume flow trim.<br>Default value. |
| – | Enable<br>[Enable]<br>[Enable]    | Enables the volume flow trim.                    |

**Volume flow trim offset**

① [Detailed setup] ► [Pro var] ► [Vol] ► [Add func] ► [Trim offset]

④ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Volume flow] ► [Additional function] ► [Volume flow trim offset]

Sets the volume flow zero offset value.

Only effective if *Volume flow trim select* is set to Enable.

|   | Value          | Description                                                             |
|---|----------------|-------------------------------------------------------------------------|
| – | Numeric digits | Value that is added to the volume flow.<br>Default value is 0.000e+000. |

### Volume flow trim gain

⌚ [Detailed setup] ► [Pro var] ► [Vol] ► [Add func] ► [Trim gain]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Volume flow] ► [Additional function] ► [Volume flow trim gain]

Sets the volume flow span offset value.

Only effective if *Volume flow trim select* is set to Enable.

|   | Value          | Description                                                                           |
|---|----------------|---------------------------------------------------------------------------------------|
| – | Numeric digits | Factor for manually adjusting a scaling error by Rotamass.<br>Default value is 1.000. |

### Pressure

Menu for configuring the pressure measurement.

The following menus/settings are available:

|   | Full name            | Display name | [Modbus] name          | Page    |
|---|----------------------|--------------|------------------------|---------|
| – | Pressure unit        | [Unit]       | [Pressure unit]        | [▶ 402] |
| – | Pressure LRV         | [LRV]        | [Pressure LRV]         | [▶ 403] |
| – | Pressure URV         | [URV]        | [Pressure URV]         | [▶ 403] |
| – | Pressure damping     | [Damp]       | [Pressure damping]     | [▶ 404] |
| – | Pressure fixed value | [Fix val]    | [Pressure fixed value] | [▶ 404] |
| – | Additional function  | [Add func]   | [Additional function]  | [▶ 405] |

### Pressure unit

⌚ [Detailed setup] ► [Pro var] ► [Pres] ► [Unit]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Pressure] ► [Pressure unit]

Sets the pressure unit.



The unit displayed on the LCD may vary depending on the setting of the parameter *Display unit selection*. During Modbus communication, the actually displayed unit may vary depending on the Modbus tool. For details, refer to *Units of the parameters* [▶ 819].

| Value                | Description                                                |
|----------------------|------------------------------------------------------------|
| – inH2O(68°F)        | Sets the displayed Pressure unit.<br>Default value is bar. |
| – inHg               |                                                            |
| – ftH2O(68°F)        |                                                            |
| – mmH2O(68°F)        |                                                            |
| – mmHg               |                                                            |
| – psi                |                                                            |
| – bar                |                                                            |
| – mbar               |                                                            |
| – g/cm <sup>2</sup>  |                                                            |
| – kg/cm <sup>2</sup> |                                                            |
| – Pa                 |                                                            |
| – kPa                |                                                            |
| – torr               |                                                            |
| – atm                |                                                            |
| – MPa                |                                                            |
| – inH2O              |                                                            |
| – mmH2O              |                                                            |
| – ftH2O              |                                                            |
| – hPa                |                                                            |

### Pressure LRV

① [Detailed setup] ► [Pro var] ► [Pres] ► [LRV]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Pressure] ► [Pressure LRV]

Sets the lower range value, 0 %, for scaling the analog and frequency output during pressure measurement.

| Value            | Description                                                                    |
|------------------|--------------------------------------------------------------------------------|
| ② Numeric digits | Default value is 0.<br>Setting must satisfy the following condition: URV ≠ LRV |

### Pressure URV

① [Detailed setup] ► [Pro var] ► [Pres] ► [URV]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Pressure] ► [Pressure URV]

Sets the upper range value, 100 %, for scaling the analog and frequency output during pressure measurement.

| Value            | Description                                                                               |
|------------------|-------------------------------------------------------------------------------------------|
| – Numeric digits | Default value is 200 bar.<br>Settings must satisfy the following conditions:<br>URV ≠ LRV |

**Pressure damping**

Ⓛ [Detailed setup] ► [Pro var] ► [Pres] ► [Damp]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Pressure] ► [Pressure damping]

Sets the damping constant for pressure measurement. The value is the time it takes for this value to become 63.2 % of the total amount of change.

|   | Value          | Description                                              |
|---|----------------|----------------------------------------------------------|
| – | Numeric digits | Setting range: 0.0 – 200.0 s.<br>Default value is 3.0 s. |

**Pressure fixed value**

Ⓛ [Detailed setup] ► [Pro var] ► [Pres] ► [Fix val]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Pressure] ► [Pressure fixed value]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [► 271]
- *Basic setup* [► 325]
- Detailed setup
  - *Pressure* [► 404]
  - *Installation configuration* [► 379]

Sets the average static line pressure to compensate for the effect of the line pressure on mass flow and density. In case of gas measurement, no setting is required.

|   | Value          | Description                                                                                                                                                                                                                                                              |
|---|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | The value is automatically converted based on the unit setting.<br>Default value is 0.<br>When the value of the parameter Analog input function is not Pressure compensation and the device is not in simulation mode, this value is used for the pressure compensation. |



**Additional function**

Menu for configuring the pressure measurement in detail. Access to this menu and the parameters below is available if Apply has been set in the parameter *Process variables additional parameters*, see *Process variables* [▶ 380].

The following menus/settings are available:

|   | Full name                  | Display name    | [Modbus] name                | Page    |
|---|----------------------------|-----------------|------------------------------|---------|
| – | Absolute/Gauge select      | [Abs/Gauge sel] | [Absolute/Gauge select]      | [▶ 405] |
| – | Gas density pressure       | [Gas dens pres] | [Gas density pressure]       | [▶ 405] |
| – | Analog input pressure unit | [AI unit]       | [Analog input pressure unit] | [▶ 406] |
| – | Analog input pressure LRV  | [AI LRV]        | [Analog input pressure LRV]  | [▶ 406] |
| – | Analog input pressure URV  | [AI URV]        | [Analog input pressure URV]  | [▶ 407] |
| – | Pressure trim select       | [Trim sel]      | [Pressure trim select]       | [▶ 407] |
| – | Pressure trim offset       | [Trim offset]   | [Pressure trim offset]       | [▶ 407] |
| – | Pressure trim gain         | [Trim gain]     | [Pressure trim gain]         | [▶ 407] |

**Absolute/Gauge select**

⌚ [Detailed setup] ▶ [Pro var] ▶ [Pres] ▶ [Add func] ▶ [Abs/Gauge sel]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Process variables] ▶ [Pressure] ▶ [Additional function] ▶ [Absolute/Gauge select]

Make this setting only when the pressure is input as current from the pressure transmitter. Sets the type of pressure gauge to be used.

|   | Value                           | Description                               |
|---|---------------------------------|-------------------------------------------|
| – | Gauge<br>[Gauge]<br>[Gauge]     | Selects gauge pressure.<br>Default value. |
| – | Absolute<br>[Abs]<br>[Absolute] | Selects absolute pressure.                |

**Gas density pressure**

⌚ [Detailed setup] ▶ [Pro var] ▶ [Pres] ▶ [Add func] ▶ [Gas dens pres]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Process variables] ▶ [Pressure] ▶ [Additional function] ▶ [Gas density pressure]

Sets the pipe pressure, absolute pressure, when measuring gas. The unit set in the pressure unit is applied.

If Calculated value has been set in the Density value selection, density is calculated based on this value.

|   | Value          | Description                       |
|---|----------------|-----------------------------------|
| – | Numeric digits | Default value is 1.01325 bar abs. |

**Analog input pressure unit**

⌚ [Detailed setup] ► [Pro var] ► [Pres] ► [Add func] ► [AI unit]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Pressure] ► [Additional function] ► [Analog input pressure unit]

Sets the unit of the displayed pressure for the analog input signal.



The unit displayed on the LCD may vary depending on the setting of the parameter *Display unit selection*. During Modbus communication, the actually displayed unit may vary depending on the Modbus tool. For details, refer to *Units of the parameters* [▶ 819].

| Value                | Description                                                |
|----------------------|------------------------------------------------------------|
| – inH2O (68 °F)      | Sets the displayed Pressure unit.<br>Default value is bar. |
| – inHg               |                                                            |
| – ftH2O (68 °F)      |                                                            |
| – mmH2O (68 °F)      |                                                            |
| – mmHg               |                                                            |
| – psi                |                                                            |
| – bar                |                                                            |
| – mbar               |                                                            |
| – g/cm <sup>2</sup>  |                                                            |
| – kg/cm <sup>2</sup> |                                                            |
| – Pa                 |                                                            |
| – kPa                |                                                            |
| – torr               |                                                            |
| – atm                |                                                            |
| – MPa                |                                                            |
| – inH2O              |                                                            |
| – mmH2O              |                                                            |
| – ftH2O              |                                                            |
| – hPa                |                                                            |

**Analog input pressure LRV**

⌚ [Detailed setup] ► [Pro var] ► [Pres] ► [Add func] ► [AI LRV]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Pressure] ► [Additional function] ► [Analog input pressure LRV]

Sets the pressure to the equivalent of the 4 mA analog input signal.

It is effective if the device is equipped with a function for analog input to a remote terminal and Pressure for compensation has been set.

| Value            | Description                                                                            |
|------------------|----------------------------------------------------------------------------------------|
| – Numeric digits | Default value is 0 bar.<br>Settings must satisfy the following condition:<br>URV ≠ LRV |

**Analog input pressure URV**

① [Detailed setup] ► [Pro var] ► [Pres] ► [Add func] ► [AI URV]

② [Device root menu] ► [Detailed setup] ► [Process variables] ► [Pressure] ► [Additional function] ► [Analog input pressure URV]

Sets the pressure to the equivalent of the 20 mA analog input signal.

It is effective if the device is equipped with a function for analog input to a remote terminal and Pressure for compensation has been set.

|   | Value          | Description                                                                                                                          |
|---|----------------|--------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | Settings must satisfy the following condition:<br>Analog input pressure URV ≠ Analog input pressure LRV<br>Default value is 200 bar. |

**Pressure trim select**

① [Detailed setup] ► [Pro var] ► [Pres] ► [Add func] ► [Trim sel]

② [Device root menu] ► [Detailed setup] ► [Process variables] ► [Pressure] ► [Additional function] ► [Pressure trim select]

Enables or disables the pressure offset.

|   | Value                | Description                                   |
|---|----------------------|-----------------------------------------------|
| – | Inhibit<br>[Inhibit] | Disables the pressure trim.<br>Default value. |
| – | Enable<br>[Enable]   | Enables the pressure trim.                    |

**Pressure trim offset**

① [Detailed setup] ► [Pro var] ► [Pres] ► [Add func] ► [Trim offset]

② [Device root menu] ► [Detailed setup] ► [Process variables] ► [Pressure] ► [Additional function] ► [Pressure trim offset]

Sets the pressure zero offset value.

|   | Value          | Description                                                          |
|---|----------------|----------------------------------------------------------------------|
| – | Numeric digits | Value that is added to the pressure.<br>Default value is 0.000e+000. |

**Pressure trim gain**

① [Detailed setup] ► [Pro var] ► [Pres] ► [Add func] ► [Trim gain]

② [Device root menu] ► [Detailed setup] ► [Process variables] ► [Pressure] ► [Additional function] ► [Pressure trim gain]

Sets the pressure span offset value.

Only effective if Pressure trim select is set to Enable.

|   | Value          | Description                                                                                         |
|---|----------------|-----------------------------------------------------------------------------------------------------|
| – | Numeric digits | Factor for manually adjusting a scaling error by Rotamass Total Insight.<br>Default value is 1.000. |

### Reference density

Menu for configuring the reference density measurement.

The Rotamass Total Insight transmitter can calculate the density of the measured medium at a reference temperature if the corresponding density function can be approximated by a quadratic polynomial of the form:

$$\rho_{ref} = \rho / (1 + A (t - t_{ref}) + B (t - t_{ref})^2)$$

$\rho_{ref}$  : density at reference temperature

$\rho$  : measured density

$t$  : measured temperature

$t_{ref}$  : reference temperature

$A$  : linear coefficient

$B$  : quadratic coefficient

The corresponding reference temperature, reference density and coefficients can be accessed through this menu.

|   | Full name                 | Display name   | [Modbus] name               | Page   |
|---|---------------------------|----------------|-----------------------------|--------|
| – | Reference density LRV     | [LRV]          | [Reference density LRV]     | [ 408] |
| – | Reference density URV     | [URV]          | [Reference density URV]     | [ 408] |
| – | Reference density damping | [Damp]         | [Reference density damping] | [ 409] |
| – | Reference temperature     | [Ref temp]     | [Reference temperature]     | [ 409] |
| – | Temperature coefficient A | [Temp coeff A] | [Temperature coeff A]       | [ 409] |
| – | Temperature coefficient B | [Temp coeff B] | [Temperature coeff B]       | [ 409] |
| – | Additional function       | [Add func]     | [Additional function]       | [ 410] |

### Reference density LRV

Ⓐ [Detailed setup] ► [Pro var] ► [Ref dens] ► [LRV]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Reference density] ► [Reference density LRV]

Sets the low range value, 0%, for scaling the analog and frequency output during the reference density measurement.

|   | Value          | Description                                                                        |
|---|----------------|------------------------------------------------------------------------------------|
| – | Numeric digits | Default value is 0.<br>Settings must satisfy the following condition:<br>URV ≠ LRV |

### Reference density URV

Ⓐ [Detailed setup] ► [Pro var] ► [Ref dens] ► [URV]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Reference density] ► [Reference density URV]

Sets the upper range value, 100%, for scaling the analog and frequency output during reference density measurement.

When Reference density is set to the Channel of AI 1-6: Sets the upper range value, 100%, for scaling the frequency output during reference density measurement.

|   | Value          | Description                |
|---|----------------|----------------------------|
| – | Numeric digits | Default value is 1.5 kg/l. |

### Reference density damping

① [Detailed setup] ► [Pro var] ► [Ref dens] ► [Damp]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Reference density] ► [Reference density damping]

Sets the damping constant for the reference density measurement. The value is the time it takes for this value to become 63.2 % of the total amount of change.

|   | Value          | Description                                              |
|---|----------------|----------------------------------------------------------|
| – | Numeric digits | Setting range: 0.0 – 200.0 s.<br>Default value is 3.0 s. |

### Reference temperature

① [Detailed setup] ► [Pro var] ► [Ref dens] ► [Ref temp]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Reference density] ► [Reference temperature]

Sets the reference temperature.

|   | Value          | Description                                                                              |
|---|----------------|------------------------------------------------------------------------------------------|
| – | Numeric digits | Temperature at which the reference density is determined.<br>Default value is 25.0 degC. |

### Temperature coefficient A

① [Detailed setup] ► [Pro var] ► [Ref dens] ► [Temp coeff A]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Reference density] ► [Temperature coeff A]

Sets the primary temperature coefficient for the density of the liquid.

Sets density variation per 1 °C rise in liquid temperature.

|   | Value          | Description                  |
|---|----------------|------------------------------|
| – | Numeric digits | Default value is 0.000e+000. |

### Temperature coefficient B

① [Detailed setup] ► [Pro var] ► [Ref dens] ► [Temp coeff B]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Reference density] ► [Temperature coeff B]

Sets the secondary temperature coefficient for the density of the liquid.

Sets density variation per 1 °C rise in liquid temperature.

|   | Value          | Description                  |
|---|----------------|------------------------------|
| – | Numeric digits | Default value is 0.000e+000. |

**Additional function**

Menu for configuring the reference density measurement in detail. Access to this menu and the parameters below is available if Apply has been set in the parameter *Process variables additional parameters*, see *Process variables* [▶ 380].

The following menus/settings are available:

|   | Full name                      | Display name  | [Modbus] name                    | Page    |
|---|--------------------------------|---------------|----------------------------------|---------|
| – | Reference density low cut      | [Lowcut]      | [Reference density lowcut]       | [▶ 410] |
| – | Reference density value select | [Val sel]     | [Reference density value select] | [▶ 410] |
| – | Reference density fixed value  | [Fix val]     | [Reference density fixed value]  | [▶ 411] |
| – | Reference pressure             | [Ref pres]    | [Reference pressure]             | [▶ 411] |
| – | Reference density trim select  | [Trim sel]    | [Reference density trim select]  | [▶ 411] |
| – | Reference density trim offset  | [Trim offset] | [Reference density trim offset]  | [▶ 412] |
| – | Reference density trim gain    | [Trim gain]   | [Reference density trim gain]    | [▶ 412] |

**Reference density low cut**

Ⓛ [Detailed setup] ▶ [Pro var] ▶ [Ref dens] ▶ [Add func] ▶ [Lowcut]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Process variables] ▶ [Reference density] ▶ [Additional function] ▶ [Reference density lowcut]

Sets the reference density low cut.

|   | Value          | Description                                                                                                                                     |
|---|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | Value below which the density is set to 0.<br>Settings must satisfy the following condition:<br>Reference density low cut $\leq 0.5\text{kg/l}$ |

**Reference density value select**

Ⓛ [Detailed setup] ▶ [Pro var] ▶ [Ref dens] ▶ [Add func] ▶ [Val sel]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Process variables] ▶ [Reference density] ▶ [Additional function] ▶ [Reference density value select]

Sets whether to use the reference density value or a preset fixed value.

For gas measurements, set this parameter to Fixed value and set Fixed value of reference density to Fixed reference density. If measured value is selected, the formula described in the Calculated Value of *Additional function* [▶ 390] is applied.

|   | Value                                            | Description                                                                                                                                                            |
|---|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Measured value<br>[Meas val]<br>[Measured value] | A reference density value calculated from the measured density is used.<br>Temperature coefficient A or Temperature coefficient B must be set to a value other than 0. |

|   | Value                                     | Description                                                     |
|---|-------------------------------------------|-----------------------------------------------------------------|
| – | Fixed value<br>[Fix val]<br>[Fixed value] | Preset fixed reference density value is used.<br>Default value. |

**Reference density fixed value**

① [Detailed setup] ► [Pro var] ► [Ref dens] ► [Add func] ► [Fix val]

④ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Reference density] ► [Additional function] ► [Reference density fixed value]

Sets a fixed reference density value.

When Reference density fixed value is selected, the volume flow of a gas can be calculated from the mass flow and the temperature/pressure using the ideal gas equation.

Set the reference density fixed value in the reference state of the measuring fluid (reference state is different by normal or standard).

For liquid measurements enter the reference density value if anything prevents the density measurement from being performed.

Please note, *reference density low-cut* [▶ 410] affects reference density fixed value. Make sure reference density low-cut value is below reference density fixed value.

|   | Value          | Description         |
|---|----------------|---------------------|
| – | Numeric digits | Default value is 1. |

**Reference pressure**

① [Detailed setup] ► [Pro var] ► [Ref dens] ► [Add func] ► [Ref pres]

④ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Reference density] ► [Additional function] ► [Reference pressure]

Sets the reference pressure.

For gas measurements, set the value of the reference pressure (absolute pressure).

|   | Value          | Description                   |
|---|----------------|-------------------------------|
| – | Numeric digits | Default value is 1.01325 bar. |

**Reference density trim select**

① [Detailed setup] ► [Pro var] ► [Ref dens] ► [Add func] ► [Trim sel]

④ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Reference density] ► [Additional function] ► [Reference density trim select]

Enables or disables the reference density offset.

|   | Value                             | Description                                            |
|---|-----------------------------------|--------------------------------------------------------|
| – | Inhibit<br>[Inhibit]<br>[Inhibit] | Disables the reference density trim.<br>Default value. |
| – | Enable<br>[Enable]<br>[Enable]    | Enables the reference density trim.                    |

**Reference density trim offset**

Ⓐ [Detailed setup] ► [Pro var] ► [Ref dens] ► [Add func] ► [Trim offset]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Reference density] ► [Additional function] ► [Reference density trim offset]

Sets the reference density zero offset value.

Only effective if *Reference density trim select* is set to Enable.

|   | Value          | Description                  |
|---|----------------|------------------------------|
| – | Numeric digits | Default value is 0.000e+000. |

**Reference density trim gain**

Ⓐ [Detailed setup] ► [Pro var] ► [Ref dens] ► [Add func] ► [Trim gain]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Reference density] ► [Additional function] ► [Reference density trim gain]

Sets the reference density span offset value.

Only effective if *Reference density trim select* is set to Enable.

|   | Value          | Description                                                                                         |
|---|----------------|-----------------------------------------------------------------------------------------------------|
| – | Numeric digits | Factor for manually adjusting a scaling error by Rotamass Total Insight.<br>Default value is 1.000. |

**Relative density**

Menu for configuring the relative density measurement.

The density of the processed medium at a selected standard temperature that is different from the current process temperature can be calculated from a known temperature dependence.

The following menus/settings are available:

|   | Full name                                   | Display name         | [Modbus] name                                 | Page    |
|---|---------------------------------------------|----------------------|-----------------------------------------------|---------|
| – | Relative density indication/equation select | [Disp ind & equ sel] | [Relative density indication/equation select] | [▶ 412] |
| – | Relative density LRV                        | [LRV]                | [Relative density LRV]                        | [▶ 414] |
| – | Relative density URV                        | [URV]                | [Relative density URV]                        | [▶ 414] |
| – | Relative density damping                    | [Damp]               | [Relative density damping]                    | [▶ 415] |
| – | Relative density reference select           | [Ref sel]            | [Relative density reference select]           | [▶ 415] |
| – | Additional function                         | [Add func]           | [Additional function]                         | [▶ 415] |

**Relative density indication/equation select**

Ⓐ [Detailed setup] ► [Pro var] ► [Rel dens] ► [Disp ind & equ sel]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Relative density] ► [Relative density indication/equation select]

Sets the unit of measure for relative density.





The unit displayed on the LCD may vary depending on the setting of the parameter *Display unit selection*. During Modbus communication, the actually displayed unit may vary depending on the Modbus tool. For details, refer to *Units of the parameters* [▶ 819].

| Relative density indication/equation select | Relative density reference select |          | Reference density value select is set to Measured value and Reference temperature |       |             |
|---------------------------------------------|-----------------------------------|----------|-----------------------------------------------------------------------------------|-------|-------------|
|                                             | Actual dens                       | Ref dens | 60 °F                                                                             | 15 °C | Other temp. |
| No Function                                 | x                                 | x        | x                                                                                 | x     | x           |
| SG 4 °C                                     | x                                 | x        | x                                                                                 | x     | x           |
| SG 15 °C                                    | x                                 | x        | x                                                                                 | x     | x           |
| SG 20 °C                                    | x                                 | x        | x                                                                                 | x     | x           |
| SG 60 °F                                    | x                                 | x        | x                                                                                 | x     | x           |
| °API                                        | -                                 | x        | x                                                                                 | -     | -           |
| °Béhv                                       | -                                 | x        | x                                                                                 | -     | -           |
| °Bélt                                       | -                                 | x        | x                                                                                 | -     | -           |
| Bh                                          | -                                 | x        | -                                                                                 | x     | -           |
| Bl                                          | -                                 | x        | -                                                                                 | x     | -           |
| °Sake                                       | -                                 | x        | -                                                                                 | x     | -           |

x : available

- : configuration error

|   | Value                                                   | Description                                                                                                                        |
|---|---------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| - | No func<br>[No func]<br>[No function]                   | Do not measure relative density. Value of relative density is zero.                                                                |
| - | SG 4 °C Specific gravity<br>[sg 4 °c]<br>[SG 4 degC]    | Specific gravity relative to 4 °C water.<br>Dimensionless<br>Default value.                                                        |
| - | SG 15 °C Specific gravity<br>[sg 15 °c]<br>[SG 15 degC] | Specific gravity relative to 15 °C water.<br>Dimensionless                                                                         |
| - | SG 20 °C Specific gravity<br>[sg 20 °c]<br>[SG 20 degC] | Specific gravity relative to 20 °C water.<br>Dimensionless                                                                         |
| - | SG 60 °F Specific gravity<br>[sg 60 °F]<br>[SG 60degF]  | Specific gravity relative to 60 °F (15.56 °C) water.<br>Dimensionless                                                              |
| - | °API<br>[°API]<br>[degAPI]                              | °API units are used for quantifying the mass densities of mineral oils.<br>°API = 141.5 / SG (60 / 60 °F) - 131.5<br>Dimensionless |

|   | Value                    | Description                                                                |
|---|--------------------------|----------------------------------------------------------------------------|
|   | °Baumé heavy             | °Baumé heavy is used for liquids heavier than water.                       |
| – | [°Bé hv]<br>[degBaum hv] | °Bé hv = $145 - 145 / (\text{SG } (60 / 60 \text{ °F}))$<br>Dimensionless. |
|   | °Baumé light             | °Bé lt = $140 / (\text{SG } (60 / 60 \text{ °F})) - 130$                   |
| – | [°Bé lt]<br>[degBaum lt] | Dimensionless                                                              |
|   | °Baumé heavy for JIS     | °Baumé heavy for JIS Z 8804:2012                                           |
| – | [Bh]<br>[Bh]             | Bh = $144.3 - 144.3 / (\text{SG } (15 / 4 \text{ °C}))$<br>Dimensionless   |
|   | °Baumé light for JIS     | °Baumé light for JIS Z 8804:2012                                           |
| – | [Bl]<br>[Bl]             | Bl = $144.3 / (\text{SG } (15 / 4 \text{ °C})) - 134.3$<br>Dimensionless   |
|   | °Sake                    | °Sake units are used for quantifying the mass densities of sake.           |
| – | [°Sake]<br>[degSake]     | °Sake = $1443 / (\text{SG } (15 / 4 \text{ °C})) - 1443$<br>Dimensionless  |

### Relative density LRV

⌚ [Detailed setup] ► [Pro var] ► [Rel dens] ► [LRV]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ►  
[Relative density] ► [Relative density LRV]

Sets the reference density to the lower range value, 0 %, for the scaling of the analog and frequency output for relative density measurement.

|   | Value          | Description                                                                        |
|---|----------------|------------------------------------------------------------------------------------|
| – | Numeric digits | Default value is 0.<br>Settings must satisfy the following condition:<br>URV ≠ LRV |

### Relative density URV

⌚ [Detailed setup] ► [Pro var] ► [Rel dens] ► [URV]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ►  
[Relative density] ► [Relative density URV]

Sets the upper range value, 100 %, for the scaling of the analog and frequency output for relative density measurement.

|   | Value          | Description                                                                           |
|---|----------------|---------------------------------------------------------------------------------------|
| – | Numeric digits | Default value is 100.<br>Settings must satisfy the following conditions:<br>URV ≠ LRV |

**Relative density damping**

⌚ [Detailed setup] ► [Pro var] ► [Rel dens] ► [Damp]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Relative density] ► [Relative density damping]

Sets the damping constant for the relative density measurement. The value is the time it takes for this value to become 63.2 % of the total amount of change.

|   | Value          | Description                                              |
|---|----------------|----------------------------------------------------------|
| – | Numeric digits | Setting range: 0.0 – 200.0 s.<br>Default value is 3.0 s. |

**Relative density reference select**

⌚ [Detailed setup] ► [Pro var] ► [Rel dens] ► [Ref sel]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Relative density] ► [Relative density reference select]

Sets Relative Density.

|   | Value                                                  | Description                                                                |
|---|--------------------------------------------------------|----------------------------------------------------------------------------|
| – | Actual density<br>[Actual dens]<br>[Actual density]    | Relative Density is calculated using the Actual density.<br>Default value. |
| – | Reference density<br>[Ref dens]<br>[Reference density] | Relative Density is calculated using the Reference density.                |

**Additional function**

Menu for configuring the relative density measurement in detail. Access to this menu and the parameters below is available if Apply has been set in the parameter *Process variables additional parameters*, see *Process variables* [▶ 380].

The following menus/settings are available:

|   | Full name                    | Display name  | [Modbus] name                  | Page    |
|---|------------------------------|---------------|--------------------------------|---------|
| – | Relative density trim select | [Trim sel]    | [Relative density trim select] | [▶ 415] |
| – | Relative density trim offset | [Trim offset] | [Relative density trim offset] | [▶ 416] |
| – | Relative density trim gain   | [Trim gain]   | [Relative density trim gain]   | [▶ 416] |

**Relative density trim select**

⌚ [Detailed setup] ► [Pro var] ► [Rel dens] ► [Add func] ► [Trim sel]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Relative density] ► [Additional function] ► [Relative density trim select]

Enables or disables the relative density offset.

|   | Value                                    | Description                                       |
|---|------------------------------------------|---------------------------------------------------|
| – | <b>Inhibit</b><br>[Inhibit]<br>[Inhibit] | Disables Relative density trim.<br>Default value. |
| – | <b>Enable</b><br>[Enable]<br>[Enable]    | Enables Relative density trim.                    |

### Relative density trim offset

Ⓛ [Detailed setup] ► [Pro var] ► [Rel dens] ► [Add func] ► [Trim offset]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Relative density] ► [Additional function] ► [Relative density trim offset]

Sets the relative density trim offset value.

|   | Value          | Description                                                                  |
|---|----------------|------------------------------------------------------------------------------|
| – | Numeric digits | Value that is added to the relative density.<br>Default value is 0.000e+000. |

### Relative density trim gain

Ⓛ [Detailed setup] ► [Pro var] ► [Rel dens] ► [Add func] ► [Trim gain]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Relative density] ► [Additional function] ► [Relative density trim gain]

Sets the relative density span offset value.

Only effective if *Relative density trim select* is set to Enable.

|   | Value          | Description                                                                                         |
|---|----------------|-----------------------------------------------------------------------------------------------------|
| – | Numeric digits | Factor for manually adjusting a scaling error by Rotamass Total Insight.<br>Default value is 1.000. |

### Corrected volume flow

Menu for configuring the corrected volume flow measurement.

The following menus/settings are available:

|   | Full name                     | Display name | [Modbus] name                   | Page    |
|---|-------------------------------|--------------|---------------------------------|---------|
| – | Corrected volume flow unit    | [Unit]       | [Corrected volume flow unit]    | [▶ 417] |
| – | Corrected volume flow LRV     | [LRV]        | [Corrected volume flow LRV]     | [▶ 417] |
| – | Corrected volume flow URV     | [URV]        | [Corrected volume flow URV]     | [▶ 418] |
| – | Corrected volume flow damping | [Damp]       | [Corrected volume flow damping] | [▶ 418] |
| – | Additional function           | [Add func]   | [Additional function]           | [▶ 419] |

**Corrected volume flow unit**

① [Detailed setup] ► [Pro var] ► [Corr vol] ► [Unit]

② [Device root menu] ► [Detailed setup] ► [Process variables] ► [Corrected volume flow] ► [Corrected volume flow unit]

Sets the corrected reference volume flow unit.



The unit displayed on the LCD may vary depending on the setting of the parameter *Display unit selection*. During Modbus communication, the actually displayed unit may vary depending on the Modbus tool. For details, refer to *Units of the parameters* [► 819].

| Value                            | Description                                                                                                                                                                                                                   |
|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – L/s(normal)                    | Sets the displayed Corrected volume flow unit.<br>Regardless of the unit selected here, the calculation is performed using the reference density fixed value set in [► 411].<br>Default value is m <sup>3</sup> /h(standard). |
| – L/min(normal)                  |                                                                                                                                                                                                                               |
| – L/h(normal)                    |                                                                                                                                                                                                                               |
| – L/d(normal)                    |                                                                                                                                                                                                                               |
| – m <sup>3</sup> /s(normal)      |                                                                                                                                                                                                                               |
| – m <sup>3</sup> /min(normal)    |                                                                                                                                                                                                                               |
| – m <sup>3</sup> /h(normal)      |                                                                                                                                                                                                                               |
| – m <sup>3</sup> /d(normal)      |                                                                                                                                                                                                                               |
| – L/s(standard)                  |                                                                                                                                                                                                                               |
| – L/min(standard)                |                                                                                                                                                                                                                               |
| – L/h(standard)                  |                                                                                                                                                                                                                               |
| – L/d(standard)                  |                                                                                                                                                                                                                               |
| – ft <sup>3</sup> /s(standard)   |                                                                                                                                                                                                                               |
| – ft <sup>3</sup> /min(standard) |                                                                                                                                                                                                                               |
| – ft <sup>3</sup> /h(standard)   |                                                                                                                                                                                                                               |
| – ft <sup>3</sup> /d(standard)   |                                                                                                                                                                                                                               |
| – MMscuft/s                      |                                                                                                                                                                                                                               |
| – MMscuft/min                    |                                                                                                                                                                                                                               |
| – MMscuft/h                      |                                                                                                                                                                                                                               |
| – MMscuft/d                      |                                                                                                                                                                                                                               |
| – m <sup>3</sup> /s(standard)    |                                                                                                                                                                                                                               |
| – m <sup>3</sup> /min(standard)  |                                                                                                                                                                                                                               |
| – m <sup>3</sup> /h(standard)    |                                                                                                                                                                                                                               |
| – m <sup>3</sup> /d(standard)    |                                                                                                                                                                                                                               |
| – User Unit                      |                                                                                                                                                                                                                               |

**Corrected volume flow LRV**

① [Detailed setup] ► [Pro var] ► [Corr vol] ► [LRV]

② [Device root menu] ► [Detailed setup] ► [Process variables] ► [Corrected volume flow] ► [Corrected volume flow LRV]

Sets the lower range value, 0 %, for the scaling of the analog, frequency and pulse outputs for corrected volume flow measurement.

|   | Value          | Description                                                                                                                                                                                                   |
|---|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | <p>Default value is 0.</p> <p>When measuring reverse flow, a negative value for Corrected volume flow LRV can be set.</p> <p>Settings must satisfy the following condition:<br/>URV <math>\neq</math> LRV</p> |

**Corrected volume flow URV**

⌚ [Detailed setup] ► [Pro var] ► [Corr vol] ► [URV]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ►  
[Corrected volume flow] ► [Corrected volume flow URV]

Sets the upper range value, 100 %, for the scaling of the analog, frequency and pulse outputs for corrected volume flow measurement.

|   | Value          | Description                                                                                                     |
|---|----------------|-----------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | <p>Default value is 10.</p> <p>Settings must satisfy the following condition:<br/>URV <math>\neq</math> LRV</p> |

**Corrected volume flow damping**

⌚ [Detailed setup] ► [Pro var] ► [Corr vol] ► [Damp]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ►  
[Corrected volume flow] ► [Corrected volume flow damping]

Sets the damping time constant in seconds for analog output and frequency output. Damping time constant is the time it takes to reach 63.2 % of the total change for step variation.

|   | Value          | Description                                                       |
|---|----------------|-------------------------------------------------------------------|
| – | Numeric digits | <p>Setting range: 0.0 – 200.0 s.</p> <p>Default value is 3.0s</p> |

**Additional function**

Menu for configuring the corrected volume flow measurement in detail. Access to this menu and the parameters below is available if Apply has been set in the parameter *Process variables additional parameters*, see *Process variables* [▶ 380].

The following menus/settings are available:

|   | Full name                                         | Display name   | [Modbus] name                                       | Page    |
|---|---------------------------------------------------|----------------|-----------------------------------------------------|---------|
| – | Corrected volume flow low cut                     | [Lowcut]       | [Corrected volume flow lowcut]                      | [▶ 419] |
| – | Corrected volume flow user unit                   | [User unit]    | [Corrected volume flow user unit]                   | [▶ 419] |
| – | Corrected volume flow user unit conversion factor | [Conv factor]  | [Corrected volume flow user unit conversion factor] | [▶ 420] |
| – | Corrected volume flow bi-directional mode         | [Bi-dir mode]  | [Corrected volume flow bi-directional mode]         | [▶ 420] |
| – | Corrected volume flow damping pulse/total         | [Damp pls/ttl] | [Corrected volume flow damping pulse/total]         | [▶ 420] |
| – | Corrected volume flow trim select                 | [Trim sel]     | [Corrected volume flow trim select]                 | [▶ 420] |
| – | Corrected volume flow trim offset                 | [Trim offset]  | [Corrected volume flow trim offset]                 | [▶ 421] |
| – | Corrected volume flow trim gain                   | [Trim gain]    | [Corrected volume flow trim gain]                   | [▶ 421] |

**Corrected volume flow lowcut**

⌚ [Detailed setup] ▶ [Pro var] ▶ [Corr vol] ▶ [Add func] ▶ [Lowcut]

⊕ [Device root menu] ▶ [Detailed setup] ▶ [Process variables] ▶ [Corrected volume flow] ▶ [Additional function] ▶ [Corrected volume flow lowcut]

Sets the corrected volume flow low cut-off.

|   | Value          | Description                                                 |
|---|----------------|-------------------------------------------------------------|
| – | Numeric digits | Value below which the corrected volume flow is set to zero. |

**Corrected volume flow user unit**

⌚ [Detailed setup] ▶ [Pro var] ▶ [Corr vol] ▶ [Add func] ▶ [User unit]

⊕ [Device root menu] ▶ [Detailed setup] ▶ [Process variables] ▶ [Corrected volume flow] ▶ [Additional function] ▶ [Corrected volume flow user unit]

Sets the user-defined unit name.

Corrected volume flow user-defined unit is effective when *Corrected volume flow user unit* is set to User-defined unit.

|   | Value            | Description                     |
|---|------------------|---------------------------------|
| – | ASCII characters | Maximum length is 8 characters. |

**Corrected volume flow user unit conversion factor**

Ⓛ [Detailed setup] ► [Pro var] ► [Corr vol] ► [Add func] ► [Conv factor]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Corrected volume flow] ► [Additional function] ► [Corrected volume flow user unit conversion factor]

Sets the conversion factor for the corrected volume flow user-defined unit.

|   | Value          | Description         |
|---|----------------|---------------------|
| – | Numeric digits | Default value is 1. |

**Corrected volume flow bi-directional mode**

Ⓛ [Detailed setup] ► [Pro var] ► [Corr vol] ► [Add func] ► [Bi-dir mode]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Corrected volume flow] ► [Additional function] ► [Corrected volume flow bi-directional mode]

Sets the direction of the corrected volume flow when setting analog output or frequency output.

|   | Value                                      | Description                                                                                                                                          |
|---|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Not active<br>[Not active]<br>[Not active] | Sets the direction of the corrected volume flow to single direction.<br>Default value.                                                               |
| – | Active<br>[Active]<br>[Active]             | Sets the direction of the corrected volume flow to bi-directional.<br>Corrected volume flow URV and Corrected volume flow LRV must be the same sign. |

**Corrected volume flow damping pulse/total**

Ⓛ [Detailed setup] ► [Pro var] ► [Corr vol] ► [Add func] ► [Damp pls/ttl]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Corrected volume flow] ► [Additional function] ► [Corrected volume flow damping pulse/total]

Sets the damping time constant in seconds for pulse output and total. Damping time constant is the time it takes to reach 63.2 % of the total change for step variation.

|   | Value          | Description                                              |
|---|----------------|----------------------------------------------------------|
| – | Numeric digits | Setting range: 0.0 – 200.0 s.<br>Default value is 0.0 s. |

**Corrected volume flow trim select**

Ⓛ [Detailed setup] ► [Pro var] ► [Corr vol] ► [Add func] ► [Trim sel]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Corrected volume flow] ► [Additional function] ► [Corrected volume trim select]

Enables or disables the corrected volume flow offset.



|   | Value                             | Description                                                |
|---|-----------------------------------|------------------------------------------------------------|
| – | Inhibit<br>[Inhibit]<br>[Inhibit] | Disables the corrected volume flow trim.<br>Default value. |
| – | Enable<br>[Enable]<br>[Enable]    | Enables the corrected volume flow trim.                    |

**Corrected volume flow trim offset**

① [Detailed setup] ► [Pro var] ► [Corr vol] ► [Add func] ► [Trim offset]

② [Device root menu] ► [Detailed setup] ► [Process variables] ► [Corrected volume flow] ► [Additional function] ► [Corrected volume flow trim offset]

Sets the corrected volume flow zero offset value.

|   | Value          | Description                  |
|---|----------------|------------------------------|
| – | Numeric digits | Default value is 0.000e+000. |

**Corrected volume flow trim gain**

① [Detailed setup] ► [Pro var] ► [Corr vol] ► [Add func] ► [Trim gain]

② [Device root menu] ► [Detailed setup] ► [Process variables] ► [Corrected volume flow] ► [Additional function] ► [Corrected volume flow trim gain]

Sets the corrected volume flow span offset value.

Only effective if *Corrected volume flow trim select* is set to Enable.

|   | Value          | Description                                                                                         |
|---|----------------|-----------------------------------------------------------------------------------------------------|
| – | Numeric digits | Factor for manually adjusting a scaling error by Rotamass Total Insight.<br>Default value is 1.000. |

**Calorific value**

Menu for configuring the calorific value measurement.

The following menus/settings are available:

|   | Full name             | Display name | [Modbus] name           | Page    |
|---|-----------------------|--------------|-------------------------|---------|
| – | Calorific unit        | [Unit]       | [Calorific unit]        | [► 421] |
| – | Calorific damping     | [Damp]       | [Calorific damping]     | [► 422] |
| – | Calorific fixed value | [Fix val]    | [Calorific fixed value] | [► 422] |
| – | Additional function   | [Add func]   | [Additional function]   | [► 422] |

**Calorific unit**

① [Detailed setup] ► [Pro var] ► [Cal] ► [Unit]

② [Device root menu] ► [Detailed setup] ► [Process variables] ► [Calorific value] ► [Calorific unit]

Sets the calorific unit.



The unit displayed on the LCD may vary depending on the setting of the parameter *Display unit selection*. During Modbus communication, the actually displayed unit may vary depending on the Modbus tool. For details, refer to *Units of the parameters* [▶ 819].

|   | Value                | Description                                                   |
|---|----------------------|---------------------------------------------------------------|
| – | MJ/kg                | Sets the displayed Calorific unit.<br>Default value is MJ/kg. |
| – | Btu/lb               |                                                               |
| – | MJ/m <sup>3</sup>    |                                                               |
| – | Btu/gal              |                                                               |
| – | MJ/Nm <sup>3</sup>   |                                                               |
| – | Btu/Sft <sup>3</sup> |                                                               |

### Calorific damping

Ⓛ [Detailed setup] ▶ [Pro var] ▶ [Cal] ▶ [Damp]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Process variables] ▶ [Calorific value] ▶ [Calorific damping]

Sets the damping time constant in seconds for analog output and frequency output. Damping time constant is the time it takes to reach 63.2 % of the total change for step variation.

|   | Value          | Description                                              |
|---|----------------|----------------------------------------------------------|
| – | Numeric digits | Setting range: 0.0 – 200.0 s.<br>Default value is 0.0 s. |

### Calorific fixed value

Ⓛ [Detailed setup] ▶ [Pro var] ▶ [Cal] ▶ [Fix val]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Process variables] ▶ [Calorific value] ▶ [Calorific fixed value]

Sets a fixed calorific value.

It is disabled if the device is equipped with a function for analog input to a remote terminal and Analog input select has been set to Calorific value.

|   | Value          | Description         |
|---|----------------|---------------------|
| – | Numeric digits | Default value is 0. |

### Additional function

Menu for configuring the calorific value measurement in detail. Access to this menu and the parameters below is available if Apply has been set in the parameter *Process variables additional parameters*.

The following menus/settings are available:

|   | Full name                   | Display name | [Modbus] name                 | Page    |
|---|-----------------------------|--------------|-------------------------------|---------|
| – | Analog input calorific unit | [AI unit]    | [Analog input calorific unit] | [▶ 423] |
| – | Analog input calorific LRV  | [AI LRV]     | [Analog input calorific LRV]  | [▶ 423] |
| – | Analog input calorific URV  | [AI URV]     | [Analog input calorific URV]  | [▶ 423] |

**Analog input calorific unit**

① [Detailed setup] ► [Pro var] ► [Cal] ► [Add func] ► [AI unit]

② [Device root menu] ► [Detailed setup] ► [Process variables] ► [Calorific value] ► [Additional function] ► [Analog input calorific unit]

*Analog input calorific unit* selects the unit of the displayed calorific for the analog input signal.

It is disabled if the device is equipped with a function for analog input to a remote terminal, and Analog input select has been set to Calorific value.



The unit displayed on the LCD may vary depending on the setting of the parameter *Display unit selection*. During Modbus communication, the actually displayed unit may vary depending on the Modbus tool. For details, refer to *Units of the parameters* [▶ 819].

|   | Value                | Description                                                                |
|---|----------------------|----------------------------------------------------------------------------|
| – | MJ/kg                | Sets the displayed Analog input calorific unit.<br>Default value is MJ/kg. |
| – | Btu/lb               |                                                                            |
| – | MJ/m <sup>3</sup>    |                                                                            |
| – | Btu/gal              |                                                                            |
| – | MJ/Nm <sup>3</sup>   |                                                                            |
| – | Btu/Sft <sup>3</sup> |                                                                            |

**Analog input calorific LRV**

① [Detailed setup] ► [Pro var] ► [Cal] ► [Add func] ► [AI LRV]

② [Device root menu] ► [Detailed setup] ► [Process variables] ► [Calorific value] ► [Additional function] ► [Analog input calorific LRV]

*Analog input calorific LRV* sets the calorific value to the equivalent of the 4 mA analog input signal.

It is disabled if the device is equipped with a function for analog input to a remote terminal and Analog input select has been set to Calorific value.

|   | Value          | Description                                                                         |
|---|----------------|-------------------------------------------------------------------------------------|
| – | Numeric digits | Default value is 0.<br>Settings must satisfy the following conditions:<br>URV ≠ LRV |

**Analog input calorific URV**

① [Detailed setup] ► [Pro var] ► [Cal] ► [Add func] ► [AI URV]

② [Device root menu] ► [Detailed setup] ► [Process variables] ► [Calorific value] ► [Additional function] ► [Analog input calorific URV]

*Analog input calorific URV* sets the calorific value to the equivalent of the 20 mA analog input signal.

It is disabled if the device is equipped with a function for analog input to a remote terminal and Analog input select has been set to Calorific value.

|   | Value          | Description                                                                          |
|---|----------------|--------------------------------------------------------------------------------------|
| – | Numeric digits | Default value is 50.<br>Settings must satisfy the following conditions:<br>URV ≠ LRV |

### Velocity

Menu for configuring the Velocity measurement of fluid.

#### Velocity unit

Ⓐ [Detailed setup] ► [Pro var] ► [Vel] ► [Unit]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Velocity] ► [Velocity unit]

Sets the unit for velocity.



The unit displayed on the LCD may vary depending on the setting of the parameter *Display unit selection*. During Modbus communication, the actually displayed unit may vary depending on the Modbus tool. For details, refer to *Units of the parameters* [▶ 819].

|   | Value | Description           |
|---|-------|-----------------------|
| – | m/s   | Default value is m/s. |
| – | ft/s  |                       |

### Concentration

Menu for configuring the Concentration measurement.

The following menus/settings are available:

|        | Full name                                | Display name         | [Modbus] name                              | Page    |
|--------|------------------------------------------|----------------------|--------------------------------------------|---------|
| Ⓐ      | Selected concentration set               | [Set]                | [Selected concentration set]               | [▶ 425] |
| Ⓐ      | Select concentration set manually        | [Set man]            | [Select concentration set manual]          | [▶ 425] |
| Ⓐ      | Concentration measurement unit set 1 – 4 | [Unit set 1 – 4]     | [Concentration measurement unit set 1 – 4] | [▶ 426] |
| Ⓐ      | Concentration measurement LRV set 1 – 4  | [LRV set 1 – 4]      | [Concentration measurement LRV set 1 – 4]  | [▶ 427] |
| Ⓐ      | Concentration measurement URV set 1 – 4  | [URV set 1 – 4]      | [Concentration measurement URV set 1 – 4]  | [▶ 427] |
| Ⓐ      | Concentration damping                    | [Damp]               | [Concentration damping]                    | [▶ 428] |
| Ⓐ      | Additional function                      | [Add func]           | [Additional function]                      | [▶ 430] |
| Ⓐ      | Standard concentration set 1 – 4         | [Std conc set 1 – 4] | [Standard concentration set 1 – 4]         | [▶ 426] |
| Ⓜ<br>Ⓐ | Advanced concentration set 1 – 4         |                      | [Advanced concentration set 1 – 4]         | [▶ 432] |
| Ⓐ      | NOC                                      | [NOC]                | [NOC]                                      | [▶ 442] |

Selected concentration set

①

[Detailed setup] ▶ [Pro var] ▶ [Conc] ▶ [Set]

②

[Device root menu] ▶ [Detailed setup] ▶ [Process variables] ▶ [Concentration] ▶ [Selected concentration set]

Shows the selected configuration set to be used for concentration measurement.

|   | Value                     | Description                                                                                                      |
|---|---------------------------|------------------------------------------------------------------------------------------------------------------|
| ③ | Set1<br>[Set1]<br>[Set1]  | 4 configuration sets can be defined on the device and one of them can be selected for concentration measurement. |
| ④ | Set2<br>[Set2]<br>[Set 2] |                                                                                                                  |
| ⑤ | Set3<br>[Set3]<br>[Set3]  |                                                                                                                  |
| ⑥ | Set4<br>[Set4]<br>[Set4]  |                                                                                                                  |

Select concentration set manual

①

[Detailed setup] ▶ [Pro var] ▶ [Conc] ▶ [Set man]

②

[Device root menu] ▶ [Detailed setup] ▶ [Process variables] ▶ [Concentration] ▶ [Select concentration set manual]

Sets the concentration configuration set to be used.

|   | Value                    | Description            |
|---|--------------------------|------------------------|
| ③ | Set1<br>[Set1]<br>[Set1] | Default value is Set1. |
| ④ | Set2<br>[Set2]<br>[Set2] |                        |
| ⑤ | Set3<br>[Set3]<br>[Set3] |                        |
| ⑥ | Set4<br>[Set4]<br>[Set4] |                        |

**Standard concentration set 1 – 4**

Set of menus for configuring Standard concentration set 1 – 4.

One of 4 sets can be selected and used for concentration measurement. The set to be used is selected manually.

The following menus/settings are available:

|   | Full name                                                 | Display name   | [Modbus] name                                         | Page    |
|---|-----------------------------------------------------------|----------------|-------------------------------------------------------|---------|
| Ⓔ | Concentration reference temperature set 1 – 4             | [Ref temp]     | [Concentration reference temperature set 1 – 4]       | [▶ 428] |
| Ⓔ | Concentration reference density carrier set 1 – 4         | [Ref dens car] | [Concentration reference density carrier set 1 – 4]   | [▶ 428] |
| Ⓔ | Concentration temperature coefficient A carrier set 1 – 4 | [Temp A car]   | [Concentration temperature coeff A carrier set 1 – 4] | [▶ 428] |
| Ⓔ | Concentration temperature coefficient B carrier set 1 – 4 | [Temp B car]   | [Concentration temperature coeff B carrier set 1 – 4] | [▶ 429] |
| Ⓔ | Concentration reference density product set 1 – 4         | [Ref dens pro] | [Concentration reference density product set 1 – 4]   | [▶ 429] |
| Ⓔ | Concentration temperature coefficient A product set 1 – 4 | [Temp A pro]   | [Concentration temperature coeff A product set 1 – 4] | [▶ 429] |
| Ⓔ | Concentration temperature coefficient B product set 1 – 4 | [Temp B pro]   | [Concentration temperature coeff B product set 1 – 4] | [▶ 429] |

**Concentration measurement unit set 1 – 4**

Ⓖ [Detailed setup] ▶ [Pro var] ▶ [Conc] ▶ [Std conc set 1 – 4] ▶ [Unit set 1 – 4]

Ⓗ [Detailed setup] ▶ [Process variables] ▶ [Concentration] ▶ [Concentration measurement unit set 1 – 4]

Sets the unit for the concentration measurement Set 1 – 4.



The unit displayed on the LCD may vary depending on the setting of the parameter *Display unit selection*. During Modbus communication, the actually displayed unit may vary depending on the Modbus tool. For details, refer to *Units of the parameters* [▶ 819].

|   | Value                                                      | Description            |
|---|------------------------------------------------------------|------------------------|
| Ⓢ | degBrix<br>[°Brix]<br>[degBrix]                            | Default value is Wt %. |
| Ⓢ | Wt % sol<br>[Wt% sol]<br>[% sol-wt]                        |                        |
| Ⓢ | Vol % sol<br>[Vol% sol]<br>[% sol-vol]                     |                        |
| Ⓢ | Wt %<br>[Wt%]<br>[%]                                       |                        |
| Ⓢ | Vol %<br>[Vol %]<br>[Vol %]                                |                        |
| Ⓢ | Wt % user unit<br>[User unit (Wt%)]<br>[Wt % User unit]    |                        |
| Ⓢ | Vol % user unit<br>[User unit (Vol%)]<br>[Vol % User unit] |                        |

### Concentration measurement LRV set 1 – 4

① [Detailed setup] ► [Pro var] ► [Conc] ► [Std conc set 1 – 4] ► [LRV set 1 – 4]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [Concentration measurement LRV set 1 – 4]

Sets the lower range value, 0%, for scaling the analog and frequency output during Concentration measurement set 1 – 4.

|   | Value          | Description                                                                                                         |
|---|----------------|---------------------------------------------------------------------------------------------------------------------|
| Ⓢ | Numeric digits | Setting range: 0.0 – 110.0.<br>Default value is 0.0.<br>Settings must satisfy the following condition:<br>URV ≠ LRV |

### Concentration measurement URV set 1 – 4

① [Detailed setup] ► [Pro var] ► [Conc] ► [Std conc set 1 – 4] ► [URV set 1 – 4]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [Concentration measurement URV set 1 – 4]

Sets the upper range value, 100%, for scaling the analog and frequency output during Concentration measurement set 1 – 4.

|   | Value          | Description                                                                                                                |
|---|----------------|----------------------------------------------------------------------------------------------------------------------------|
| Ⓔ | Numeric digits | Setting range: 0.0 – 110.0.<br>Default value is 100.0.<br>Settings must satisfy the following condition:<br>$URV \neq LRV$ |

### Concentration FTime (damping)

Ⓖ [Detailed setup] ► [Pro var] ► [Conc] ► [Std conc set 1 – 4] ► [Damp]

Ⓗ [Device root menu] ► [Detailed setup] ► [Process variables] ►  
[Concentration] ► [Concentration damping]

Sets the damping constant for concentration measurement. The value is the time for the process value to become 63.2 % of the total amount of change.

|   | Value          | Description                                              |
|---|----------------|----------------------------------------------------------|
| Ⓔ | Numeric digits | Setting range: 0.0 – 200.0 s.<br>Default value is 3.0 s. |

### Concentration reference temperature set 1 – 4

Ⓖ [Detailed setup] ► [Pro var] ► [Conc] ► [Std conc set 1 – 4] ► [Ref temp]

Ⓗ [Device root menu] ► [Detailed setup] ► [Process variables] ►  
[Concentration] ► [Standard concentration set 1 – 4] ► [Concentration  
reference temperature set 1 – 4]

Sets the temperature when the reference density of both components of the mixture is defined for concentration set 1 – 4.

|   | Value          | Description            |
|---|----------------|------------------------|
| Ⓔ | Numeric digits | Default value is 25.0. |

### Concentration reference density carrier set 1 – 4

Ⓖ [Detailed setup] ► [Pro var] ► [Conc] ► [Std conc set 1 – 4] ► [Ref dens  
car]

Ⓗ [Device root menu] ► [Detailed setup] ► [Process variables] ►  
[Concentration] ► [Standard concentration set 1 – 4] ► [Concentration  
reference density carrier set 1 – 4]

Sets the reference density of the carrier that is defined at the reference temperature for concentration set 1 – 4.

|   | Value          | Description             |
|---|----------------|-------------------------|
| Ⓔ | Numeric digits | Default value is 0.997. |

### Concentration temperature coefficient A carrier set 1 – 4

Ⓖ [Detailed setup] ► [Pro var] ► [Conc] ► [Std conc set 1 – 4] ► [Temp A  
car]

Ⓗ [Device root menu] ► [Detailed setup] ► [Process variables] ►  
[Concentration] ► [Standard concentration set 1 – 4] ► [Concentration  
temperature coeff A carrier set 1 – 4]

Sets the linear temperature coefficient of density of the carrier for concentration set 1 – 4.



|   | Value          | Description                        |
|---|----------------|------------------------------------|
| Ⓢ | Numeric digits | Default value is $-2.610e^{-04}$ . |

### Concentration temperature coefficient B carrier set 1 – 4

① [Detailed setup] ► [Pro var] ► [Conc] ► [Std conc set 1 – 4] ► [Temp B car]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [Standard concentration set 1 – 4] ► [Concentration temperature coeff B carrier set 1 – 4]

Sets the quadratic temperature coefficient of density of the carrier for concentration set 1 – 4.

|   | Value          | Description                        |
|---|----------------|------------------------------------|
| Ⓢ | Numeric digits | Default value is $-3.600e^{-06}$ . |

### Concentration reference density product set 1 – 4

① [Detailed setup] ► [Pro var] ► [Conc] ► [Std conc set 1 – 4] ► [Ref dens pro]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [Standard concentration set 1 – 4] ► [Concentration reference density product set 1 – 4]

Sets the reference density of the product that is defined at the reference temperature for concentration set 1 – 4.

|   | Value          | Description           |
|---|----------------|-----------------------|
| Ⓢ | Numeric digits | Default value is 0.0. |

### Concentration temperature coefficient A product set 1 – 4

① [Detailed setup] ► [Pro var] ► [Conc] ► [Std conc set 1 – 4] ► [Temp A pro]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [Standard concentration set 1 – 4] ► [Concentration temperature coeff A product set 1 – 4]

Sets the linear temperature coefficient of density of the product for concentration set 1 – 4.

|   | Value          | Description                     |
|---|----------------|---------------------------------|
| Ⓢ | Numeric digits | Default value is $0.000e+000$ . |

### Concentration temperature coefficient B product set 1 – 4

① [Detailed setup] ► [Pro var] ► [Conc] ► [Std conc set 1 – 4] ► [Temp B pro]

Ⓜ [Device root menu] ► [Device root menu] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [Standard concentration set 1 – 4] ► [Concentration temperature coeff B product set 1 – 4]

Sets the quadratic temperature coefficient of density of the product for concentration set 1 – 4.

|   | Value          | Description                     |
|---|----------------|---------------------------------|
| Ⓢ | Numeric digits | Default value is $0.000e+000$ . |

**Additional function**

Menu for parameters to configure Concentration measurement in detail. The menu is only available when *Process variables additional parameters*, see *Process variables* [▶ 380] has been set to Apply.

The following menus/settings are available:

|   | Full name                                     | Display name         | [Modbus] name                                   | Page    |
|---|-----------------------------------------------|----------------------|-------------------------------------------------|---------|
| ⓔ | Concentration name set 1 – 4                  | [Name set1 – 4]      | [Concentration name set 1 – 4]                  | [▶ 430] |
| ⓔ | Concentration measurement user unit set 1 – 4 | [User unit set1 – 4] | [Concentration measurement user unit set 1 – 4] | [▶ 430] |
| ⓔ | Concentration trim select                     | [Trim sel]           | [Concentration trim select]                     | [▶ 430] |
| ⓔ | Concentration trim offset                     | [Trim offset]        | [Concentration trim offset]                     | [▶ 431] |
| ⓔ | Concentration trim gain                       | [Trim gain]          | [Concentration trim gain]                       | [▶ 431] |

**Concentration name set 1 – 4**

Ⓛ [Detailed setup] ▶ [Pro var] ▶ [Conc] ▶ [Std conc set 1 – 4] ▶ [Add func] ▶ [Name set1 – 4]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Process variables] ▶ [Concentration] ▶ [Additional function] ▶ [Concentration name set 1 – 4]

Sets a name to help identify concentration set 1 – 4.

|   | Value      | Description                                                     |
|---|------------|-----------------------------------------------------------------|
| ⓔ | Characters | Maximum length is 16 characters.<br>Default value is Set 1 – 4. |

**Concentration measurement user unit set 1 – 4**

Ⓛ [Detailed setup] ▶ [Pro var] ▶ [Conc] ▶ [Std conc set 1 – 4] ▶ [Add func] ▶ [User unit set1 – 4]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Process variables] ▶ [Concentration] ▶ [Additional function] ▶ [Concentration measurement user unit set 1 – 4]

Sets the user-defined unit for concentration measurement set 1 – 4.

|   | Value            | Description                                                |
|---|------------------|------------------------------------------------------------|
| – | ASCII characters | Maximum length is 8 characters.<br>Default value is blank. |

**Concentration trim select**

Ⓛ [Detailed setup] ▶ [Pro var] ▶ [Conc] ▶ [Std conc set 1 – 4] ▶ [Add func] ▶ [Trim sel]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Process variables] ▶ [Concentration] ▶ [Additional function] ▶ [Concentration trim select]

Enables or disables the trim function for concentration measurement.

|                          | Value   | Description                                        |
|--------------------------|---------|----------------------------------------------------|
| Ⓢ [Inhibit]<br>[Inhibit] | Inhibit | Disables the concentration trim.<br>Default value. |
| Ⓢ [Enable]<br>[Enable]   | Enable  | Enables the concentration trim.                    |

**Concentration trim gain**

Ⓛ [Detailed setup] ▶ [Pro var] ▶ [Conc] ▶ [Std conc set 1 - 4] ▶ [Add func] ▶ [Trim gain]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Process variables] ▶ [Concentration] ▶ [Additional function] ▶ [Concentration trim gain]

Sets the gain for trimming the concentration measurement.

|                  | Value          | Description             |
|------------------|----------------|-------------------------|
| Ⓢ Numeric digits | Numeric digits | Default value is 1.000. |

**Concentration trim offset**

Ⓛ [Detailed setup] ▶ [Pro var] ▶ [Conc] ▶ [Std conc set 1 - 4] ▶ [Add func] ▶ [Trim offset]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Process variables] ▶ [Concentration] ▶ [Additional function] ▶ [Concentration trim offset]

Sets the offset for trimming the concentration measurement.

|                  | Value          | Description                  |
|------------------|----------------|------------------------------|
| Ⓢ Numeric digits | Numeric digits | Default value is 0.000e+000. |

**Advanced concentration set 1 – 4**

Set of menus for configuring the Advanced concentration set 1 – 4.

One of 4 sets can be selected and used for concentration measurement. The set to be used is selected manually.

The following menus/settings are available:

|        | Full name                                  | Display name | [Modbus] name                                | Page                  |
|--------|--------------------------------------------|--------------|----------------------------------------------|-----------------------|
| Ⓜ<br>Ⓢ | Concentration temperature set 1 – 4 number | —            | [Concentration temperature set 1 – 4 number] | <a href="#">▶ 434</a> |
| Ⓜ<br>Ⓢ | Concentration temperature 1 set 1 – 4      | —            | [Concentration temperature 1 set 1 – 4]      | <a href="#">▶ 434</a> |
| Ⓜ<br>Ⓢ | Concentration A 1 set 1 – 4                | —            | [Concentration A 1 set 1 – 4]                | <a href="#">▶ 434</a> |
| Ⓜ<br>Ⓢ | Concentration B 1 set 1 – 4                | —            | [Concentration B 1 set 1 – 4]                | <a href="#">▶ 434</a> |
| Ⓜ<br>Ⓢ | Concentration C 1 set 1 – 4                | —            | [Concentration C 1 set 1 – 4]                | <a href="#">▶ 434</a> |
| Ⓜ<br>Ⓢ | Concentration D 1 set 1 – 4                | —            | [Concentration D 1 set 1 – 4]                | <a href="#">▶ 435</a> |
| Ⓜ<br>Ⓢ | Concentration temperature 2 set 1 – 4      | —            | [Concentration temperature 2 set 1 – 4]      | <a href="#">▶ 435</a> |
| Ⓜ<br>Ⓢ | Concentration A 2 set 1 – 4                | —            | [Concentration A 2 set 1 – 4]                | <a href="#">▶ 435</a> |
| Ⓜ<br>Ⓢ | Concentration B 2 set 1 – 4                | —            | [Concentration B 2 set 1 – 4]                | <a href="#">▶ 435</a> |
| Ⓜ<br>Ⓢ | Concentration C 2 set 1 – 4                | —            | [Concentration C 2 set 1 – 4]                | <a href="#">▶ 435</a> |
| Ⓜ<br>Ⓢ | Concentration D 2 set 1 – 4                | —            | [Concentration D 2 set 1 – 4]                | <a href="#">▶ 436</a> |
| Ⓜ<br>Ⓢ | Concentration temperature 3 set 1 – 4      | —            | [Concentration temperature 3 set 1 – 4]      | <a href="#">▶ 436</a> |
| Ⓜ<br>Ⓢ | Concentration A 3 set 1 – 4                | —            | [Concentration A 3 set 1 – 4]                | <a href="#">▶ 436</a> |
| Ⓜ<br>Ⓢ | Concentration B 3 set 1 – 4                | —            | [Concentration B 3 set 1 – 4]                | <a href="#">▶ 436</a> |
| Ⓜ<br>Ⓢ | Concentration C 3 set 1 – 4                | —            | [Concentration C 3 set 1 – 4]                | <a href="#">▶ 436</a> |
| Ⓜ<br>Ⓢ | Concentration D 3 set 1 – 4                | —            | [Concentration D 3 set 1 – 4]                | <a href="#">▶ 437</a> |
| Ⓜ<br>Ⓢ | Concentration temperature 4 set 1 – 4      | —            | [Concentration temperature 4 set 1 – 4]      | <a href="#">▶ 437</a> |
| Ⓜ<br>Ⓢ | Concentration A 4 set 1 – 4                | —            | [Concentration A 4 set 1 – 4]                | <a href="#">▶ 437</a> |
| Ⓜ<br>Ⓢ | Concentration B 4 set 1 – 4                | —            | [Concentration B 4 set 1 – 4]                | <a href="#">▶ 437</a> |

|        |                                       |   |                                         |         |
|--------|---------------------------------------|---|-----------------------------------------|---------|
| Ⓜ<br>Ⓜ | Concentration C 4 set 1 – 4           | — | [Concentration C 4 set 1 – 4]           | [▶ 437] |
| Ⓜ<br>Ⓜ | Concentration D 4 set 1 – 4           | — | [Concentration D 4 set 1 – 4]           | [▶ 438] |
| Ⓜ<br>Ⓜ | Concentration temperature 5 set 1 – 4 | — | [Concentration temperature 5 set 1 – 4] | [▶ 438] |
| Ⓜ<br>Ⓜ | Concentration A 5 set 1 – 4           | — | [Concentration A 5 set 1 – 4]           | [▶ 438] |
| Ⓜ<br>Ⓜ | Concentration B 5 set 1 – 4           | — | [Concentration B 5 set 1 – 4]           | [▶ 438] |
| Ⓜ<br>Ⓜ | Concentration C 5 set 1 – 4           | — | [Concentration C 5 set 1 – 4]           | [▶ 438] |
| Ⓜ<br>Ⓜ | Concentration D 5 set 1 – 4           | — | [Concentration D 5 set 1 – 4]           | [▶ 439] |
| Ⓜ<br>Ⓜ | Concentration temperature 6 set 1 – 4 | — | [Concentration temperature 6 set 1 – 4] | [▶ 439] |
| Ⓜ<br>Ⓜ | Concentration A 6 set 1 – 4           | — | [Concentration A 6 set 1 – 4]           | [▶ 439] |
| Ⓜ<br>Ⓜ | Concentration B 6 set 1 – 4           | — | [Concentration B 6 set 1 – 4]           | [▶ 439] |
| Ⓜ<br>Ⓜ | Concentration C 6 set 1 – 4           | — | [Concentration C 6 set 1 – 4]           | [▶ 439] |
| Ⓜ<br>Ⓜ | Concentration D 6 set 1 – 4           | — | [Concentration D 6 set 1 – 4]           | [▶ 440] |
| Ⓜ<br>Ⓜ | Concentration temperature 7 set 1 – 4 | — | [Concentration temperature 7 set 1 – 4] | [▶ 440] |
| Ⓜ<br>Ⓜ | Concentration A 7 set 1 – 4           | — | [Concentration A 7 set 1 – 4]           | [▶ 440] |
| Ⓜ<br>Ⓜ | Concentration B 7 set 1 – 4           | — | [Concentration B 7 set 1 – 4]           | [▶ 440] |
| Ⓜ<br>Ⓜ | Concentration C 7 set 1 – 4           | — | [Concentration C 7 set 1 – 4]           | [▶ 440] |
| Ⓜ<br>Ⓜ | Concentration D 7 set 1 – 4           | — | [Concentration D 7 set 1 – 4]           | [▶ 441] |
| Ⓜ<br>Ⓜ | Concentration temperature 8 set 1 – 4 | — | [Concentration temperature 8 set 1 – 4] | [▶ 441] |
| Ⓜ<br>Ⓜ | Concentration A 8 set 1 – 4           | — | [Concentration A 8 set 1 – 4]           | [▶ 441] |
| Ⓜ<br>Ⓜ | Concentration B 8 set 1 – 4           | — | [Concentration B 8 set 1 – 4]           | [▶ 441] |
| Ⓜ<br>Ⓜ | Concentration C 8 set 1 – 4           | — | [Concentration C 8 set 1 – 4]           | [▶ 441] |
| Ⓜ<br>Ⓜ | Concentration D 8 set 1 – 4           | — | [Concentration D 8 set 1 – 4]           | [▶ 442] |

**Concentration temperature set 1 – 4 number**

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [Advanced concentration set 1 – 4] ► [Concentration temperature set 1 – 4 number]

Sets the number of the set of temperatures for concentration set 1 – 4.

|   | Value          | Description           |
|---|----------------|-----------------------|
| Ⓜ | Numeric digits | Setting range: 2 – 8. |
| Ⓜ |                | Default value is 8.   |

**Concentration temperature 1 set 1 – 4**

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [Advanced concentration set 1 – 4] ► [Concentration temperature 1 set 1 – 4]

Sets the temperature of coefficient set 1 for concentration set 1 – 4.

|   | Value          | Description         |
|---|----------------|---------------------|
| Ⓜ | Numeric digits | Default value is 0. |
| Ⓜ |                |                     |

**Concentration A 1 set 1 – 4**

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [Advanced concentration set 1 – 4] ► [Concentration A 1 set 1 – 4]

Sets coefficient A of coefficient set 1 for concentration set 1 – 4.

|   | Value          | Description         |
|---|----------------|---------------------|
| Ⓜ | Numeric digits | Default value is 0. |
| Ⓜ |                |                     |

**Concentration B 1 set 1 – 4**

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [Advanced concentration set 1 – 4] ► [Concentration B 1 set 1 – 4]

Sets coefficient B of coefficient set 1 for concentration set 1 – 4.

|   | Value          | Description         |
|---|----------------|---------------------|
| Ⓜ | Numeric digits | Default value is 0. |
| Ⓜ |                |                     |

**Concentration C 1 set 1 – 4**

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [Advanced concentration set 1 – 4] ► [Concentration C 1 set 1 – 4]

Sets coefficient C of coefficient set 1 for concentration set 1 – 4.

|   | Value          | Description         |
|---|----------------|---------------------|
| Ⓜ | Numeric digits | Default value is 0. |
| Ⓜ |                |                     |

**Concentration D 1  
set 1 – 4**

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ►  
[Concentration] ► [Advanced concentration set 1 – 4] ► [Concentration  
D 1 set 1 – 4]

Sets coefficient D of coefficient set 1 for concentration set 1 – 4.

|   | Value          | Description         |
|---|----------------|---------------------|
| Ⓜ | Numeric digits | Default value is 0. |
| Ⓜ |                |                     |

**Concentration  
temperature 2  
set 1 – 4**

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ►  
[Concentration] ► [Advanced concentration set 1 – 4] ► [Concentration  
temperature 2 set 1 – 4]

Sets the temperature of coefficient set 2 for concentration set 1 – 4.

|   | Value          | Description         |
|---|----------------|---------------------|
| Ⓜ | Numeric digits | Default value is 0. |
| Ⓜ |                |                     |

**Concentration A 2  
set 1 – 4**

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ►  
[Concentration] ► [Advanced concentration set 1 – 4] ► [Concentration  
A 2 set 1 – 4]

Sets coefficient A of coefficient set 2 for concentration set 1 – 4.

|   | Value          | Description         |
|---|----------------|---------------------|
| Ⓜ | Numeric digits | Default value is 0. |
| Ⓜ |                |                     |

**Concentration B 2  
set 1 – 4**

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ►  
[Concentration] ► [Advanced concentration set 1 – 4] ► [Concentration  
B 2 set 1 – 4]

Sets coefficient B of coefficient set 2 for concentration set 1 – 4.

|   | Value          | Description         |
|---|----------------|---------------------|
| Ⓜ | Numeric digits | Default value is 0. |
| Ⓜ |                |                     |

**Concentration C 2  
set 1 – 4**

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ►  
[Concentration] ► [Advanced concentration set 1 – 4] ► [Concentration  
C 2 set 1 – 4]

Sets coefficient C of coefficient set 2 for concentration set 1 – 4.

|   | Value          | Description         |
|---|----------------|---------------------|
| Ⓜ | Numeric digits | Default value is 0. |
| Ⓜ |                |                     |

**Concentration D 2  
set 1 – 4**

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ►  
[Concentration] ► [Advanced concentration set 1 – 4] ► [Concentration  
D 2 set 1 – 4]

Sets coefficient D of coefficient set 2 for concentration set 1 – 4.

|        | Value          | Description         |
|--------|----------------|---------------------|
| Ⓜ<br>ⓔ | Numeric digits | Default value is 0. |

**Concentration  
temperature 3  
set 1 – 4**

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ►  
[Concentration] ► [Advanced concentration set 1 – 4] ► [Concentration  
temperature 3 set 1 – 4]

Sets the temperature of coefficient set 3 for concentration set 1 – 4.

|        | Value          | Description         |
|--------|----------------|---------------------|
| Ⓜ<br>ⓔ | Numeric digits | Default value is 0. |

**Concentration A 3  
set 1 – 4**

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ►  
[Concentration] ► [Advanced concentration set 1 – 4] ► [Concentration  
A 3 set 1 – 4]

Sets coefficient A of coefficient set 3 for concentration set 1 – 4.

|        | Value          | Description         |
|--------|----------------|---------------------|
| Ⓜ<br>ⓔ | Numeric digits | Default value is 0. |

**Concentration B 3  
set 1 – 4**

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ►  
[Concentration] ► [Advanced concentration set 1 – 4] ► [Concentration  
B 3 set 1 – 4]

Sets coefficient B of coefficient set 3 for concentration set 1 – 4.

|        | Value          | Description         |
|--------|----------------|---------------------|
| Ⓜ<br>ⓔ | Numeric digits | Default value is 0. |

**Concentration C 3  
set 1 – 4**

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ►  
[Concentration] ► [Advanced concentration set 1 – 4] ► [Concentration  
C 3 set 1 – 4]

Sets coefficient C of coefficient set 3 for concentration set 1 – 4.

|        | Value          | Description         |
|--------|----------------|---------------------|
| Ⓜ<br>ⓔ | Numeric digits | Default value is 0. |



**Concentration D 3  
set 1 – 4**

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ►  
[Concentration] ► [Advanced concentration set 1 – 4] ► [Concentration  
D 3 set 1 – 4]

Sets coefficient D of coefficient set 3 for concentration set 1 – 4.

|   | Value          | Description         |
|---|----------------|---------------------|
| Ⓜ | Numeric digits | Default value is 0. |
| Ⓜ |                |                     |

**Concentration  
temperature 4  
set 1 – 4**

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ►  
[Concentration] ► [Advanced concentration set 1 – 4] ► [Concentration  
temperature 4 set 1 – 4]

Sets the temperature of coefficient set 4 for concentration set 1 – 4.

|   | Value          | Description         |
|---|----------------|---------------------|
| Ⓜ | Numeric digits | Default value is 0. |
| Ⓜ |                |                     |

**Concentration A 4  
set 1 – 4**

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ►  
[Concentration] ► [Advanced concentration set 1 – 4] ► [Concentration  
A 4 set 1 – 4]

Sets coefficient A of coefficient set 4 for concentration set 1 – 4.

|   | Value          | Description         |
|---|----------------|---------------------|
| Ⓜ | Numeric digits | Default value is 0. |
| Ⓜ |                |                     |

**Concentration B 4  
set 1 – 4**

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ►  
[Concentration] ► [Advanced concentration set 1 – 4] ► [Concentration  
B 4 set 1 – 4]

Sets coefficient B of coefficient set 4 for concentration set 1 – 4.

|   | Value          | Description         |
|---|----------------|---------------------|
| Ⓜ | Numeric digits | Default value is 0. |
| Ⓜ |                |                     |

**Concentration C 4  
set 1 – 4**

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ►  
[Concentration] ► [Advanced concentration set 1 – 4] ► [Concentration  
C 4 set 1 – 4]

Sets coefficient C of coefficient set 4 for concentration set 1 – 4.

|   | Value          | Description         |
|---|----------------|---------------------|
| Ⓜ | Numeric digits | Default value is 0. |
| Ⓜ |                |                     |

**Concentration D 4  
set 1 – 4**

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ►  
[Concentration] ► [Advanced concentration set 1 – 4] ► [Concentration  
D 4 set 1 – 4]

Sets coefficient D of coefficient set 4 for concentration set 1 – 4.

|        | Value          | Description         |
|--------|----------------|---------------------|
| Ⓜ<br>ⓔ | Numeric digits | Default value is 0. |

**Concentration  
temperature 5  
set 1 – 4**

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ►  
[Concentration] ► [Advanced concentration set 1 – 4] ► [Concentration  
temperature 5 set 1 – 4]

Sets the temperature of coefficient set 5 for concentration set 1 – 4.

|        | Value          | Description         |
|--------|----------------|---------------------|
| Ⓜ<br>ⓔ | Numeric digits | Default value is 0. |

**Concentration A 5  
set 1 – 4**

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ►  
[Concentration] ► [Advanced concentration set 1 – 4] ► [Concentration  
A 5 set 1 – 4]

Sets coefficient A of coefficient set 5 for concentration set 1 – 4.

|        | Value          | Description         |
|--------|----------------|---------------------|
| Ⓜ<br>ⓔ | Numeric digits | Default value is 0. |

**Concentration B 5  
set 1 – 4**

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ►  
[Concentration] ► [Advanced concentration set 1 – 4] ► [Concentration  
B 5 set 1 – 4]

Sets coefficient B of coefficient set 5 for concentration set 1 – 4.

|        | Value          | Description           |
|--------|----------------|-----------------------|
| Ⓜ<br>ⓔ | Numeric digits | Default value is 0.0. |

**Concentration C 5  
set 1 – 4**

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ►  
[Concentration] ► [Advanced concentration set 1 – 4] ► [Concentration  
C 5 set 1 – 4]

Sets coefficient C of coefficient set 5 for concentration set 1 – 4.

|        | Value          | Description         |
|--------|----------------|---------------------|
| Ⓜ<br>ⓔ | Numeric digits | Default value is 0. |

**Concentration D 5  
set 1 – 4**

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ►  
[Concentration] ► [Advanced concentration set 1 – 4] ► [Concentration  
D 5 set 1 – 4]

Sets coefficient D of coefficient set 5 for concentration set 1 – 4.

|        | Value          | Description         |
|--------|----------------|---------------------|
| Ⓜ<br>ⓔ | Numeric digits | Default value is 0. |

**Concentration  
temperature 6  
set 1 – 4**

Ⓜ [Device root menu] ► [Device root menu] ► [Detailed setup] ► [Process  
variables] ► [Concentration] ► [Advanced concentration set 1 – 4] ►  
[Concentration temperature 6 set 1 – 4]

Sets the temperature of coefficient set 6 for concentration set 1 – 4.

|        | Value          | Description         |
|--------|----------------|---------------------|
| Ⓜ<br>ⓔ | Numeric digits | Default value is 0. |

**Concentration A 6  
set 1 – 4**

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ►  
[Concentration] ► [Advanced concentration set 1 – 4] ► [Concentration  
A 6 set 1 – 4]

Sets coefficient A of coefficient set 6 for concentration set 1 – 4.

|        | Value          | Description         |
|--------|----------------|---------------------|
| Ⓜ<br>ⓔ | Numeric digits | Default value is 0. |

**Concentration B 6  
set 1 – 4**

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ►  
[Concentration] ► [Advanced concentration set 1 – 4] ► [Concentration  
B 6 set 1 – 4]

Sets coefficient B of coefficient set 6 for concentration set 1 – 4.

|        | Value          | Description         |
|--------|----------------|---------------------|
| Ⓜ<br>ⓔ | Numeric digits | Default value is 0. |

**Concentration C 6  
set 1 – 4**

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ►  
[Concentration] ► [Advanced concentration set 1 – 4] ► [Concentration  
C 6 set 1 – 4]

Sets coefficient C of coefficient set 6 for concentration set 1 – 4.

|        | Value          | Description         |
|--------|----------------|---------------------|
| Ⓜ<br>ⓔ | Numeric digits | Default value is 0. |

**Concentration D 6  
set 1 – 4**

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ►  
[Concentration] ► [Advanced concentration set 1 – 4] ► [Concentration  
D 6 set 1 – 4]

Sets coefficient D of coefficient set 6 for concentration set 1 – 4.

|        | Value          | Description         |
|--------|----------------|---------------------|
| Ⓜ<br>ⓔ | Numeric digits | Default value is 0. |

**Concentration  
temperature 7  
set 1 – 4**

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ►  
[Concentration] ► [Advanced concentration set 1 – 4] ► [Concentration  
temperature 7 set 1 – 4]

Sets the temperature of coefficient set 7 for concentration set 1 – 4.

|        | Value          | Description         |
|--------|----------------|---------------------|
| Ⓜ<br>ⓔ | Numeric digits | Default value is 0. |

**Concentration A 7  
set 1 – 4**

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ►  
[Concentration] ► [Advanced concentration set 1 – 4] ► [Concentration  
A 7 set 1 – 4]

Sets coefficient A of coefficient set 7 for concentration set 1 – 4.

|        | Value          | Description         |
|--------|----------------|---------------------|
| Ⓜ<br>ⓔ | Numeric digits | Default value is 0. |

**Concentration B 7  
set 1 – 4**

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ►  
[Concentration] ► [Advanced concentration set 1 – 4] ► [Concentration  
B 7 set 1 – 4]

Sets coefficient B of coefficient set 7 for concentration set 1 – 4.

|        | Value          | Description         |
|--------|----------------|---------------------|
| Ⓜ<br>ⓔ | Numeric digits | Default value is 0. |

**Concentration C 7  
set 1 – 4**

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ►  
[Concentration] ► [Advanced concentration set 1 – 4] ► [Concentration  
C 7 set 1 – 4]

Sets coefficient C of coefficient set 7 for concentration set 1 – 4.

|        | Value          | Description         |
|--------|----------------|---------------------|
| Ⓜ<br>ⓔ | Numeric digits | Default value is 0. |

**Concentration D 7  
set 1 – 4**

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ►  
[Concentration] ► [Advanced concentration set 1 – 4] ► [Concentration  
D 7 set 1 – 4]

Sets coefficient D of coefficient set 7 for concentration set 1 – 4.

|   | Value          | Description         |
|---|----------------|---------------------|
| Ⓜ | Numeric digits | Default value is 0. |
| Ⓟ |                |                     |

**Concentration  
temperature 8  
set 1 – 4**

Ⓜ [Device root menu] ► [Detailed setup] ► [Detailed setup] ► [Process  
variables] ► [Concentration] ► [Advanced concentration set 1 – 4] ►  
[Concentration temperature 8 set 1 – 4]

Sets the temperature of coefficient set 8 for concentration set 1 – 4.

|   | Value          | Description           |
|---|----------------|-----------------------|
| Ⓜ | Numeric digits | Default value is 0.0. |
| Ⓟ |                |                       |

**Concentration A 8  
set 1 – 4**

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ►  
[Concentration] ► [Advanced concentration set 1 – 4] ► [Concentration  
A 8 set 1 – 4]

Sets coefficient A of coefficient set 8 for concentration set 1 – 4.

|   | Value          | Description         |
|---|----------------|---------------------|
| Ⓜ | Numeric digits | Default value is 0. |
| Ⓟ |                |                     |

**Concentration B 8  
set 1 – 4**

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ►  
[Concentration] ► [Advanced concentration set 1 – 4] ► [Concentration  
B 8 set 1 – 4]

Sets coefficient B of coefficient set 8 for concentration set 1 – 4.

|   | Value          | Description         |
|---|----------------|---------------------|
| Ⓜ | Numeric digits | Default value is 0. |
| Ⓟ |                |                     |

**Concentration C 8  
set 1 – 4**

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ►  
[Concentration] ► [Advanced concentration set 1 – 4] ► [Concentration  
C 8 set 1 – 4]

Sets coefficient C of coefficient set 8 for concentration set 1 – 4.

|   | Value          | Description         |
|---|----------------|---------------------|
| Ⓜ | Numeric digits | Default value is 0. |
| Ⓟ |                |                     |

**Concentration D 8 set 1 – 4**

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [Advanced concentration set 1 – 4] ► [Concentration D 8 set 1 – 4]

Sets coefficient D of coefficient set 8 for concentration set 1 – 4.

|        | Value          | Description         |
|--------|----------------|---------------------|
| Ⓜ<br>ⓔ | Numeric digits | Default value is 0. |

**NOC**

Set of menus for configuring the net NOC and GVF (Gas Void Fraction).

The following menus/settings are available:

|   | Full name                        | Display name   | [Modbus] name                      | Page    |
|---|----------------------------------|----------------|------------------------------------|---------|
| ⓔ | Oil density                      | [Oil dens]     | [Oil density]                      | [▶ 442] |
| ⓔ | Water density                    | [Water dens]   | [Water density]                    | [▶ 443] |
| ⓔ | Mass concentration value         | [Mass conc]    | [Mass concentration value]         | [▶ 443] |
| ⓔ | Volume concentration value       | [Vol conc]     | [Volume concentration value]       | [▶ 443] |
| ⓔ | Water cut value                  | [Water cut]    | [Water cut value]                  | [▶ 443] |
| ⓔ | Gas void fraction                | [GVF]          | [Gas void fraction]                | [▶ 443] |
| ⓔ | Current thermal expansion factor | –              | [Current thermal expansion factor] | [▶ 444] |
| ⓔ | Current K0 coefficient           | –              | [Current K0 coefficient]           | [▶ 444] |
| ⓔ | Current K1 coefficient           | –              | [Current K1 coefficient]           | [▶ 444] |
| ⓔ | Current K2 coefficient           | –              | [Current K2 coefficient]           | [▶ 444] |
| ⓔ | Concentration select             | [Conc sel]     | [Concentration select]             | [▶ 444] |
| ⓔ | GVF select                       | [GVF sel]      | [GVF select]                       |         |
| ⓔ | NOC pressure fixed value         | [NOC pres fix] | [NOC pressure fixed value]         | [▶ 445] |
| ⓔ | NOC density hysteresis           | [NOC dens hys] | [NOC density hysteresis]           | [▶ 445] |
| ⓔ | GVF density hysteresis           | [GVF dens hys] | [GVF density hysteresis]           | [▶ 445] |

**Oil density**

Ⓜ [Detailed setup] ► [Pro var] ► [NOC] ► [Oil dens]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [NOC] ► [Oil density]

Shows the density of oil at alternate conditions.

|   | Value          | Description                  |
|---|----------------|------------------------------|
| ⓔ | Numeric digits | Default value is 0.0 [kg/L]. |

**Water density**

① [Detailed setup] ► [Pro var] ► [NOC] ► [Water dens]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [NOC] ► [Water density]

Shows the density of water at alternate conditions.

|   | Value          | Description                  |
|---|----------------|------------------------------|
| Ⓜ | Numeric digits | Default value is 0.0 [kg/L]. |

**Mass concentration value**

① [Detailed setup] ► [Pro var] ► [NOC] ► [Mass conc]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [NOC] ► [Mass concentration value]

Shows the concentration value of the mass flow.

|   | Value          | Description           |
|---|----------------|-----------------------|
| Ⓜ | Numeric digits | Default value is 0.0% |

**Volume concentration value**

① [Detailed setup] ► [Pro var] ► [NOC] ► [Vol conc]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [NOC] ► [Volume concentration value]

Shows the concentration value of the volume flow.

|   | Value          | Description           |
|---|----------------|-----------------------|
| Ⓜ | Numeric digits | Default value is 0.0% |

**Water cut value**

① [Detailed setup] ► [Pro var] ► [NOC] ► [Water cut]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [NOC] ► [Water cut value]

Shows the water cut value.

|   | Value          | Description           |
|---|----------------|-----------------------|
| Ⓜ | Numeric digits | Default value is 0.0% |

**Gas void fraction**

① [Detailed setup] ► [Pro var] ► [NOC] ► [GVF]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [NOC] ► [Gas void fraction]

Shows the gas void fraction value. This value is available only for option C52.

|   | Value          | Description           |
|---|----------------|-----------------------|
| Ⓜ | Numeric digits | Default value is 0.0% |

**Current thermal expansion factor**

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [NOC] ► [Current thermal expansion factor]

Shows the current thermal expansion factor which is used for oil density calculation.

|   | Value          | Description           |
|---|----------------|-----------------------|
| Ⓜ | Numeric digits | Default value is 0.0. |

**Current K0 coefficient**

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [NOC] ► [Current K0 coefficient]

Shows the current K0 coefficient which is used for oil density calculation.

|   | Value          | Description           |
|---|----------------|-----------------------|
| Ⓜ | Numeric digits | Default value is 0.0. |

**Current K1 coefficient**

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [NOC] ► [Current K1 coefficient]

Shows the current K1 coefficient which is used for oil density calculation.

|   | Value          | Description           |
|---|----------------|-----------------------|
| Ⓜ | Numeric digits | Default value is 0.0. |

**Current K2 coefficient**

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [NOC] ► [Current K2 coefficient]

Shows the current K2 coefficient which is used for oil density calculation.

|   | Value          | Description           |
|---|----------------|-----------------------|
| Ⓜ | Numeric digits | Default value is 0.0. |

**Concentration select**

Ⓜ [Detailed setup] ► [Pro var] ► [NOC] ► [Conc sel]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [NOC] ► [Concentration select]

Selects the output value for Concentration value and relevant Analog output/Frequency if assigned.

|   | Value                 | Description                                                                                                                                    |
|---|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓜ | Concentration(mass)   | Concentration configuration error alarm is set to On when Concentration unit except for degBrix, WT-% sol, WT-% or WT-% User unit is selected. |
| Ⓜ | Concentration(volume) | Concentration configuration error alarm is set to On when Concentration unit except for Vol-% sol, Vol-% or Vol-% User unit is selected.       |
| Ⓜ | Water cut             | Concentration configuration error alarm is set to On when Concentration unit except for Vol-% sol, Vol-% or Vol-% User unit is selected.       |



**NOC pressure  
fixed value**

⌚ [Detailed setup] ▶ [Pro var] ▶ [NOC] ▶ [NOC pres fix]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Process variables] ▶ [Concentration] ▶ [NOC] ▶ [NOC pressure fixed value]

Sets the pressure value for NOC. When the value of Analog input selection is not “Pressure NOC” and “Pressure compensation and NOC”, this value is valid for the pressure for NOC calculation.

When the above selection is others or not available, a value on this parameter is used as pressure value for NOC calculation.

|   | Value          | Description                 |
|---|----------------|-----------------------------|
| Ⓜ | Numeric digits | Default value is 0.0 [bar]. |

**NOC density  
hysteresis**

⌚ [Detailed setup] ▶ [Pro var] ▶ [NOC] ▶ [NOC dens hys]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Process variables] ▶ [Concentration] ▶ [NOC] ▶ [NOC density hysteresis]

Sets the NOC hysteresis value for threshold density.

|   | Value          | Description                  |
|---|----------------|------------------------------|
| Ⓜ | Numeric digits | Default value is 0.0 [kg/L]. |

**GVF density  
hysteresis**

⌚ [Detailed setup] ▶ [Pro var] ▶ [NOC] ▶ [GVF dens hys]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Process variables] ▶ [Concentration] ▶ [NOC] ▶ [GVF density hysteresis]

Sets the GVF hysteresis value for threshold density.

|   | Value          | Description                  |
|---|----------------|------------------------------|
| Ⓜ | Numeric digits | Default value is 0.0 [kg/L]. |

**NOC concentration set 1 – 4**

Set of menus for configuring the oil/water density for NOC for each set.

The following menus/settings are available:

|   | Full name                          | Display name        | [Modbus] name                        | Page    |
|---|------------------------------------|---------------------|--------------------------------------|---------|
| ⓔ | Reference oil density set 1 – 4    | [Ref oil dens]      | [Reference oil density set 1 – 4]    | [▶ 446] |
| ⓔ | Reference water density set 1 – 4  | [Ref water dens]    | [Reference water density set 1 – 4]  | [▶ 446] |
| ⓔ | Oil density calculator set 1 – 4   | [Oil dens calc]     | [Oil density calculator set 1 – 4]   | [▶ 447] |
| ⓔ | Thermal expansion factor set 1 – 4 | [Thermal factor]    | [Thermal expansion factor set 1 – 4] | [▶ 447] |
| ⓔ | K0 coefficient set 1 – 4           | [K0]                | [K0 coefficient set 1 – 4]           | [▶ 448] |
| ⓔ | K1 coefficient set 1 – 4           | [K1]                | [K1 coefficient set 1 – 4]           | [▶ 448] |
| ⓔ | K2 coefficient set 1 – 4           | [K2]                | [K2 coefficient set 1 – 4]           | [▶ 448] |
| ⓔ | Water density calculator set 1 – 4 | [Water dens calc]   | [Water density calculator set 1 – 4] | [▶ 448] |
| ⓔ | Water density UNESCO1980 set 1 – 4 | [Water dens UNESCO] | [Water density UNESCO1980 set 1 – 4] | [▶ 449] |
| ⓔ | Reference temperature set 1 – 4    | [Ref temp]          | [Reference temperature set 1 – 4]    | [▶ 449] |
| ⓔ | Salinity ppt set 1 – 4             | [Salinity]          | [Salinity ppt set 1 – 4]             | [▶ 449] |
| ⓔ | Salinity fixed value set 1 – 4     | [Salinity fix]      | [Salinity fixed value set 1 – 4]     | [▶ 450] |

**Reference oil density set 1 – 4**

Ⓛ [Detailed setup] ▶ [Pro var] ▶ [NOC] ▶ [Set1 – 4] ▶ [Ref oil dens]

ⓗ [Device root menu] ▶ [Detailed setup] ▶ [Process variables] ▶ [Concentration] ▶ [NOC] ▶ [NOC concentration set 1 – 4] ▶ [Reference oil density set 1 – 4]

Sets the density of the oil determined at the reference temperature. Density at base conditions (60°F and 0 psig) p60.

|   | Value          | Description                  |
|---|----------------|------------------------------|
| ⓔ | Numeric digits | Default value is 0.8 [kg/L]. |

**Reference water density set 1 – 4**

Ⓛ [Detailed setup] ▶ [Pro var] ▶ [NOC] ▶ [Set1 – 4] ▶ [Ref water dens]

ⓗ [Device root menu] ▶ [Detailed setup] ▶ [Process variables] ▶ [Concentration] ▶ [NOC] ▶ [NOC concentration set 1 – 4] ▶ [Reference water density set 1 – 4]

Sets the density of the produced water determined at the reference temperature. Density of produced water at 15 (°C) or 60 (°F).

|   | Value          | Description                  |
|---|----------------|------------------------------|
| ⓔ | Numeric digits | Default value is 1.0 [kg/L]. |

**Oil density calculator set 1 – 4**

① [Detailed setup] ► [Pro var] ► [NOC] ► [Set1 – 4] ► [Oil dens calc]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [NOC] ► [ NOC concentration set 1 – 4 ] ► [Oil density calculator set 1 – 4]

Selects how API calculation is performed. Calculation method for Thermal expansion factor set 1 – 4 is decided.

|   | Value                                                                      | Description                                                                                                                                                                                                                                                                                                                                                    |
|---|----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓜ | Off<br>[off]<br>[Off]                                                      | No correction. Oil density is calculated as Reference oil density.                                                                                                                                                                                                                                                                                             |
| Ⓜ | Crude oil<br>[Crude oil]<br>[Crude oil]                                    | The temperature coefficient $\alpha_{60}$ is calculated based on API standard, as shown in equations. A complete calculation is performed when entering a new reference density for the oil in Reference oil density. The factors FP and CPL are recalculated every time the pressure changes. The factor CPL is calculated each time the temperature changes. |
| Ⓜ | Products<br>[Products]<br>[Products]                                       |                                                                                                                                                                                                                                                                                                                                                                |
| Ⓜ | Lubricating oil<br>[Lubricating oil]<br>[Lubricating oil]                  |                                                                                                                                                                                                                                                                                                                                                                |
| Ⓜ | Fixed thermal exp factor<br>[Thermal factor]<br>[Fixed thermal exp factor] | A temperature coefficient $\alpha_{60}$ has to be specified in Thermal expansion factor set 1 – 4. This value is used for NOC calculations.                                                                                                                                                                                                                    |
| Ⓜ | Other<br>[other]<br>[Other]                                                | Same as Crude Oil except using user defined K0, K1, and K2.                                                                                                                                                                                                                                                                                                    |

**Thermal expansion factor set 1 – 4**

① [Detailed setup] ► [Pro var] ► [NOC] ► [Set1 – 4] ► [Thermal factor]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [NOC] ► [ NOC concentration set 1 – 4 ] ► [Thermal expansion factor set 1 – 4]

Sets the Thermal expansion factor which is used for oil density calculation for each set 1 – 4.

|   | Value          | Description           |
|---|----------------|-----------------------|
| Ⓜ | Numeric digits | Default value is 0.0. |

**K0 coefficient  
set 1 – 4**

Ⓐ [Detailed setup] ► [Pro var] ► [NOC] ► [Set1 – 4] ► [K0]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [NOC] ► [ NOC concentration set 1 – 4 ] ► [K0 coefficient set 1 – 4]

Sets the current K0 coefficient which is used for oil density calculation for each set 1 – 4.

|   | Value          | Description           |
|---|----------------|-----------------------|
| Ⓐ | Numeric digits | Default value is 0.0. |

**K1 coefficient  
set 1 – 4**

Ⓐ [Detailed setup] ► [Pro var] ► [NOC] ► [Set1 – 4] ► [K1]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [NOC] ► [ NOC concentration set 1 – 4 ] ► [K1 coefficient set 1 – 4]

Sets the K1 coefficient which is used for oil density calculation for each set 1 – 4.

|   | Value          | Description           |
|---|----------------|-----------------------|
| Ⓐ | Numeric digits | Default value is 0.0. |

**K2 coefficient  
set 1 – 4**

Ⓐ [Detailed setup] ► [Pro var] ► [NOC] ► [Set1 – 4] ► [K2]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [NOC] ► [ NOC concentration set 1 – 4 ] ► [K2 coefficient set 1 – 4]

Sets the K2 coefficient which is used for oil density calculation each set 1 – 4.

|   | Value          | Description           |
|---|----------------|-----------------------|
| Ⓐ | Numeric digits | Default value is 0.0. |

**Water density  
calculator  
set 1 – 4**

Ⓐ [Detailed setup] ► [Pro var] ► [NOC] ► [Set1 – 4] ► [Water dens calc]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [NOC] ► [ NOC concentration set 1 – 4 ] ► [Water density calculator set 1 – 4]

Selects the calculation method for water density.

|   | Value                          | Description                          |
|---|--------------------------------|--------------------------------------|
| Ⓐ | SMOW                           |                                      |
| Ⓐ | [SMOW]<br>[SMOW]               | Standard Mean Ocean Water (SMOW)     |
| Ⓐ | UNESCO1980                     |                                      |
| Ⓐ | [UNESCO1980]<br>[UNESCO1980]   | Density by UNESCO1980                |
| Ⓐ | Fresh water                    |                                      |
| Ⓐ | [Fresh water]<br>[Fresh water] | Fresh Water Density by API MPMS 11.4 |

|   | Value                                                  | Description                                          |
|---|--------------------------------------------------------|------------------------------------------------------|
| Ⓕ | Produced water<br>[Produced water]<br>[Produced water] | Produced Water Density by API MPMS 20.1 Appendix A.2 |
| Ⓕ | Brine water<br>[Brine water]<br>[Brine water]          | Brine water density by El-Dessouky, Ettouy (2002)    |
| Ⓕ | STD formula<br>[Std formula]<br>[STD formula]          | Same as Standard concentration formula               |

### Water density UNESCO1980 set 1 – 4

Ⓕ [Detailed setup] ► [Pro var] ► [NOC] ► [Set1 – 4] ► [Water dens UNESCO]

Ⓕ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [NOC] ► [ NOC concentration set 1 – 4 ] ► [Water density UNESCO1980 set 1 – 4]

Selects the method for water density correction. This value is available only for UNESCO 1980 in Water density calculator set 1 – 4

|   | Value                                      | Description                      |
|---|--------------------------------------------|----------------------------------|
| Ⓕ | SMOW<br>[SMOW]<br>[SMOW]                   | Standard Mean Ocean Water (SMOW) |
| Ⓕ | UNESCO1980<br>[UNESCO1980]<br>[UNESCO1980] | Density by UNESCO1980            |

### Reference temperature set 1 – 4

Ⓕ [Detailed setup] ► [Pro var] ► [NOC] ► [Set1 – 4] ► [Ref temp]

Ⓕ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [NOC] ► [ NOC concentration set 1 – 4 ] ► [Reference temperature set 1 – 4]

Sets the Reference temperature for water density calculation for each set 1 – 4.

|   | Value          | Description                   |
|---|----------------|-------------------------------|
| Ⓕ | Numeric digits | Default value is 15.0 [degC]. |

### Salinity ppt set 1 – 4

Ⓕ [Detailed setup] ► [Pro var] ► [NOC] ► [Set1 – 4] ► [Salinity]

Ⓕ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [NOC] ► [ NOC concentration set 1 – 4 ] ► [Salinity ppt set 1 – 4]

Sets the Salinity of brine water. This value is used by Brine water density by El-Dessouky, Ettouy (2002) for each set 1 – 4.

|   | Value          | Description                                       |
|---|----------------|---------------------------------------------------|
| Ⓕ | Numeric digits | Default value is 0.0 [ppt (parts par thousands)]. |

**Salinity fixed value  
set 1 – 4**

Ⓐ [Detailed setup] ► [Pro var] ► [NOC] ► [Set1 – 4] ► [Salinity fix]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [NOC] ► [ NOC concentration set 1 – 4 ] ► [Salinity fixed value set 1 – 4]

This parameter is available when Water density calculator is Produced water. Water density is calculated by calculating Reference density water from set value in this parameter when Reference density water is set to 0 for each set 1 – 4.

|   | Value          | Description           |
|---|----------------|-----------------------|
| Ⓜ | Numeric digits | Default value is 0.0% |

**Net mass flow 1 – 2**

Set of menus for configuring net mass flow measurement.

The following menus/settings are available:

|   | Full name                   | Display name | [Modbus] name                 | Page    |
|---|-----------------------------|--------------|-------------------------------|---------|
| Ⓜ | Net mass flow 1 – 2 unit    | [Unit]       | [Net mass flow 1 – 2 unit]    | [▶ 450] |
| Ⓜ | Net mass flow 1 – 2 LRV     | [LRV]        | [Net mass flow 1 – 2 LRV]     | [▶ 451] |
| Ⓜ | Net mass flow 1 – 2 URV     | [URV]        | [Net mass flow 1 – 2 URV]     | [▶ 451] |
| Ⓜ | Net mass flow 1 – 2 damping | [Damp]       | [Net mass flow 1 – 2 damping] | [▶ 452] |
| Ⓜ | Additional function         | [Add func]   | [Additional function]         | [▶ 452] |

**Net mass flow  
1 – 2 unit**

Ⓐ [Detailed setup] ► [Pro var] ► [Net mass 1 – 2] ► [Unit]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Net mass flow 1 – 2] ► [Net mass flow 1 – 2 unit]

Sets the unit for net mass flow 1 – 2.



The unit displayed on the LCD may vary depending on the setting of the parameter *Display unit selection*. During Modbus communication, the actually displayed unit may vary depending on the Modbus tool. For details, refer to *Units of the parameters* [▶ 819].

|   | Value       | Description                                                           |
|---|-------------|-----------------------------------------------------------------------|
| Ⓢ | g/s         | Sets the displayed Net mass flow 1 – 2 unit.<br>Default value is t/h. |
| Ⓢ | g/min       |                                                                       |
| Ⓢ | g/h         |                                                                       |
| Ⓢ | kg/s        |                                                                       |
| Ⓢ | kg/min      |                                                                       |
| Ⓢ | kg/h        |                                                                       |
| Ⓢ | kg/d        |                                                                       |
| Ⓢ | t/min       |                                                                       |
| Ⓢ | t/h         |                                                                       |
| Ⓢ | t/d         |                                                                       |
| Ⓢ | ton(US)/min |                                                                       |
| Ⓢ | ton(US)/h   |                                                                       |
| Ⓢ | ton(US)/d   |                                                                       |
| Ⓢ | ton(UK)/min |                                                                       |
| Ⓢ | ton(UK)/h   |                                                                       |
| Ⓢ | ton(UK)/d   |                                                                       |
| Ⓢ | lb/s        |                                                                       |
| Ⓢ | lb/min      |                                                                       |
| Ⓢ | lb/h        |                                                                       |
| Ⓢ | lb/d        |                                                                       |
| Ⓢ | User unit   |                                                                       |

### Net mass flow 1 – 2 LRV

① [Detailed setup] ► [Pro var] ► [Net mass 1 – 2] ► [LRV]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Net mass flow 1 – 2] ► [Net mass flow 1 – 2 LRV]

Sets the lower range value, 0 %, for the scaling of the analog, frequency and pulse outputs for net mass flow 1 – 2 measurement.

|   | Value          | Description                                                                                                                                                                                                                                                                                        |
|---|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | <p>Default value is 0.0.</p> <p>Settings must satisfy the following conditions:</p> <p><math>URV \neq LRV</math></p> <p><math>LRV \leq Q_{max}</math></p> <p><math>LRV \geq -Q_{max}</math></p> <p>For the <math>Q_{max}</math> value refer to the General Specification (GS) of each product.</p> |

### Net mass flow 1 – 2 URV

① [Detailed setup] ► [Pro var] ► [Net mass 1 – 2] ► [URV]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Net mass flow 1 – 2] ► [Net mass flow 1 – 2 URV]

Sets the upper range value, 100 %, for the scaling of the analog, frequency and pulse outputs for net mass flow 1 – 2 measurement.

|   | Value          | Description                                                                                                                                                                                                                                   |
|---|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | <p>Default value is 10.0.</p> <p>Settings must satisfy the following conditions:</p> $URV \leq Q_{max}$ $URV \geq -Q_{max}$ $URV \neq LRV$ <p>For the <math>Q_{max}</math> value refer to the General Specification (GS) of each product.</p> |

### Net mass flow 1 – 2 damping

Ⓐ [Detailed setup] ► [Pro var] ► [Net mass 1 – 2] ► [Damp]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Net mass flow 1 – 2] ► [Net mass flow 1 – 2 damping]

Sets the damping constant for the net mass flow 1 – 2 measurement.

The value is time for the value to become 63.2% of total amount of change.

|   | Value          | Description                                                         |
|---|----------------|---------------------------------------------------------------------|
| Ⓜ | Numeric digits | <p>Setting range: 0.0 – 200.0 s.</p> <p>Default value is 3.0 s.</p> |

### Additional function

Menu for configuring the Net mass flow measurement in detail. The menu is only available when *Process variables additional parameters*, see *Process variables* [ 380] has been set to Apply.

The following menus/settings are available:

|   | Full name                                       | Display name   | [Modbus] name                                     | Page   |
|---|-------------------------------------------------|----------------|---------------------------------------------------|--------|
| Ⓜ | Net mass flow 1 – 2 low cut                     | [Lowcut]       | [Net mass flow 1 – 2 lowcut]                      | [ 452] |
| Ⓜ | Net mass flow 1 – 2 user unit                   | [User unit]    | [Net mass flow 1 – 2 user unit]                   | [ 453] |
| Ⓜ | Net mass flow 1 – 2 user unit conversion factor | [Conv factor]  | [Net mass flow 1 – 2 user unit conversion factor] | [ 453] |
| Ⓜ | Net mass flow 1 – 2 bi-directional mode         | [Bi-dir mode]  | [Net mass flow 1 – 2 bi-directional mode]         | [ 453] |
| Ⓜ | Net mass flow 1 – 2 damping pulse/total         | [Damp pls/ttl] | [Net mass flow 1 – 2 damping pulse/total]         | [ 454] |
| Ⓜ | Net mass flow 1 – 2 trim select                 | [Trim sel]     | [Net mass flow 1 – 2 trim select]                 | [ 454] |
| Ⓜ | Net mass flow 1 – 2 trim offset                 | [Trim offset]  | [Net mass flow 1 – 2 trim offset]                 | [ 454] |
| Ⓜ | Net mass flow 1 – 2 trim gain                   | [Trim gain]    | [Net mass flow 1 – 2 trim gain]                   | [ 454] |

### Net mass flow 1 – 2 lowcut

Ⓐ [Detailed setup] ► [Pro var] ► [Net mass 1 – 2] ► [Add func] ► [Lowcut]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Net mass flow 1 – 2] ► [Additional function] ► [Net mass flow 1 – 2 lowcut]

Sets a value for the low cut-off of net mass flow 1 – 2.



|   | Value          | Description                                                                                                                                                                                                                   |
|---|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓢ | Numeric digits | Settings must satisfy the following condition:<br>$ \text{Net mass flow 1 - 2 low cut}  \leq Q_{\text{nom}} * 0.2$<br>For the value of $Q_{\text{max}}$ , refer to the General Specifications (GS) of the particular product. |

### Net mass flow 1 – 2 user unit

Ⓛ [Detailed setup] ► [Pro var] ► [Net mass 1 – 2] ► [Add func] ► [User unit]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Net mass flow 1 – 2] ► [Additional function] ► [Net mass flow 1 – 2 user unit]

Sets the user-defined unit for net mass flow 1 – 2.

|   | Value            | Description                                                |
|---|------------------|------------------------------------------------------------|
| – | ASCII characters | Maximum length is 8 characters.<br>Default value is blank. |

### Net mass flow 1 – 2 user unit conversion factor

Ⓛ [Detailed setup] ► [Pro var] ► [Net mass 1 – 2] ► [Add func] ► [Conv factor]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Net mass flow 1 – 2] ► [Additional function] ► [Net mass flow 1 – 2 user unit conversion factor]

Sets the conversion factor for the user-defined unit.

|   | Value          | Description                                                                                                                                                   |
|---|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓢ | Numeric digits | Reference unit is kg/h.<br>Default value is 1.0.<br>Measured value at user-defined unit = measured net mass flow value at kg/h * conversion factor from kg/h. |

### Net mass flow 1 – 2 bi-directional mode

Ⓛ [Detailed setup] ► [Pro var] ► [Net mass 1 – 2] ► [Add func] ► [Bi-dir mode]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Net mass flow 1 – 2] ► [Additional function] ► [Net mass flow 1 – 2 bi-directional mode]

Sets whether bi-directional mode on analog output and pulse output is used for net mass flow 1 – 2.

|   | Value                                      | Description                                                                                                                                                                                 |
|---|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓢ | Not active<br>[Not active]<br>[Not active] | Bi-directional mode is not active. Analog and pulse signals are generated when flow direction is either forward or reverse.<br>Default value.                                               |
| Ⓢ | Active<br>[Active]<br>[Active]             | Bi-directional mode is active. Analog and pulse signals are generated for both forward flow and reverse flow.<br>Net mass flow 1 – 2 URV and Net mass flow 1 – 2 LRV must be the same sign. |

**Net mass flow  
1 – 2 damping  
pulse/total**

Ⓐ [Detailed setup] ► [Pro var] ► [Net mass 1 – 2] ► [Add func] ► [Damp pls/ttl]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Net mass flow 1 – 2] ► [Additional function] ► [Net mass flow 1 – 2 damping pulse/total]

Sets the damping constant for the net mass flow value 1 – 2 on pulse output and total.

The value is the time it takes for this value on the output to become 63.2% of the total amount of change.

|   | Value          | Description                                              |
|---|----------------|----------------------------------------------------------|
| Ⓜ | Numeric digits | Setting range: 0.0 – 200.0 s.<br>Default value is 0.0 s. |

**Net mass flow  
1 – 2 trim select**

Ⓐ [Detailed setup] ► [Pro var] ► [Net mass 1 – 2] ► [Add func] ► [Trim sel]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Net mass flow 1 – 2] ► [Additional function] ► [Net mass flow 1 – 2 trim select]

Enables or disables the trim function during net mass flow 1 – 2 measurement.

|   | Value                             | Description                                                                                                                                                                                                                                   |
|---|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓜ | Inhibit<br>[Inhibit]<br>[Inhibit] | Trim function during net mass flow 1 – 2 measurement is disabled.<br>Default value.                                                                                                                                                           |
| Ⓜ | Enable<br>[Enable]<br>[Enable]    | Trim function during net mass flow 1 – 2 measurement is enabled.<br>Net mass flow value is linearly trimmed using Net mass flow trim offset and Net mass flow trim gain.<br>Trimmed net mass flow value = gain * net mass flow value + offset |

**Net mass flow  
1 – 2 trim offset**

Ⓐ [Detailed setup] ► [Pro var] ► [Net mass 1 – 2] ► [Add func] ► [Trim offset]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Net mass flow 1 – 2] ► [Additional function] ► [Net mass flow 1 – 2 trim offset]

Sets the offset for trimming of net mass flow 1 – 2.

|   | Value          | Description                  |
|---|----------------|------------------------------|
| Ⓜ | Numeric digits | Default value is 0.000e+000. |

**Net mass flow  
1 – 2 trim gain**

Ⓐ [Detailed setup] ► [Pro var] ► [Net mass 1 – 2] ► [Add func] ► [Trim gain]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Net mass flow 1 – 2] ► [Additional function] ► [Net mass flow 1 – 2 trim gain]

Sets the gain for trimming the net mass flow 1 – 2 measurement.

|   | Value          | Description             |
|---|----------------|-------------------------|
| ⓔ | Numeric digits | Default value is 1.000. |

**Net volume flow 1 – 2**

Set of menus for configuring the net volume flow 1 – 2 measurement.

The following menus/settings are available:

|   | Full name                          | Display name | [Modbus] name                   | Page    |
|---|------------------------------------|--------------|---------------------------------|---------|
| ⓔ | Net volume flow 1 – 2 unit         | [Unit]       | [Net volume flow 1 – 2 unit]    | [▶ 455] |
| ⓔ | Net volume flow 1 – 2 LRV          | [LRV]        | [Net volume flow 1 – 2 LRV]     | [▶ 457] |
| ⓔ | Net volume flow 1 – 2 URV          | [URV]        | [Net volume flow 1 – 2 URV]     | [▶ 457] |
| ⓔ | Net volume flow 1 – 2 damp-<br>ing | [Damp]       | [Net volume flow 1 – 2 damping] | [▶ 457] |
| ⓔ | Additional function                | [Add func]   | [Additional function]           | [▶ 458] |

**Net volume flow  
1 – 2 unit**

Ⓛ [Detailed setup] ▶ [Pro var] ▶ [Net volume flow 1 – 2] ▶ [Unit]

ⓗ [Device root menu] ▶ [Detailed setup] ▶ [Process variables] ▶ [Net volume flow 1 – 2] ▶ [Net volume flow 1 – 2 unit]

Sets the unit for net volume flow 1 – 2.



The unit displayed on the LCD may vary depending on the setting of the parameter *Display unit selection*. During Modbus communication, the actually displayed unit may vary depending on the Modbus tool. For details, refer to *Units of the parameters* [▶ 819].

|   | Value                | Description                                                                           |
|---|----------------------|---------------------------------------------------------------------------------------|
| Ⓔ | cm <sup>3</sup> /s   | Sets the displayed Net volume flow 1 – 2 unit.<br>Default value is m <sup>3</sup> /h. |
| Ⓔ | cm <sup>3</sup> /min |                                                                                       |
| Ⓔ | cm <sup>3</sup> /h   |                                                                                       |
| Ⓔ | l/s                  |                                                                                       |
| Ⓔ | l/min                |                                                                                       |
| Ⓔ | l/h                  |                                                                                       |
| Ⓔ | l/d                  |                                                                                       |
| Ⓔ | m <sup>3</sup> /s    |                                                                                       |
| Ⓔ | m <sup>3</sup> /min  |                                                                                       |
| Ⓔ | m <sup>3</sup> /h    |                                                                                       |
| Ⓔ | m <sup>3</sup> /d    |                                                                                       |
| Ⓔ | gal/s                |                                                                                       |
| Ⓔ | gal/min              |                                                                                       |
| Ⓔ | gal/h                |                                                                                       |
| Ⓔ | gal/d                |                                                                                       |
| Ⓔ | ft <sup>3</sup> /s   |                                                                                       |
| Ⓔ | ft <sup>3</sup> /min |                                                                                       |
| Ⓔ | ft <sup>3</sup> /h   |                                                                                       |
| Ⓔ | ft <sup>3</sup> /d   |                                                                                       |
| Ⓔ | bbl/s                |                                                                                       |
| Ⓔ | bbl/min              |                                                                                       |
| Ⓔ | bbl/h                |                                                                                       |
| Ⓔ | bbl/d                |                                                                                       |
| Ⓔ | Impgal/s             |                                                                                       |
| Ⓔ | Impgal/min           |                                                                                       |
| Ⓔ | Impgal/h             |                                                                                       |
| Ⓔ | Impgal/d             |                                                                                       |
| Ⓔ | User unit            |                                                                                       |

**Net volume flow  
1 – 2 LRV**

① [Detailed setup] ► [Pro var] ► [Net volume flow 1 – 2] ► [LRV]

② [Device root menu] ► [Detailed setup] ► [Process variables] ► [Net volume flow 1 – 2] ► [Net volume flow 1 – 2 LRV]

Sets the lower range value, 0 %, for the scaling of the analog, frequency and pulse outputs for the net volume flow 1 – 2 measurement.

|   | Value          | Description                                                                          |
|---|----------------|--------------------------------------------------------------------------------------|
| ② | Numeric digits | Default value is 0.0.<br>Settings must satisfy the following condition:<br>URV ≠ LRV |

**Net volume flow  
1 – 2 URV**

① [Detailed setup] ► [Pro var] ► [Net volume flow 1 – 2] ► [URV]

② [Device root menu] ► [Detailed setup] ► [Process variables] ► [Net volume flow 1 – 2] ► [Net volume flow 1 – 2 URV]

Sets the upper range value, 100 %, for the scaling of the analog, frequency and pulse outputs for the net volume flow 1 – 2 measurement.

|   | Value          | Description            |
|---|----------------|------------------------|
| ② | Numeric digits | Default value is 10.0. |

**Net volume flow  
1 – 2 damping**

① [Detailed setup] ► [Pro var] ► [Net volume flow 1 – 2] ► [Damp]

② [Device root menu] ► [Detailed setup] ► [Process variables] ► [Net volume flow 1 – 2] ► [Net mass flow 1 – 2 damping]

Sets the damping constant for the net volume flow 1 – 2 measurement.

The value is the time it takes for this value to become 63.2% of the total amount of change.

|   | Value          | Description                                              |
|---|----------------|----------------------------------------------------------|
| ② | Numeric digits | Setting range: 0.0 – 200.0 s.<br>Default value is 3.0 s. |

**Additional function**

Menu for configuring the net volume flow measurement in detail. The menu is only available when *Process variables additional parameters*, see *Process variables* [ 380] has been set in Apply.

The following menus/settings are available:

|   | Full name                                         | Display name   | [Modbus] name                                       | Page   |
|---|---------------------------------------------------|----------------|-----------------------------------------------------|--------|
| ⓔ | Net volume flow 1 – 2 low cut                     | [Lowcut]       | [Net volume flow 1 – 2 lowcut]                      | [ 458] |
| ⓔ | Net volume flow 1 – 2 user unit                   | [User unit]    | [Net volume flow 1 – 2 user unit]                   | [ 458] |
| ⓔ | Net volume flow 1 – 2 user unit conversion factor | [Conv factor]  | [Net volume flow 1 – 2 user unit conversion factor] | [ 453] |
| ⓔ | Net volume flow 1 – 2 bi-directional mode         | [Bi-dir mode]  | [Net volume flow 1 – 2 bi-directional mode]         | [ 459] |
| ⓔ | Net volume flow 1 – 2 damping pulse/total         | [Damp pls/ttl] | [Net volume flow 1 – 2 damping pulse/total]         | [ 459] |
| ⓔ | Net volume flow 1 – 2 trim select                 | [Trim sel]     | [Net volume flow 1 – 2 trim select]                 | [ 460] |
| ⓔ | Net volume flow 1 – 2 trim offset                 | [Trim offset]  | [Net volume flow 1 – 2 trim offset]                 | [ 460] |
| ⓔ | Net volume flow 1 – 2 trim gain                   | [Trim gain]    | [Net volume flow 1 – 2 trim gain]                   | [ 460] |

**Net volume flow 1 – 2 low cut**

Ⓛ [Detailed setup] ► [Pro var] ► [Net volume flow 1 – 2] ► [Add func] ► [Lowcut]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Net volume flow 1 – 2] ► [Additional function] ► [Net volume flow 1 – 2 lowcut]

Sets a value for the low cut-off of net volume flow 1 – 2.

|   | Value          | Description |
|---|----------------|-------------|
| ⓔ | Numeric digits |             |

**Net volume flow 1 – 2 user unit**

Ⓛ [Detailed setup] ► [Pro var] ► [Net volume flow 1 – 2] ► [Add func] ► [User unit]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Net volume flow 1 – 2] ► [Additional function] ► [Net volume flow 1 – 2 user unit]

Sets the user-defined unit for net volume flow 1 – 2.

|   | Value            | Description                                                |
|---|------------------|------------------------------------------------------------|
| – | ASCII characters | Maximum length is 8 characters.<br>Default value is blank. |

**Net volume flow 1 – 2 user unit conversion factor**

① [Detailed setup] ► [Pro var] ► [Net volume flow 1 – 2] ► [Add func] ► [Conv factor]

④ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Net volume flow 1 – 2] ► [Additional function] ► [Net volume flow 1 – 2 user unit conversion factor]

Sets the conversion factor for the user-defined unit.

|   | Value          | Description                                                                                                                                                                                            |
|---|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ⑥ | Numeric digits | Reference unit is m <sup>3</sup> /h.<br>Default value is 1.0.<br>Measured value at user-defined unit = measured net volume flow value at m <sup>3</sup> /h * conversion factor from m <sup>3</sup> /h. |

**Net volume flow 1 – 2 bi-directional mode**

① [Detailed setup] ► [Pro var] ► [Net volume flow 1 – 2] ► [Add func] ► [Bi-dir mode]

④ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Net volume flow 1 – 2] ► [Additional function] ► [Net volume flow 1 – 2 bi-directional mode]

Sets whether bi-directional mode on analog output and pulse output is used for net volume flow 1 – 2.

|   | Value                                      | Description                                                                                                                                                                                     |
|---|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ⑥ | Not active<br>[Not active]<br>[Not active] | Bi-directional mode is not active. Analog and pulse signals are generated when flow direction is either forward or reverse.<br>Default value.                                                   |
| ⑥ | Active<br>[Active]<br>[Active]             | Bi-directional mode is active. Analog and pulse signals are generated for both forward flow and reverse flow.<br>Net volume flow 1 – 2 URV and Net volume flow 1 – 2 LRV must be the same sign. |

**Net volume flow 1 – 2 damping pulse/total**

① [Detailed setup] ► [Pro var] ► [Net volume flow 1 – 2] ► [Add func] ► [Damp pls/ttl]

④ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Net volume flow 1 – 2] ► [Additional function] ► [Net volume flow 1 – 2 damping pulse/total]

Sets the damping constant for the net volume flow value 1 – 2 on pulse output and total.

The value is the time it takes for this value on the output to become 63.2% of the total amount of change.

|   | Value          | Description                                              |
|---|----------------|----------------------------------------------------------|
| ⑥ | Numeric digits | Setting range: 0.0 – 200.0 s.<br>Default value is 0.0 s. |

**Net volume flow  
1 – 2 trim select**

Ⓐ [Detailed setup] ► [Pro var] ► [Net volume flow 1 – 2] ► [Add func] ► [Trim sel]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Net volume flow 1 – 2] ► [Additional function] ► [Net volume flow 1 – 2 trim select]

Enables or disables the trim function during net volume flow 1 – 2 measurement.

|   | Value                             | Description                                                                           |
|---|-----------------------------------|---------------------------------------------------------------------------------------|
| Ⓐ | Inhibit<br>[Inhibit]<br>[Inhibit] | Trim function during net volume flow 1 – 2 measurement is disabled.<br>Default value. |
| Ⓐ | Enable<br>[Enable]<br>[Enable]    | Trim function during net volume flow 1 – 2 measurement is enabled.                    |

**Net volume flow  
1 – 2 trim offset**

Ⓐ [Detailed setup] ► [Pro var] ► [Net volume flow 1 – 2] ► [Add func] ► [Trim offset]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Net volume flow 1 – 2] ► [Additional function] ► [Net volume flow 1 – 2 trim offset]

Sets the offset for trimming of net volume flow 1 – 2.

|   | Value          | Description                  |
|---|----------------|------------------------------|
| Ⓐ | Numeric digits | Default value is 0.000e+000. |

**Net volume flow  
1 – 2 trim gain**

Ⓐ [Detailed setup] ► [Pro var] ► [Net volume flow 1 – 2] ► [Add func] ► [Trim gain]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Net volume flow 1 – 2] ► [Additional function] ► [Net volume flow 1 – 2 trim gain]

Sets the gain for trimming of the net volume flow 1 – 2 measurement.

|   | Value          | Description             |
|---|----------------|-------------------------|
| Ⓐ | Numeric digits | Default value is 1.000. |



Net corrected volume flow

Menu for configuring the net corrected volume flow measurement.

The following menus/settings are available:

|   | Full name                         | Display name | [Modbus] name                       | Page    |
|---|-----------------------------------|--------------|-------------------------------------|---------|
| ⓔ | Net corrected volume flow unit    | [Unit]       | [Net corrected volume flow unit]    | [▶ 461] |
| ⓔ | Net corrected volume flow LRV     | [LRV]        | [Net corrected volume flow LRV]     | [▶ 462] |
| ⓔ | Net corrected volume flow URV     | [URV]        | [Net corrected volume flow URV]     | [▶ 462] |
| ⓔ | Net corrected volume flow damping | [Damp]       | [Net corrected volume flow damping] | [▶ 463] |
| ⓔ | Additional function               | [Add func]   | [Additional function]               | [▶ 463] |

Net corrected volume flow unit

- Ⓛ [Detailed setup] ▶ [Pro var] ▶ [Net corr vol] ▶ [Unit]
- ⓗ [Device root menu] ▶ [Detailed setup] ▶ [Process variables] ▶ [Net corrected volume flow] ▶ [Net corrected volume flow unit]

Sets the unit for the net corrected volume flow.



The unit displayed on the LCD may vary depending on the setting of the parameter *Display unit selection*. During Modbus communication, the actually displayed unit may vary depending on the Modbus tool. For details, refer to *Units of the parameters* [▶ 819].

|   | Value                          | Description                                                                                 |
|---|--------------------------------|---------------------------------------------------------------------------------------------|
| Ⓔ | L/s(normal)                    | Setting of indicated Net corrected volume flow unit.<br>Default value is m <sup>3</sup> /h. |
| Ⓔ | L/min(normal)                  |                                                                                             |
| Ⓔ | L/h(normal)                    |                                                                                             |
| Ⓔ | L/d(normal)                    |                                                                                             |
| Ⓔ | m <sup>3</sup> /s(normal)      |                                                                                             |
| Ⓔ | m <sup>3</sup> /min(normal)    |                                                                                             |
| Ⓔ | m <sup>3</sup> /h(normal)      |                                                                                             |
| Ⓔ | m <sup>3</sup> /d(normal)      |                                                                                             |
| Ⓔ | L/s(standard)                  |                                                                                             |
| Ⓔ | L/min(standard)                |                                                                                             |
| Ⓔ | L/h(standard)                  |                                                                                             |
| Ⓔ | L/d(standard)                  |                                                                                             |
| Ⓔ | ft <sup>3</sup> /s(standard)   |                                                                                             |
| Ⓔ | ft <sup>3</sup> /min(standard) |                                                                                             |
| Ⓔ | ft <sup>3</sup> /h(standard)   |                                                                                             |
| Ⓔ | ft <sup>3</sup> /d(standard)   |                                                                                             |
| Ⓔ | MMscuft/s                      |                                                                                             |
| Ⓔ | MMscuft/min                    |                                                                                             |
| Ⓔ | MMscuft/h                      |                                                                                             |
| Ⓔ | MMscuft/d                      |                                                                                             |
| Ⓔ | m <sup>3</sup> /s(standard)    |                                                                                             |
| Ⓔ | m <sup>3</sup> /min(standard)  |                                                                                             |
| Ⓔ | m <sup>3</sup> /h(standard)    |                                                                                             |
| Ⓔ | m <sup>3</sup> /d(standard)    |                                                                                             |
| Ⓔ | User unit                      |                                                                                             |

### Net corrected volume flow LRV

Ⓖ [Detailed setup] ► [Pro var] ► [Net corr vol] ► [LRV]

Ⓗ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Net corrected volume flow] ► [Net corrected volume flow LRV]

Sets the lower range value, 0 %, for the scaling of the analog, frequency and pulse outputs for the net corrected volume flow measurement.

|   | Value          | Description                                                                        |
|---|----------------|------------------------------------------------------------------------------------|
| Ⓔ | Numeric digits | Default value is 0.<br>Settings must satisfy the following condition:<br>URV ≠ LRV |

### Net corrected volume flow URV

Ⓖ [Detailed setup] ► [Pro var] ► [Net corr vol] ► [URV]

Ⓗ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Net corrected volume flow] ► [Net corrected volume flow URV]

Sets the upper range value, 100 %, for the scaling of the analog, frequency and pulse outputs for the net corrected volume flow measurement.

|   | Value          | Description            |
|---|----------------|------------------------|
| Ⓔ | Numeric digits | Default value is 10.0. |

**Net corrected volume flow damping**

① [Detailed setup] ► [Pro var] ► [Net corr vol] ► [Damp]

② [Device root menu] ► [Detailed setup] ► [Process variables] ► [Net corrected volume flow] ► [Net corrected volume flow damping]

Sets the damping constant for the net corrected volume flow measurement.

The value is the time it takes for this value to become 63.2% of the total amount of change.

|   | Value          | Description                                              |
|---|----------------|----------------------------------------------------------|
| ③ | Numeric digits | Setting range: 0.0 – 200.0 s.<br>Default value is 3.0 s. |

**Additional function**

Menu for configuring the net corrected volume flow measurement in detail. The menu is only available when *Process variables additional parameters*, *Process variables* [► 380] has been set to Apply.

The following menus/settings are available:

|   | Full name                                             | Display name   | [Modbus] name                                           | Page    |
|---|-------------------------------------------------------|----------------|---------------------------------------------------------|---------|
| ④ | Net corrected volume flow low cut                     | [Lowcut]       | [Net corrected volume flow lowcut]                      | [► 463] |
| ⑤ | Net corrected volume flow user unit                   | [User unit]    | [Net corrected volume flow user unit]                   | [► 464] |
| ⑥ | Net corrected volume flow user unit conversion factor | [Conv factor]  | [Net corrected volume flow user unit conversion factor] | [► 464] |
| ⑦ | Net corrected volume flow bi-directional mode         | [Bi-dir mode]  | [Net corrected volume flow bi-directional mode]         | [► 464] |
| ⑧ | Net corrected volume flow damping pulse/total         | [Damp pls/ttl] | [Net corrected volume flow damping pulse/total]         | [► 465] |
| ⑨ | Net corrected volume flow trim select                 | [Trim sel]     | [Net corrected volume flow trim select]                 | [► 465] |
| ⑩ | Net corrected volume flow trim offset                 | [Trim offset]  | [Net corrected volume flow trim offset]                 | [► 465] |
| ⑪ | Net corrected volume flow trim gain                   | [Trim gain]    | [Net corrected volume flow trim gain]                   | [► 465] |

**Net corrected volume flow low cut**

① [Detailed setup] ► [Pro var] ► [Net corr vol] ► [Add func] ► [Lowcut]

② [Device root menu] ► [Detailed setup] ► [Process variables] ► [Net corrected volume flow] ► [Additional function] ► [Net corrected volume flow lowcut]

Sets a value for the low cut-off of the net corrected volume flow.

|   | Value          | Description                                                     |
|---|----------------|-----------------------------------------------------------------|
| ③ | Numeric digits | Value below which the net corrected volume flow is set to zero. |

**Net corrected volume flow user unit**

Ⓐ [Detailed setup] ► [Pro var] ► [Net corr vol] ► [Add func] ► [User unit]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Net corrected volume flow] ► [Additional function] ► [Net corrected volume flow user unit]

Sets the unit for the net corrected volume flow.

|   | Value            | Description                                                |
|---|------------------|------------------------------------------------------------|
| – | ASCII characters | Maximum length is 8 characters.<br>Default value is blank. |

**Net corrected volume flow user unit conversion factor**

Ⓐ [Detailed setup] ► [Pro var] ► [Net corr vol] ► [Add func] ► [Conv factor]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Net corrected volume flow] ► [Additional function] ► [Net corrected volume flow user unit conversion factor]

Sets the conversion factor for the user-defined unit.

|   | Value          | Description                                                                                                                                                                                                     |
|---|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓜ | Numeric digits | Reference unit is m <sup>3</sup> /h<br>Default value is 1.0.<br>Measured value at user-defined unit = measured net corrected volume flow value at m <sup>3</sup> /h * conversion factor from m <sup>3</sup> /h. |

**Net corrected volume flow bi-directional mode**

Ⓐ [Detailed setup] ► [Pro var] ► [Net corr vol] ► [Add func] ► [Bi-dir mode]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Net corrected volume flow] ► [Additional function] ► [Net corrected volume flow bi-directional mode]

Sets whether bi-directional mode on analog output and pulse output is used for the net corrected volume flow.

|   | Value                                      | Description                                                                                                                                                                                                |
|---|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓜ | Not active<br>[Not active]<br>[Not active] | Bi-directional mode is not active. Analog and pulse signals are generated when the flow direction is either forward or reverse.<br>Default value.                                                          |
| Ⓜ | Active<br>[Active]<br>[Active]             | Bi-directional mode is active. Analog and pulse signals are generated for both of forward flow and reverse flow.<br>Net corrected volume flow URV and Net corrected volume flow LRV must be the same sign. |

**Net corrected volume flow damping pulse/total**

① [Detailed setup] ► [Pro var] ► [Net corr vol] ► [Add func] ► [Damp pls/ttl]

② [Device root menu] ► [Detailed setup] ► [Process variables] ► [Net corrected volume flow] ► [Additional function] ► [Net corrected volume flow damping pulse/total]

Sets the damping constant for the net corrected volume flow value on pulse output and total.

The value is the time it takes for this value on the output to become 63.2% of the total amount of change.

|   | Value          | Description                                              |
|---|----------------|----------------------------------------------------------|
| ② | Numeric digits | Setting range: 0.0 – 200.0 s.<br>Default value is 0.0 s. |

**Net corrected volume flow trim select**

① [Detailed setup] ► [Pro var] ► [Net corr vol] ► [Add func] ► [Trim sel]

② [Device root menu] ► [Detailed setup] ► [Process variables] ► [Net corrected volume flow] ► [Additional function] ► [Net corrected volume flow trim select]

Enables or disables the trim function during net corrected volume flow measurement.

|   | Value                             | Description                                                                               |
|---|-----------------------------------|-------------------------------------------------------------------------------------------|
| ② | Inhibit<br>[Inhibit]<br>[Inhibit] | Trim function during net corrected volume flow measurement is disabled.<br>Default value. |
| ② | Enable<br>[Enable]<br>[Enable]    | Trim function during net corrected volume flow measurement is enabled.                    |

**Net corrected volume flow trim offset**

① [Detailed setup] ► [Pro var] ► [Net corr vol] ► [Add func] ► [Trim offset]

② [Device root menu] ► [Detailed setup] ► [Process variables] ► [Net corrected volume flow] ► [Additional function] ► [Net corrected volume flow trim offset]

Sets the offset for trimming of the net corrected volume flow measurement.

|   | Value          | Description                  |
|---|----------------|------------------------------|
| ② | Numeric digits | Default value is 0.000e+000. |

**Net corrected volume flow trim gain**

① [Detailed setup] ► [Pro var] ► [Net corr vol] ► [Add func] ► [Trim gain]

② [Device root menu] ► [Detailed setup] ► [Process variables] ► [Net corrected volume flow] ► [Additional function] ► [Net corrected volume flow trim gain]

Sets the gain for trimming the net corrected volume flow measurement.

|   | Value          | Description             |
|---|----------------|-------------------------|
| ② | Numeric digits | Default value is 1.000. |

**Viscosity**

Menu for configuring the Viscosity. This function is available only for VM option.

The following menus/settings are available:

|   | Full name           | Display name | [Modbus] name         | Page    |
|---|---------------------|--------------|-----------------------|---------|
| ⓔ | Viscosity unit      | [Unit]       | [Viscosity unit]      | [▶ 466] |
| ⓔ | Viscosity LRV       | [LRV]        | [Viscosity LRV]       | [▶ 466] |
| ⓔ | Viscosity URV       | [URV]        | [Viscosity URV]       | [▶ 467] |
| ⓔ | Viscosity damping   | [Damp]       | [Viscosity damping]   | [▶ 467] |
| ⓔ | Additional function | [Add func]   | [Additional function] | [▶ 467] |

**Viscosity unit**

Ⓛ [Detailed setup] ▶ [Pro var] ▶ [Visc] ▶ [Unit]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Process variables] ▶ [Viscosity] ▶ [Viscosity unit]

Sets the unit for Viscosity.

|   | Value                 | Description                                                    |
|---|-----------------------|----------------------------------------------------------------|
| ⓔ | mPas                  | Setting of indicated Viscosity unit.<br>Default value is mPas. |
| ⓔ | Pas                   |                                                                |
| ⓔ | cP                    |                                                                |
| ⓔ | Ns/m <sup>2</sup>     |                                                                |
| ⓔ | kg/ms                 |                                                                |
| ⓔ | User unit (dynamic)   |                                                                |
| ⓔ | cSt                   |                                                                |
| ⓔ | St                    |                                                                |
| ⓔ | mm <sup>2</sup> /s    |                                                                |
| ⓔ | cm <sup>2</sup> /s    |                                                                |
| ⓔ | dm <sup>2</sup> /s    |                                                                |
| ⓔ | m <sup>2</sup> /s     |                                                                |
| ⓔ | User unit (kinematic) |                                                                |



The unit displayed on the LCD may vary depending on the setting of the parameter *Display unit selection*. During Modbus communication, the actually displayed unit may vary depending on the Modbus tool. For details, refer to *Units of the parameters* [▶ 819].

**Viscosity LRV**

Ⓛ [Detailed setup] ▶ [Pro var] ▶ [Visc] ▶ [LRV]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Process variables] ▶ [Viscosity] ▶ [Viscosity LRV]

Sets the lower range value, 0 %, for the scaling of the analog and frequency for the Viscosity.

|   | Value          | Description                                                                    |
|---|----------------|--------------------------------------------------------------------------------|
| ⓔ | Numeric digits | Default value is 0.<br>Setting must satisfy the following condition: URV ≠ LRV |

**Viscosity URV**

① [Detailed setup] ► [Pro var] ► [Visc] ► [URV]

② [Device root menu] ► [Detailed setup] ► [Process variables] ► [Viscosity] ► [Viscosity URV]

Sets the upper range value, 100 %, for the scaling of the analog and frequency for the Viscosity.

|   | Value          | Description             |
|---|----------------|-------------------------|
| ③ | Numeric digits | Default value is 100.0. |

**Viscosity damping**

① [Detailed setup] ► [Pro var] ► [Visc] ► [Damp]

② [Device root menu] ► [Detailed setup] ► [Process variables] ► [Viscosity] ► [Viscosity damping]

Sets the damping constant for the Viscosity.

The value is the time it takes for this value to become 63.2 % of the total amount of change.

|   | Value          | Description                                              |
|---|----------------|----------------------------------------------------------|
| ③ | Numeric digits | Setting range: 0.0 – 200.0 s.<br>Default value is 3.0 s. |

**Additional function**

Menu for configuring the Viscosity in detail. The menu is only available when *Process variables additional parameters*, see *Process variables* [▶ 380] has been set to Apply.

The following menus/settings are available:

|   | Full name                                       | Display name      | [Modbus] name                                     | Page    |
|---|-------------------------------------------------|-------------------|---------------------------------------------------|---------|
| ③ | Viscosity user unit dynamic                     | [User unit (d)]   | [Viscosity user unit dynamic]                     | [▶ 467] |
| ③ | Viscosity user unit kinematic                   | [User unit (k)]   | [Viscosity user unit kinematic]                   | [▶ 468] |
| ③ | Viscosity user unit dynamic conversion factor   | [Conv factor (d)] | [Viscosity user unit dynamic conversion factor]   | [▶ 468] |
| ③ | Viscosity user unit kinematic conversion factor | [Conv factor (k)] | [Viscosity user unit kinematic conversion factor] | [▶ 468] |
| ③ | Viscosity trim select                           | [Trim sel]        | [Viscosity trim select]                           | [▶ 468] |
| ③ | Viscosity trim offset                           | [Trim offset]     | [Viscosity trim offset]                           | [▶ 469] |
| ③ | Viscosity trim gain                             | [Trim gain]       | [Viscosity trim gain]                             | [▶ 469] |

**Viscosity user unit dynamic**

① [Detailed setup] ► [Pro var] ► [Visc] ► [Add func] ► [User unit (d)]

② [Device root menu] ► [Detailed setup] ► [Process variables] ► [Viscosity] ► [Additional function] ► [Viscosity user unit dynamic]

Sets the unit for the Viscosity (Dynamic).

|   | Value            | Description                                                |
|---|------------------|------------------------------------------------------------|
| – | ASCII characters | Maximum length is 8 characters.<br>Default value is blank. |

**Viscosity user unit kinematic**

Ⓐ [Detailed setup] ► [Pro var] ► [Visc] ► [Add func] ► [User unit (k)]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Viscosity] ► [Additional function] ► [Viscosity user unit kinematic]

Sets the unit for the Viscosity (Kinematic).

|   | Value            | Description                                                |
|---|------------------|------------------------------------------------------------|
| – | ASCII characters | Maximum length is 8 characters.<br>Default value is blank. |

**Viscosity user unit dynamic conversion factor**

Ⓐ [Detailed setup] ► [Pro var] ► [Visc] ► [Add func] ► [Conv factor (d)]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Viscosity] ► [Additional function] ► [Viscosity user unit conversion factor (Dynamic)]

Sets the conversion factor for the user-defined unit.

|   | Value         | Description                                                                                                                                      |
|---|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓜ | Numeic digits | Reference unit is mPas.<br>Default value is 1.0.<br>Measured value at user-defined unit = Viscosity value at mPas * conversion factor from mPas. |

**Viscosity user unit kinematic conversion factor**

Ⓐ [Detailed setup] ► [Pro var] ► [Visc] ► [Add func] ► [Conv factor (k)]

Sets the conversion factor for the user-defined unit.

|   | Value          | Description                                                                                                                                   |
|---|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓜ | Numeric digits | Reference unit is cSt.<br>Default value is 1.0.<br>Measured value at user-defined unit = Viscosity value at cSt * conversion factor from cSt. |

**Viscosity trim select**

Ⓐ [Detailed setup] ► [Pro var] ► [Visc] ► [Add func] ► [Trim sel]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Viscosity] ► [Additional function] ► [Viscosity trim select]

Enables or disables the trim function during Viscosity.

|   | Value                             | Description                                                   |
|---|-----------------------------------|---------------------------------------------------------------|
| Ⓜ | Inhibit<br>[Inhibit]<br>[Inhibit] | Trim function during Viscosity is disabled.<br>Default value. |



|   | Value                          | Description                                |
|---|--------------------------------|--------------------------------------------|
| Ⓢ | Enable<br>[Enable]<br>[Enable] | Trim function during Viscosity is enabled. |

**Viscosity trim offset**

Ⓛ [Detailed setup] ► [Pro var] ► [Visc] ► [Add func] ► [Trim offset]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Viscosity] ► [Additional function] ► [Viscosity trim offset]

Sets the offset for trimming the Viscosity.

|   | Value          | Description                  |
|---|----------------|------------------------------|
| Ⓢ | Numeric digits | Default value is 0.000e+000. |

**Viscosity trim gain**

Ⓛ [Detailed setup] ► [Pro var] ► [Visc] ► [Add func] ► [Trim gain]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Viscosity] ► [Additional function] ► [Viscosity trim gain]

Sets the gain for trimming the Viscosity.

|   | Value          | Description             |
|---|----------------|-------------------------|
| Ⓢ | Numeric digits | Default value is 1.000. |

**Drive current**

Menu for configuring the Drive current.

The following menus/settings are available:

|   | Full name             | Display name | [Modbus] name           | Page    |
|---|-----------------------|--------------|-------------------------|---------|
| – | Drive current LRV     | [LRV]        | [Drive current LRV]     | [▶ 469] |
| – | Drive current URV     | [URV]        | [Drive current URV]     | [▶ 470] |
| – | Drive current damping | [Damp]       | [Drive current damping] | [▶ 470] |

**Drive current LRV**

Ⓛ [Detailed setup] ► [Pro var] ► [Drv curr] ► [LRV]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Drive current] ► [Drive current LRV]

Sets the lower range value, 0 %, for the scaling of the analog and frequency for the Viscosity.

|   | Value          | Description                                                                    |
|---|----------------|--------------------------------------------------------------------------------|
| Ⓢ | Numeric digits | Default value is 0.<br>Setting must satisfy the following condition: URV ≠ LRV |

## Drive current URV

Ⓐ [Detailed setup] ► [Pro var] ► [Drv curr] ► [URV]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Drive current] ► [Drive current URV]

Sets the upper range value, 100 %, for the scaling of the analog and frequency for the Drive current.

|   | Value          | Description             |
|---|----------------|-------------------------|
| Ⓔ | Numeric digits | Default value is 100.0. |

## Drive current damping

Ⓐ [Detailed setup] ► [Pro var] ► [Drv curr] ► [Drv curr damp]

Ⓜ [Device root menu] ► [Detailed setup] ► [Process variables] ► [Drive current] ► [Drive current damping]

This parameter can be set in the following menu/menus:

- *Diag/Service* [▶ 237]

Sets the damping constant for the Drive current.

The value is the time it takes for this value to become 63.2 % of the total amount of change.

|   | Value          | Description                                              |
|---|----------------|----------------------------------------------------------|
| Ⓔ | Numeric digits | Setting range: 0.0 – 200.0 s.<br>Default value is 3.0 s. |

## 5.7.3 Analog output

*Analog output* is a menu for configuring Analog output.

The following overview shows the selectable menu items within the submenu *Analog output*.

|   | Full name                  | Display name | [Modbus] name                | Page    |
|---|----------------------------|--------------|------------------------------|---------|
| – | Analog output select       | [Sel]        | [Analog output select]       | [▶ 471] |
| – | Analog output low limit    | [Lo lim]     | [Analog output low limit]    | [▶ 472] |
| – | Analog output high limit   | [Hi lim]     | [Analog output high limit]   | [▶ 473] |
| – | Analog output alarm output | [Alm out]    | [Analog output alarm output] | [▶ 473] |
| – | NAMUR NE 43 option         | [NE43]       | [NAMUR NE 43 option]         | [▶ 474] |

Analog output select

⌚ [Detailed setup] ▶ [AO] ▶ [Sel]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Analog output] ▶ [Analog output select]

This parameter is also available in additional menus. The values can be set in each of these menus:

- *Easy setup wizard* [▶ 283]
- *Basic setup* [▶ 334]

*Analog output select* sets the process variables for Analog output.

|   | Value                                 | Description                                                                        |
|---|---------------------------------------|------------------------------------------------------------------------------------|
|   | None                                  | Sets the Analog output value.<br>The default value for Analog output is Mass flow. |
| – | [None]<br>[None]                      |                                                                                    |
|   | Mass flow                             |                                                                                    |
| – | [Mass]<br>[Mass flow]                 |                                                                                    |
|   | Density                               |                                                                                    |
| – | [Dens]<br>[Density]                   |                                                                                    |
|   | Temperature                           |                                                                                    |
| – | [Temp]<br>[Temperature]               |                                                                                    |
|   | Pressure                              |                                                                                    |
| – | [Pres]<br>[Pressure]                  |                                                                                    |
|   | Volume flow                           |                                                                                    |
| – | [Vol]<br>[Volume flow]                |                                                                                    |
|   | Reference density                     |                                                                                    |
| – | [Ref dens]<br>[Reference density]     |                                                                                    |
|   | Relative density                      |                                                                                    |
| – | [Rel dens]<br>[Relative density]      |                                                                                    |
|   | Corrected volume flow                 |                                                                                    |
| – | [Corr vol]<br>[Corrected volume flow] |                                                                                    |
|   | Concentration                         |                                                                                    |
| Ⓜ | [Conc]<br>[Concentration]             |                                                                                    |

|                  | Value                                                                      | Description                                                                        |
|------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| Ⓢ [Net mass1]    | Net mass flow 1<br>[Net mass1]<br>[Net mass flow 1]                        | Sets the Analog output value.<br>The default value for Analog output is Mass flow. |
| Ⓢ [Net mass2]    | Net mass flow 2<br>[Net mass2]<br>[Net mass flow 2]                        |                                                                                    |
| Ⓢ [Net vol1]     | Net volume flow 1<br>[Net vol1]<br>[Net volume flow 1]                     |                                                                                    |
| Ⓢ [Net vol2]     | Net volume flow 2<br>[Net vol2]<br>[Net volume flow 2]                     |                                                                                    |
| Ⓢ [Net corr vol] | Net corrected volume flow<br>[Net corr vol]<br>[Net corrected volume flow] |                                                                                    |
| Ⓢ [Batch]        | Batch<br>[Batch]<br>[Batch]                                                |                                                                                    |
| Ⓢ [Visc]         | Viscosity<br>[Visc]<br>[Viscosity]                                         |                                                                                    |
| – [Drv curr]     | Drive current<br>[Drv curr]<br>[Drive current]                             |                                                                                    |

### Analog output low limit

Ⓛ [Detailed setup] ► [AO] ► [Lo lim]

Ⓜ [Device root menu] ► [Detailed setup] ► [Analog output] ► [Analog output low limit]

This parameter is also available in additional menus. The values can be set in each of these menus:

- *Easy setup wizard* [ 285]
- *Basic setup* [ 335]

*Analog output low limit* sets the lower limit of the current for Analog output during normal operation.



This parameter depends on the parameter of NE43 opt. If NE43 opt is set to NE43, the value of this parameter must be set to 3.8 mA.

|   | Value          | Description                                                |
|---|----------------|------------------------------------------------------------|
| – | Numeric digits | Setting range: 2.4...21.6 mA.<br>Default value is 2.40 mA. |

**Analog output  
high limit**

① [Detailed setup] ► [AO] ► [Hi lim]

② [Device root menu] ► [Detailed setup] ► [Analog output] ► [Analog output high limit]

This parameter is also available in additional menus. The values can be set in each of these menus:

- *Easy setup wizard* [► 285]
- *Basic setup* [► 336]

*Analog output high limit* sets the higher limit current of Analog output during normal operation.



This parameter depends on the parameter of NE43 opt. If NE43 opt is set to NE43, the value of this parameter must be set to 20.50 mA.

|   | Value          | Description                                                 |
|---|----------------|-------------------------------------------------------------|
| – | Numeric digits | Setting range: 2.4...21.6 mA.<br>Default value is 21.60 mA. |

**Analog output  
alarm output**

① [Detailed setup] ► [AO] ► [Alm out]

② [Device root menu] ► [Detailed setup] ► [Analog output] ► [Analog output alarm output]

This parameter is also available in additional menus. The values can be set in each of these menus:

- *Easy setup wizard* [► 286]
- *Basic setup* [► 336]

*Analog output alarm output* sets the value of the current value for Analog output during an alarm state.

|   | Value                                            | Description                                                                               |
|---|--------------------------------------------------|-------------------------------------------------------------------------------------------|
| – | < 2.4 mA<br>[<2.4mA]<br>[< 2.4 mA]               | Sets the value of the Analog output during an alarm state.<br>Default value is > 21.6 mA. |
| – | 4 mA<br>[4.0 mA]<br>[4 mA]                       |                                                                                           |
| – | > 21.6 mA<br>[>21.6mA]<br>[> 21.6 mA]            |                                                                                           |
| – | Measured value<br>[Meas val]<br>[Measured value] |                                                                                           |
| – | Hold<br>[Hold]<br>[Hold]                         |                                                                                           |

## NAMUR NE 43 option

## NAMUR NE 43 option

Ⓐ [Detailed setup] ► [AO] ► [NE43 opt]

Ⓜ [Device root menu] ► [Detailed setup] ► [Analog output] ► [NAMUR NE 43 option]

Sets the signal mode of Analog output.

|   | Value                                          | Description                                                                                                                                                    |
|---|------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Not Namur43<br>[Not NE43]<br>[Not NAMUR NE 43] | Analog output is not in Namur43 mode.<br>Default value.                                                                                                        |
| – | Namur43<br>[NE43]<br>[NAMUR NE 43]             | Analog output is in Namur43 mode.<br>Settings must satisfy the following conditions:<br>Analog output low limit = 3.8 mA<br>Analog output high limit = 20.5 mA |

## 5.7.4 Pulse/Status outputs

Menu for configuring pulse/status outputs.

The following menus/settings are available:

|   | Full name                      | Display name          | [Modbus] name                    | Page    |
|---|--------------------------------|-----------------------|----------------------------------|---------|
| – | Pulse/Status output type       | [Pls/Sts type]        | [Pulse/Status output type]       | [▶ 474] |
| – | Pulse/Status output 1 – 2 mode | [Pls/Sts1 mode]       | [Pulse/Status output 1 – 2 mode] | [▶ 475] |
| – | Pulse output 1 – 2             | [Pls out1 – 2]        | [Pulse output 1 – 2]             | [▶ 476] |
| – | Frequency output 1 – 2         | [Freq out1 – 2]       | [Frequency output 1 – 2]         | [▶ 484] |
| – | Status output 1 – 2            | [Status output 1 – 2] | [Status output 1 – 2]            | [▶ 488] |
| – | Double pulse output            | [Dbl pls out]         | [Double pulse output]            | [▶ 491] |

## Pulse/Status output type

Ⓐ [Detailed setup] ► [Pls/Sts out] ► [Pls/Sts type]

Ⓜ [Device root menu] ► [Detailed setup] ► [Pulse/Status outputs] ► [Pulse/Status output type]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [▶ 287]
- *Basic setup* [▶ 337]

Sets the pulse signal type of the Pulse/Status signal.

When this parameter has just been changed, the output signal of pulse/status is not exact.

|   | Value                                        | Description                                                       |
|---|----------------------------------------------|-------------------------------------------------------------------|
| – | Single pulse<br>[Sngl pls]<br>[Single pulse] | Do not synchronize. Output 1 – 2 is individual.<br>Default value. |

|   | Value                                       | Description                                                                                         |
|---|---------------------------------------------|-----------------------------------------------------------------------------------------------------|
| – | Double pulse<br>[Db1 pls]<br>[Double pulse] | Pulse/status Output 1 – 2 are set to frequency mode and provide a synchronized double pulse signal. |

**Pulse/Status output 1 – 2 mode**

⌚ [Detailed setup] ► [Pls/Sts out] ► [Pls/Sts1 – 2 mode]

Ⓜ [Device root menu] ► [Detailed setup] ► [Pulse/Status outputs] ► [Pulse/Status output 1 – 2 mode]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [► 288]
- *Basic setup* [► 337]

Sets the pulse signal mode of Pulse/Status output 1 – 2.

If Pulse/Status output 1 – 2 mode has just been changed, the output signal of pulse/status is not exact.

|   | Value                                                       | Description                                                                                                                              |
|---|-------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| – | No function<br>[No func]<br>[No function]                   | Pulse signal or status signal is not available.<br>Default value.<br>Output signal level depends on the Status output 1 – 2 active mode. |
| – | Fixed pulse output<br>[Fix pls out]<br>[Fixed pulse output] | Pulse signal with fixed pulse width, duty ratio changes. Status signal is not available.                                                 |
| – | Frequency output<br>[Freq out]<br>[Frequency output]        | Pulse signal with fixed duty ratio, pulse width changes. Status signal is not available.                                                 |
| – | Status output<br>[Sts out]<br>[Status output]               | Status signal. Pulse or frequency signal is not available.                                                                               |

**Pulse output 1 – 2**

Set of menus for configuring the pulse signal. These are available when Fixed pulse output has been selected in the parameter *Pulse/Status output 1 – 2 mode*.

The following menus/settings are available:

|   | Full name                               | Display name      | [Modbus] name                             | Page    |
|---|-----------------------------------------|-------------------|-------------------------------------------|---------|
| – | Pulse output 1 – 2 select               | [Sel]             | [Pulse output 1 – 2 select]               | [▶ 476] |
| – | Pulse output 1 – 2 unit select          | [Unit]            | [Pulse output 1 – 2 unit select]          | [▶ 477] |
| – | Pulse output 1 – 2 width                | [Width]           | [Pulse output 1 – 2 width]                | [▶ 480] |
| – | Pulse output 1 – 2 rate                 | [Rate]            | [Pulse output 1 – 2 rate]                 | [▶ 482] |
| – | Pulse output 1 – 2 alarm action         | [Action at alm]   | [Pulse output 1 – 2 alarm action]         | [▶ 482] |
| – | Pulse output 1 – 2 user set alarm value | [User val at alm] | [Pulse output 1 – 2 user set alarm value] | [▶ 482] |
| – | Pulse output 1 – 2 flow direction       | [Flow dir]        | [Pulse output 1 – 2 flow direction]       | [▶ 483] |
| – | Pulse output 1 – 2 active mode          | [Act mode]        | [Pulse output 1 – 2 active mode]          | [▶ 483] |
| – | Pulse/Status output 2 active pulse mode | [Act pls mode]    | [Pulse/Status output 2 active pulse mode] | [▶ 484] |

**Pulse output 1 – 2 select**

Ⓐ [Detailed setup] ▶ [Pls/Sts out] ▶ [Pls out1 – 2] ▶ [Sel]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Pulse/Status outputs] ▶ [Pulse output 1 – 2] ▶ [Pulse output 1 – 2 select]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [▶ 289]
- *Basic setup* [▶ 338]

Assigns a process variable to pulse output 1 – 2.



|   | Value                                                                             | Description                                                                                                                                    |
|---|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
|   | Mass flow<br>– <b>[Mass]</b><br>[Mass flow]                                       |                                                                                                                                                |
|   | Volume flow<br>– <b>[Vol]</b><br>[Volume flow]                                    |                                                                                                                                                |
|   | Corrected volume flow<br>– <b>[Corr vol]</b><br>[Corrected volume flow]           |                                                                                                                                                |
|   | Energy<br>– <b>[Energy]</b><br>[Energy]                                           |                                                                                                                                                |
| Ⓢ | Net mass flow 1<br><b>[Net mass1]</b><br>[Net mass flow 1]                        |                                                                                                                                                |
| Ⓢ | Net mass flow 2<br><b>[Net mass2]</b><br>[Net mass flow 2]                        |                                                                                                                                                |
| Ⓢ | Net volume flow 1<br><b>[Net vol1]</b><br>[Net volume flow 1]                     |                                                                                                                                                |
| Ⓢ | Net volume flow 2<br><b>[Net vol2]</b><br>[Net volume flow 2]                     | Sets the Pulse output 1 – 2 value.<br>The default value of Pulse output 1 is Mass flow.<br>The default value of Pulse output 2 is Volume flow. |
| Ⓢ | Net corrected volume flow<br><b>[Net corr vol]</b><br>[Net corrected volume flow] |                                                                                                                                                |

#### Pulse output 1 – 2 unit select

Ⓛ [Detailed setup] ► [Pls/Sts out] ► [Pls out1 – 2] ► [Unit]

Ⓢ [Device root menu] ► [Detailed setup] ► [Pulse/Status outputs] ► [Pulse output 1 – 2] ► [Pulse output 1 – 2 unit select]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [► 290]
- *Basic setup* [► 339]

It can be selected and set for the following process variables. The available units change depending on the process variables that are assigned to the output. The default value for Pulse output 1 is kg/P, and Pulse output 2 is cm<sup>3</sup>/P.



The unit displayed on the LCD may vary depending on the setting of the parameter *Display unit selection*. During Modbus communication, the actually displayed unit may vary depending on the Modbus tool. For details, refer to *Units of the parameters* [▶ 819].

|   | Process variables                                                       | Available units                                                                                                                                                                                                                             |
|---|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| — | For<br>Mass flow:<br>[Mass]:<br>[Mass flow]:                            | <ul style="list-style-type: none"><li>▪ g/P</li><li>▪ kg/P</li><li>▪ t/P</li><li>▪ ton(US)/P</li><li>▪ ton(UK)/P</li><li>▪ lb/P</li><li>▪ P/g</li><li>▪ P/kg</li><li>▪ P/t</li><li>▪ P/ton(US)</li><li>▪ P/ton(UK)</li><li>▪ P/lb</li></ul> |
| — | For<br>Net mass flow 1 – 2:<br>[Net mass1]<br>[Net mass flow<br>1 – 2]: | <ul style="list-style-type: none"><li>▪ g/P</li><li>▪ kg/P</li><li>▪ t/P</li><li>▪ ton(US)/P</li><li>▪ ton(UK)/P</li><li>▪ lb/P</li><li>▪ P/g</li><li>▪ P/kg</li><li>▪ P/t</li><li>▪ P/ton(US)</li><li>▪ P/ton(UK)</li><li>▪ P/lb</li></ul> |

|   | Process variables                                                       | Available units                                                                                                                                                                                                                                                                                                                                     |
|---|-------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| — | For<br>Volume flow:<br>[vo1]<br>[Volume flow]:                          | <ul style="list-style-type: none"><li>▪ cm³/P</li><li>▪ L/P</li><li>▪ m³/P</li><li>▪ gal/P</li><li>▪ kgal/P</li><li>▪ Cuft/P</li><li>▪ bbl/P</li><li>▪ Impgal/P</li><li>▪ kImpgal/P</li><li>▪ P/cm³</li><li>▪ P/L</li><li>▪ P/m³</li><li>▪ P/gal</li><li>▪ P/kgal</li><li>▪ P/Cuft</li><li>▪ P/bbl</li><li>▪ p/Impgal</li><li>▪ P/kImpgal</li></ul> |
| — | For<br>Net volume flow 1 – 2:<br>[Net vol1]<br>[Net volume flow 1 – 2]: | <ul style="list-style-type: none"><li>▪ cm³/P</li><li>▪ L/P</li><li>▪ m³/P</li><li>▪ gal/P</li><li>▪ kgal/P</li><li>▪ Cuft/P</li><li>▪ bbl/P</li><li>▪ Impgal/P</li><li>▪ kImpgal/P</li><li>▪ P/cm³</li><li>▪ P/L</li><li>▪ P/m³</li><li>▪ P/gal</li><li>▪ P/kgal</li><li>▪ P/Cuft</li><li>▪ P/bbl</li><li>▪ p/Impgal</li><li>▪ P/kImpgal</li></ul> |

|   | Process variables                                                                          | Available units                                                                                                                                                                                                                                                              |
|---|--------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | For<br>Corrected volume<br>flow:<br>[Corr vol]:<br>[Corrected volume<br>flow]:             | <ul style="list-style-type: none"> <li>▪ NmL/P</li> <li>▪ NmLm<sup>3</sup>/P</li> <li>▪ StdL/P</li> <li>▪ Scuft/P</li> <li>▪ Stdm<sup>3</sup>/P</li> <li>▪ P/NmL</li> <li>▪ P/NmLm<sup>3</sup></li> <li>▪ P/StdL</li> <li>▪ P/Scuft</li> <li>▪ P/Stdm<sup>3</sup></li> </ul> |
| – | For<br>Net corrected volume<br>flow:<br>[Net corr vol]:<br>[Net corrected<br>volume flow]: | <ul style="list-style-type: none"> <li>▪ NmL/P</li> <li>▪ NmLm<sup>3</sup>/P</li> <li>▪ StdL/P</li> <li>▪ Scuft/P</li> <li>▪ Stdm<sup>3</sup>/P</li> <li>▪ P/NmL</li> <li>▪ P/NmLm<sup>3</sup></li> <li>▪ P/StdL</li> <li>▪ P/Scuft</li> <li>▪ P/Stdm<sup>3</sup></li> </ul> |
| – | For<br>Energy:<br>[Energy]:<br>[Energy]:                                                   | <ul style="list-style-type: none"> <li>▪ MJ/P</li> <li>▪ Btu/P</li> <li>▪ P/MJ</li> <li>▪ P/Btu</li> </ul>                                                                                                                                                                   |

### Pulse output 1 – 2 width

① [Detailed setup] ► [Pls/Sts out] ► [Pls out1 – 2] ► [width]

② [Device root menu] ► [Detailed setup] ► [Pulse/Status outputs] ►  
[Pulse output 1 – 2] ► [Pulse output 1 – 2 width]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [ 292]
- *Basic setup* [ 342]

Sets the pulse width, this means the duration of the active state.

| Value                              | Description                                                                   |
|------------------------------------|-------------------------------------------------------------------------------|
| 0.05 ms<br>– [0.05ms]<br>[0.05 ms] | <p>Sets the pulse width.<br/>Default value of Pulse output 1 – 2 is 1 ms.</p> |
| 0.1 ms<br>– [0.1ms]<br>[0.1 ms]    |                                                                               |
| 0.5 ms<br>– [0.5ms]<br>[0.5 ms]    |                                                                               |
| 1 ms<br>– [1ms]<br>[1 ms]          |                                                                               |
| 5 ms<br>– [5ms]<br>[5 ms]          |                                                                               |
| 10 ms<br>– [10ms]<br>[10 ms]       |                                                                               |
| 20 ms<br>– [20ms]<br>[20 ms]       |                                                                               |
| 33 ms<br>– [33ms]<br>[33 ms]       |                                                                               |
| 50 ms<br>– [50ms]<br>[50 ms]       |                                                                               |
| 100 ms<br>– [100ms]<br>[100 ms]    |                                                                               |
| 200 ms<br>– [200ms]<br>[200 ms]    |                                                                               |
| 330 ms<br>– [330ms]<br>[330 ms]    |                                                                               |
| 500 ms<br>– [500ms]<br>[500 ms]    |                                                                               |
| 1000 ms<br>– [1000ms]<br>[1000 ms] |                                                                               |
| 2000 ms<br>– [2000ms]<br>[2000 ms] |                                                                               |

**Pulse output 1 – 2  
rate**

④ [Detailed setup] ► [Pls/Sts out] ► [Pls out1 – 2] ► [Rate]

⑧ [Device root menu] ► [Detailed setup] ► [Pulse/Status outputs] ►  
[Pulse output 1 – 2] ► [Pulse output 1 – 2 rate]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [▶ 294]
- *Basic setup* [▶ 343]

Parameter for defining the number of units of the assigned process variable for 1 pulse of Pulse output 1 – 2.

|   | Value          | Description                                                                                                                                                                                                                   |
|---|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | Setting range: 0 – no check.<br>Default value is 1.0.<br>The unit for this value is defined in the parameter Pulse output 1 – 2 unit.<br>This value depends on the parameter of Pulse output 1 – 2 width and on maximum flow. |

**Pulse output 1 – 2  
alarm action**

④ [Detailed setup] ► [Pls/Sts out] ► [Pls out1 – 2] ► [Action at alm]

⑧ [Device root menu] ► [Detailed setup] ► [Pulse/Status outputs] ►  
[Pulse output 1 – 2] ► [Pulse output 1 – 2 alarm action]

This parameter can be set in the following menu/menus:

- *Basic setup* [▶ 343]

Defines pulse output 1 – 2 when an alarm occurs.

|   | Value                                                | Description                                                                        |
|---|------------------------------------------------------|------------------------------------------------------------------------------------|
| – | 0.0 pulse<br>[0.0pls]<br>[0.0 pulse]                 | Pulse signal is stopped.<br>Default value.                                         |
| – | Measured value<br>[Meas val]<br>[Measured value]     | Pulse output at measured value.                                                    |
| – | Hold<br>[Hold]<br>[Hold]                             | Pulse output before an alarm occurs is held.                                       |
| – | User set value<br>[User set val]<br>[User set value] | Pulse output that is set in the parameter Pulse output 1 – 2 user set alarm value. |

**Pulse output 1 – 2  
user set alarm  
value**

④ [Detailed setup] ► [Pls/Sts out] ► [Pls out1 – 2] ► [User val at alm]

⑧ [Device root menu] ► [Detailed setup] ► [Pulse/Status outputs] ►  
[Pulse output 1 – 2] ► [Pulse output 1 – 2 user set alarm value]

This parameter can be set in the following menu/menus:

- *Basic setup* [▶ 343]

*Pulse output 1 – 2 user set alarm value* sets the frequency value of Fixed pulse when an alarm occurs, if the parameter Pulse output 1 – 2 alarm action is set to User set value.

|   | Value          | Description                                                           |
|---|----------------|-----------------------------------------------------------------------|
| – | Numeric digits | Setting range: 0.0 – 10000.0 pulses/s.<br>Default value is 0.0 pulse. |

#### Pulse output 1 – 2 flow direction

① [Detailed setup] ► [Pls/Sts out] ► [Pls out1 – 2] ► [Flow dir]

Ⓜ [Device root menu] ► [Detailed setup] ► [Pulse/Status outputs] ►  
[Pulse output 1 – 2] ► [Pulse output 1 – 2 flow direction]

If bi-directional mode is active for the selected process value, the parameter setting of Pulse output 1 – 2 flow direction is ignored.

|   | Value                             | Description                                                                                                                                   |
|---|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| – | Forward<br>[Forward]<br>[Forward] | Pulse signal is generated when the direction of flow is forward. Pulse is not generated when the flow direction is reverse.<br>Default value. |
| – | Reverse<br>[Reverse]<br>[Reverse] | Pulse signal is generated when the direction of flow is reverse. Pulse is not generated when the flow direction is forward.                   |

#### Pulse output 1 – 2 active mode

① [Detailed setup] ► [Pls/Sts out] ► [Pls out1 – 2] ► [Act mode]

Ⓜ [Device root menu] ► [Detailed setup] ► [Pulse/Status outputs] ►  
[Pulse output 1 – 2] ► [Pulse output 1 – 2 active mode]

Sets the active mode of pulse output 1 – 2.

When *Pulse output 1 – 2 active mode* has just been changed, the output signal of pulse/status is not exact.

|   | Value                                   | Description                                                                |
|---|-----------------------------------------|----------------------------------------------------------------------------|
| – | Off active<br>[off act]<br>[Off active] | Off state of pulse signal is defined as the active state.                  |
| – | On active<br>[on act]<br>[On active]    | On state of pulse signal is defined as the active state.<br>Default value. |

**Pulse output 2  
active pulse mode**

Ⓛ [Detailed setup] ► [Pls/Sts out] ► [Pls out2] ► [Act pls mode]

Ⓜ [Device root menu] ► [Detailed setup] ► [Pulse/Status outputs] ►  
[Pulse output 2] ► [Pulse/Status output 2 active pulse mode]

Available when Pulse output2 is Active and there is no pull-up register (non-Pull-up R).  
When a magnetic counter is used, this parameter has to be set to "Magnetic counter".

|   | Value            | Description                                     |
|---|------------------|-------------------------------------------------|
| – | Normal           | Default value.                                  |
| – | Magnetic counter | Must be selected when magnetic counter is used. |

If set to "Magnetic counter", the value of the following parameters is limited as shown in the table below.

| Value                      | Description                                 |
|----------------------------|---------------------------------------------|
| Pulse/Status output 2 mode | Frequency and Status out are not selectable |
| Pulse output 2 active mode | Off active is not selectable                |
| Pulse output 2 width       | 20ms, 33ms, 50ms, 100ms can be selected     |

**Frequency output 1 – 2**

Set of menus for configuring the frequency signals. These are available when Frequency output has been selected in the parameter Pulse/Status output 1 – 2 mode.

The following menus/settings are available:

|   | Full name                                   | Display name      | [Modbus] name                                 | Page    |
|---|---------------------------------------------|-------------------|-----------------------------------------------|---------|
| – | Frequency output 1 – 2 select               | [Sel]             | [Frequency output 1 – 2 select]               | [▶ 485] |
| – | Maximum frequency 1 – 2                     | [Max freq]        | [Max frequency 1 – 2]                         | [▶ 486] |
| – | Minimum frequency 1 – 2                     | [Min freq]        | [Min frequency 1 – 2]                         | [▶ 486] |
| – | Frequency output 1 – 2 alarm action         | [Action at alm]   | [Frequency output 1 – 2 alarm action]         | [▶ 487] |
| – | Frequency output 1 – 2 user set alarm value | [User val at alm] | [Frequency output 1 – 2 user set alarm value] | [▶ 487] |



Frequency output  
1 – 2 select

① [Detailed setup] ► [Pls/Sts out] ► [Freq out1 – 2] ► [Sel]

Ⓜ [Device root menu] ► [Detailed setup] ► [Pulse/Status outputs] ►  
[Frequency output 1 – 2] ► [Frequency output 1 – 2 select]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [► 294]
- *Basic setup* [► 344]

Assigns a process variable to Frequency output 1 – 2.

|   | Value                                 | Description                                                                                                                                                            |
|---|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   | Mass flow                             | Sets the process variables for Frequency output 1 – 2.<br>The default value of Frequency output 1 is Mass flow.<br>The default value of Frequency output 2 is Density. |
| – | [Mass]<br>[Mass flow]                 |                                                                                                                                                                        |
|   | Density                               |                                                                                                                                                                        |
| – | [Dens]<br>[Density]                   |                                                                                                                                                                        |
|   | Temperature                           |                                                                                                                                                                        |
| – | [Temp]<br>[Temperature]               |                                                                                                                                                                        |
|   | Pressure                              |                                                                                                                                                                        |
| – | [Pres]<br>[Pressure]                  |                                                                                                                                                                        |
|   | Volume flow                           |                                                                                                                                                                        |
| – | [Vol]<br>[Volume flow]                |                                                                                                                                                                        |
|   | Reference density                     |                                                                                                                                                                        |
| – | [Ref dens]<br>[Reference density]     |                                                                                                                                                                        |
|   | Relative density                      |                                                                                                                                                                        |
| – | [Rel dens]<br>[Relative density]      |                                                                                                                                                                        |
|   | Corrected volume flow                 |                                                                                                                                                                        |
| – | [Corr vol]<br>[Corrected volume flow] |                                                                                                                                                                        |
|   | Concentration                         |                                                                                                                                                                        |
| Ⓜ | [Conc]<br>[Concentration]             |                                                                                                                                                                        |

|   | Value                                                                      | Description                                                                                                                                                    |
|---|----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓢ | Net mass flow 1<br>[Net mass1]<br>[Net mass flow 1]                        | Sets the process variables for Frequency output 1 – 2.<br>Default value of Frequency output 1 is Mass flow.<br>Default value of Frequency output 2 is Density. |
| Ⓢ | Net mass flow 2<br>[Net mass2]<br>[Net mass flow 2]                        |                                                                                                                                                                |
| Ⓢ | Net volume flow 1<br>[Net vol1]<br>[Net volume flow 1]                     |                                                                                                                                                                |
| Ⓢ | Net volume flow 2<br>[Net vol2]<br>[Net volume flow 2]                     |                                                                                                                                                                |
| Ⓢ | Net corrected volume flow<br>[Net corr vol]<br>[Net corrected volume flow] |                                                                                                                                                                |
| Ⓢ | Viscosity<br>[Visc]<br>[Viscosity]                                         |                                                                                                                                                                |
| – | Drive current<br>[Drv curr]<br>[Drive current]                             |                                                                                                                                                                |

### Max frequency 1 – 2

Ⓢ [Detailed setup] ► [Pls/Sts out] ► [Freq out1 – 2] ► [Max freq]

Ⓢ [Device root menu] ► [Detailed setup] ► [Pulse/Status outputs] ► [Frequency output 1 – 2] ► [Max frequency 1 – 2]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [ 296]
- *Basic setup* [ 345]

Sets the frequency value when the process value that is assigned to the Frequency output is the upper range value, 100 %.

|   | Value          | Description                                                         |
|---|----------------|---------------------------------------------------------------------|
| – | Numeric digits | Setting range: 0.0001 – 10000.0 Hz.<br>Default value is 10000.0 Hz. |

### Min frequency 1 – 2

Ⓢ [Detailed setup] ► [Pls/Sts out] ► [Freq out1 – 2] ► [Min freq]

Ⓢ [Device root menu] ► [Detailed setup] ► [Pulse/Status outputs] ► [Frequency output 1 – 2] ► [Min frequency 1 – 2]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [ 296]

- *Basic setup* [▶ 345]

Sets the frequency value when the process value that is assigned to the Frequency output is the lower range value, 0 %.

|   | Value          | Description                                                  |
|---|----------------|--------------------------------------------------------------|
| – | Numeric digits | Setting range: 0.0 – 10000.0 Hz.<br>Default value is 0.0 Hz. |

### Frequency output 1 – 2 alarm action

① [Detailed setup] ▶ [Pls/Sts out] ▶ [Freq out1 – 2] ▶ [Action at alm]

② [Device root menu] ▶ [Detailed setup] ▶ [Pulse/Status outputs] ▶  
[Frequency output 1 – 2] ▶ [Pulse output 1 – 2 alarm action]

This parameter can be set in the following menu/menus:

- *Basic setup* [▶ 346]

Sets the frequency output when an alarm occurs.

|   | Value                                                | Description                                                                         |
|---|------------------------------------------------------|-------------------------------------------------------------------------------------|
| – | 0.0 Hz<br>[0.0Hz]<br>[0.0 Hz]                        | Frequency becomes 0.0 Hz.<br>Default value.                                         |
| – | Measured value<br>[Meas val]<br>[Measured value]     | Frequency at measured value.                                                        |
| – | Hold<br>[Hold]<br>[Hold]                             | Frequency before an alarm occurs is held.                                           |
| – | User set value<br>[User set val]<br>[User set value] | Frequency that is set in the parameter Frequency output 1 – 2 user set alarm value. |

### Frequency output 1 – 2 user set alarm value

① [Detailed setup] ▶ [Pls/Sts out] ▶ [Freq out1 – 2] ▶ [User val at alm]

② [Device root menu] ▶ [Detailed setup] ▶ [Pulse/Status outputs] ▶  
[Frequency output 1 – 2] ▶ [Frequency output 1 – 2 user set alarm  
value]

This parameter can be set in the following menu/menus:

- *Basic setup* [▶ 346]

Sets the frequency value when an alarm occurs, if the parameter Frequency output 1 – 2 alarm action has been set to User set value.

|   | Value          | Description                                                 |
|---|----------------|-------------------------------------------------------------|
| – | Numeric digits | Setting range: 0.0 – 15000.0 Hz<br>Default value is 0.0 Hz. |

**Status output 1 – 2**

Set of menus for configuring Status outputs. These menus are available when Status output has been selected in the parameter *Pulse/Status output 1 – 2 mode*.

The following menus/settings are available:

|   | Full name                       | Display name | [Modbus] name                     | Page    |
|---|---------------------------------|--------------|-----------------------------------|---------|
| – | Status output 1 – 2 function    | [Func]       | [Status output 1 – 2 function]    | [▶ 488] |
| – | Status output 1 – 2 active mode | [Act mode]   | [Status output 1 – 2 active mode] | [▶ 491] |

**Status output 1 – 2 function**

Ⓐ [Detailed setup] ▶ [Pls/Sts out] ▶ [Status output 1 – 2] ▶ [Func]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Pulse/Status outputs] ▶ [Status output 1 – 2] ▶ [Status output 1 – 2 function]

Set of menus for configuring Status output functions. These menus are available when Status output is selected in the parameter *Pulse/Status output 1 – 2 mode*.

Concentration high low alarm, Net mass flow 1 – 2 high low alarm, Net volume flow 1 – 2 high low alarm and Net corrected volume flow high low alarm can only be selected if the concentration function is available in the device.

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [▶ 297]
- *Basic setup* [▶ 346]

|   | Value                                                           | Description                                                                                                       |
|---|-----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| – | Off<br>[off]<br>[Off]                                           | Not used. Status signal does not become active.<br>Default value.                                                 |
| – | Flow direction<br>[Flow dir]<br>[Flow direction]                | The signal becomes inactive when flow direction is forward and active when flow direction is reverse.             |
| – | Total limit 1 – 6<br>[Total limit 1 – 6]<br>[Total limit 1 – 6] | Signal becomes active when the value of Totalizer 1 – 6 exceeds the value of the parameter Total 1 – 6 set point. |
| – | F category<br>[F only]<br>[F category]                          | Signal becomes active when an alarm that is categorized as F on NE107 occurs.                                     |
| – | S,C,M category<br>[s,c,m]<br>[S,C,M category]                   | Signal becomes active when an alarm that is categorized as S, C or M on NE107 occurs.                             |
| – | F + S,C,M category<br>[F+s,c,m]<br>[F + S,C,M category]         | Signal becomes active when an alarm that is categorized as F, S, C or M on NE107 occurs.                          |

|   | Value                                                           | Description                                                              |
|---|-----------------------------------------------------------------|--------------------------------------------------------------------------|
|   | Slug detection                                                  |                                                                          |
| – | <b>[Slug]</b><br>[Slug detection]                               | Signal becomes active when a Slug detection alarm occurs.                |
|   | Empty pipe                                                      |                                                                          |
| – | <b>[Empty]</b><br>[Empty pipe]                                  | Signal becomes active when an Empty pipe alarm occurs.                   |
|   | Corrosion detection                                             |                                                                          |
| – | <b>[Crrsn]</b><br>[Corrosion detection]                         | Signal becomes active when a Corrosion detection alarm occurs.           |
|   | Mass flow high low alarm                                        |                                                                          |
| – | <b>[Mass H/L alm]</b><br>[Mass flow high low alarm]             | Signal becomes active when a Mass flow high or low alarm occurs.         |
|   | Density high low alarm                                          |                                                                          |
| – | <b>[Dens H/L alm]</b><br>[Density high low alarm]               | Signal becomes active when a Density high or low alarm occurs.           |
|   | Reference density high low alarm                                |                                                                          |
| – | <b>[Ref dens H/L alm]</b><br>[Reference density high low alarm] | Signal becomes active when a Reference density high or low alarm occurs. |
|   | Relative density high low alarm                                 |                                                                          |
| – | <b>[Rel dens H/L alm]</b><br>[Relative density high low alarm]  | Signal becomes active when a Relative density high or low alarm occurs.  |
|   | Temperature high low alarm                                      |                                                                          |
| – | <b>[Temp H/L alm]</b><br>[Temperature high low alarm]           | Signal becomes active when a Temperature high or low alarm occurs.       |
|   | Pressure high low alarm                                         |                                                                          |
| – | <b>[Pres H/L alm]</b><br>[Pressure high low alarm]              | Signal becomes active when a Pressure high or low alarm occurs.          |
|   | Volume flow high low alarm                                      |                                                                          |
| – | <b>[Vol H/L alm]</b><br>[Volume flow high low alarm]            | Signal becomes active when a Volume flow high or low alarm occurs.       |

|   | Value                                                                                                                    | Description                                                                      |
|---|--------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| – | Corrected volume flow high low alarm<br>[Corr vol H/L alm]<br>[Corrected volume flow high low alarm]                     | Signal becomes active when a Corrected volume flow high or low alarm occurs.     |
| Ⓔ | Concentration high low alarm<br>[Conc H/L alm]<br>[Concentration high low alarm]                                         | Signal becomes active when a Concentration high or low alarm occurs.             |
| Ⓔ | Net mass flow 1 high low alarm<br>[Net mass1 H/L alm]<br>[Net mass flow 1 high low alarm]                                | Signal becomes active when a Net mass flow 1 high or low alarm occurs.           |
| Ⓔ | Net mass flow 2 high low alarm<br>[Net mass2 H/L alm]<br>[Net mass flow 2 high low alarm]                                | Signal becomes active when a Net mass flow 2 high or low alarm occurs.           |
| Ⓔ | Net volume flow 1 high low alarm<br>[Net vol1 H/L alm]<br>[Net volume flow 1 high low alarm]                             | Signal becomes active when a Net volume flow 1 high or low alarm occurs.         |
| Ⓔ | Net volume flow 2 high low alarm<br>[Net vol2 H/L alm]<br>[Net volume flow 2 high low alarm]                             | Signal becomes active when a Net volume flow 2 high or low alarm occurs.         |
| Ⓔ | Net corrected net volume flow high low alarm<br>[Net corr vol H/L alm]<br>[Net corrected net volume flow high low alarm] | Signal becomes active when a Corrected net volume flow high or low alarm occurs. |
| Ⓔ | Batch function<br>[Batch func]<br>[Batch function]                                                                       | Need to be set when a Batch function is used.                                    |
| Ⓔ | Viscosity high low alarm<br>[Visc H/L alm]<br>[Viscosity high low alarm]                                                 | Signal becomes active when a Viscosity high or low alarm occurs.                 |

**Status output 1 – 2 active mode**

⌚ [Detailed setup] ► [Pls/Sts out] ► [Act mode] ► [Act mode]

Ⓜ [Device root menu] ► [Detailed setup] ► [Pulse/Status outputs] ► [Status output 1 – 2] ► [Status output 1 – 2 active mode]

Sets the active mode of status output 1 – 2.

When Status output 1 – 2 active mode has just been changed, the Pulse/Status output signal is not exact.

|   | Value                                   | Description                                                               |
|---|-----------------------------------------|---------------------------------------------------------------------------|
| – | Off active<br>[off act]<br>[Off active] | The Off state of the status output is defined as active.                  |
| – | On active<br>[on act]<br>[On active]    | The On state of the status output is defined as active.<br>Default value. |

**Double pulse output**

Menu for configuring the double pulse signal. This menu is available when Double pulse has been selected in the parameter Pulse/Status output type.

The following menus/settings are available:

|   | Full name                               | Display name       | [Modbus] name                             | Page    |
|---|-----------------------------------------|--------------------|-------------------------------------------|---------|
| – | Frequency output 1 select               | [Sel]              | [Frequency output 1 select]               | [▶ 492] |
| – | Double pulse phase shift mode           | [Phase shift mode] | [Double pulse phase shift mode]           | [▶ 493] |
| – | Max frequency 1                         | [Max freq]         | [Max frequency 1]                         | [▶ 494] |
| – | Min frequency 1                         | [Min freq]         | [Min frequency 1]                         | [▶ 494] |
| – | Frequency output 1 alarm action         | [Action at alm]    | [Frequency output 1 alarm action]         | [▶ 494] |
| – | Frequency output 1 user set alarm value | [User val at alm]  | [Frequency output 1 user set alarm value] | [▶ 495] |
| – | Double pulse rate                       | [Rate]             | [Double pulse rate]                       | [▶ 495] |
| – | Pulse output 1 unit select              | [Unit]             | [Pulse output 1 unit select]              | [▶ 496] |

Frequency output  
1 select

⌚ [Detailed setup] ► [Pls/Sts out] ► [Dbl pls out] ► [Sel]

Ⓜ [Device root menu] ► [Detailed setup] ► [Pulse/Status outputs] ►  
[Double pulse output] ► [Frequency output 1 select]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [▶ 300]
- *Basic setup* [▶ 349]

Assigns a process variable to double pulse output.

Concentration, Net mass flow 1 – 2, Net volume flow 1 – 2 and Net corrected volume flow can only be selected, if the concentration function is available on the device.

|   | Value                                                          | Description                                                          |
|---|----------------------------------------------------------------|----------------------------------------------------------------------|
| – | Mass flow<br>[Mass]<br>[Mass flow]                             | Sets the displayed process variables.<br>Default value is Mass flow. |
| – | Density<br>[Dens]<br>[Density]                                 |                                                                      |
| – | Temperature<br>[Temp]<br>[Temperature]                         |                                                                      |
| – | Pressure<br>[Pres]<br>[Pressure]                               |                                                                      |
| – | Volume flow<br>[Vol]<br>[Volume flow]                          |                                                                      |
| – | Reference density<br>[Ref dens]<br>[Reference density]         |                                                                      |
| – | Relative density<br>[Rel dens]<br>[Relative density]           |                                                                      |
| – | Corrected volume flow<br>[Corr vol]<br>[Corrected volume flow] |                                                                      |
| – | Concentration<br>[Conc]<br>[Concentration]                     |                                                                      |



| Value                                                                        | Description                                                          |
|------------------------------------------------------------------------------|----------------------------------------------------------------------|
| Net mass flow 1<br>– [Net mass1]<br>[Net mass flow 1]                        | Sets the displayed process variables.<br>Default value is Mass flow. |
| Net mass flow 2<br>– [Net mass2]<br>[Net mass flow 2]                        |                                                                      |
| Net volume flow 1<br>– [Net vol1]<br>[Net volume flow 1]                     |                                                                      |
| Net volume flow 2<br>– [Net vol2]<br>[Net volume flow 2]                     |                                                                      |
| Net corrected volume flow<br>– [Net corr vol]<br>[Net corrected volume flow] |                                                                      |
| Viscosity<br>Ⓔ [Visc]<br>[Viscosity]                                         |                                                                      |
| Drive current<br>– [Drv curr]<br>[Drive current]                             |                                                                      |

### Double pulse phase shift mode

① [Detailed setup] ► [Pls/Sts out] ► [Dbl pls out] ► [Phase shift mode]

Ⓔ [Device root menu] ► [Detailed setup] ► [Pulse/Status outputs] ► [Double pulse output] ► [Double pulse phase shift mode]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [► 301]
- *Basic setup* [► 350]

Sets the pulse shift mode of double pulse.

Directly after changing the shift mode, the output signal of pulse/status is not exact.

| Value                                | Description                                                |
|--------------------------------------|------------------------------------------------------------|
| 0 degrees<br>– [0°]<br>[0 deg]       | No phase shift between pulse signal 1 and 2.               |
| 180 degrees<br>– [180°]<br>[180 deg] | Phase shift between pulse signal 1 and 2 is 180 degrees.   |
| -90 degrees<br>– [-90°]<br>[-90 deg] | Pulse 2 signal is shifted -90 degrees from pulse 1 signal. |

|   | Value                                      | Description                                                                                                                                                                   |
|---|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | +90 degrees<br>[+90°]<br>[+90 deg]         | Pulse 2 signal is shifted +90 degrees from pulse 1 signal.                                                                                                                    |
| – | Quadrature<br>[Quadrature]<br>[Quadrature] | When the flow is forward, pulse 2 signal is shifted +90 degrees from pulse 1 signal. When the flow is reverse, pulse 2 is shifted -90 degrees from pulse 1.<br>Default value. |

**Max frequency 1**

Ⓛ [Detailed setup] ► [Pls/Sts out] ► [Dbl pls out] ► [Max freq]

Ⓜ [Device root menu] ► [Detailed setup] ► [Pulse/Status outputs] ► [Double pulse output] ► [Max frequency 1]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [▶ 302]
- *Basic setup* [▶ 350]

Sets the frequency value when the process value that is assigned to Double pulse output is the upper range value, 100 %.

|   | Value          | Description                                                        |
|---|----------------|--------------------------------------------------------------------|
| – | Numeric digits | Setting range: 0.0001 – 10000.0 Hz<br>Default value is 10000.0 Hz. |

**Min frequency 1**

Ⓛ [Detailed setup] ► [Pls/Sts out] ► [Dbl pls out] ► [Min freq]

Ⓜ [Device root menu] ► [Detailed setup] ► [Pulse/Status outputs] ► [Double pulse output] ► [Min frequency 1]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [▶ 302]
- *Basic setup* [▶ 351]

Sets the frequency value when the process value that is assigned to Double pulse output is the lower range value, 0 %.

|   | Value          | Description                                                  |
|---|----------------|--------------------------------------------------------------|
| – | Numeric digits | Setting range: 0.0 – 10000.0 Hz.<br>Default value is 0.0 Hz. |

**Frequency output 1 alarm action**

Ⓛ [Detailed setup] ► [Pls/Sts out] ► [Dbl pls out] ► [Action at alm]

Ⓜ [Device root menu] ► [Detailed setup] ► [Pulse/Status outputs] ► [Double pulse output] ► [Frequency output 1 alarm action]

This parameter can be set in the following menu/menus:

*Basic setup* [▶ 351]

Sets the frequency output of double pulse when an alarm occurs.

|   | Value                                                | Description                                                                               |
|---|------------------------------------------------------|-------------------------------------------------------------------------------------------|
| – | 0.0 Hz<br>[0.0Hz]<br>[0.0 Hz]                        | Frequency becomes 0.0 Hz.<br>Default value.                                               |
| – | Measured value<br>[Meas val]<br>[Measured value]     | Frequency at measured value.                                                              |
| – | Hold<br>[Hold]<br>[Hold]                             | Frequency before an alarm occurs is held.                                                 |
| – | User set value<br>[User set val]<br>[User set value] | Frequency that has been set in the parameter Frequency output 1 – 2 user set alarm value. |

### Frequency output 1 user set alarm value

① [Detailed setup] ► [Pls/Sts out] ► [Dbl pls out] ► [User val at alm]

② [Device root menu] ► [Detailed setup] ► [Pulse/Status outputs] ► [Double pulse output] ► [Frequency output 1 user set alarm value]

This parameter can be set in the following menu/menus:

*Basic setup* [► 351]

Sets the frequency value of double pulse when an alarm occurs, if User set value has been set in the parameter *Frequency output 1 – 2 alarm action*.

|   | Value          | Description                                                 |
|---|----------------|-------------------------------------------------------------|
| – | Numeric digits | Setting range: 0.0 – 15000.0 Hz<br>Default value is 0.0 Hz. |

### Double pulse rate

① [Detailed setup] ► [Pls/Sts out] ► [Dbl pls out] ► [Rate]

② [Device root menu] ► [Detailed setup] ► [Pulse/Status outputs] ► [Double pulse output] ► [Double puls rate]

Sets/Shows maximum range for double pulse 50% duty output. When Max frequency 1 range is set or read, then this parameter value is automatically converted to the value based on Pulse output 1 unit select.

|   | Value          | Description                                                 |
|---|----------------|-------------------------------------------------------------|
| – | Numeric digits | Setting range: more than 0.0<br>Default value is 1.0 [kg/P] |



This parameter is assumed to be set by the following pre-condition. If the following conditions are not fulfilled, the parameter cannot be written or the calculation result might not be correctly indicated:

- ▶ Mass flow/Volume flow/Corrected volume flow/Net mass flow1/Net mass flow2/Net volume flow1/Net volume flow2 or Net corrected volume flow is set in Frequency output 1 select
- ▶ The LRV of selected process value in Frequency output 1 select is 0, URV is more than 0 and Min frequency 1 is 0. – (condition a)



- ▶ This parameter cannot be written when 0 or less than 0 value is set in this parameter.
- ▶ This parameter cannot be written when Density/Temperature/Pressure/Reference density/Relative density or Concentration is set in Frequency output 1 select.
- ▶ This parameter cannot be written when Frequency output 1 select setting and Pulse output 1 unit select setting have the consistency.
- ▶ This parameter value is calculated to regard the condition a) above as fulfilling. Even if the condition a) above is not fulfilled, this parameter is calculated but the calculation result is not correctly indicated.
- ▶ When Max frequency 1 is out of range of 0.0001 – 10000 by this calculation result, this parameter cannot be written and Max frequency 1 and Double pulse rate values are not updated
- ▶ When this parameter value is calculated and result is indicated, then Max frequency 1 becomes conversion result from Double pulse rate and Min frequency 1 is set to 0
- ▶ When Max frequency 1 is set, this parameter value is automatically calculated and converted based on Pulse output 1 unit select. In addition, when this parameter value is written, then Max frequency 1 is automatically calculated. This calculation is done even if double pulse mode is not selected.

### Calculation example

For example, when Pulse output 1 unit select is kg/P and Max frequency 1 is 10000Hz, the following calculation is done automatically:

Mass flow span (Mass flow URV(ex:10t/h) – Mass flow LRV(ex:0t/h)) = 10t/h = 2.77778 kg/s  
 $\text{Kg/P} = 2.77778 / 10000 = 0.000277778 \text{ kg/P}$  is the maximum range.

### Pulse output 1 unit select

Ⓐ [Detailed setup] ▶ [Pls/Sts out] ▶ [Dbl pls out] ▶ [Unit]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Pulse/Status outputs] ▶ [Double pulse output] ▶ [Pulse output 1 unit select]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [ 302]
- *Basic setup* [ 351]

Assigns process variable to pulse output 1.

|   | Value          | Description                                                 |
|---|----------------|-------------------------------------------------------------|
| – | Numeric digits | Setting range: more than 0.0<br>Default value is 1.0 [kg/P] |

|   | Process variables                                                                                                                                                                     | Available units                                                                                                                                                            |
|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | For<br>Mass flow<br><b>[Mass]</b><br>[Mass flow ]<br>and<br>Net mass flow 1 – 2<br><b>[Net mass1]</b><br>[Net mass flow<br>1 – 2]                                                     | g/P<br>kg/P<br>t/P<br>ton(US)/P<br>ton(UK)/P<br>lb/P<br>P/g<br>P/kg<br>P/t<br>P/ton(US)<br>P/ton(UK)<br>P/lb                                                               |
| – | For<br>Volume flow<br><b>[vol]</b><br>[Volume flow]<br>and<br>Net volume flow 1 – 2<br><b>[Net vol1]</b><br>[Net volume flow<br>1 – 2]                                                | cm3/P<br>L/P<br>m3/P<br>gal/P<br>kgal/P<br>Cuft/P<br>bbl/P<br>Impgal/P<br>kImpgal/P<br>P/cm3<br>P/L<br>P/m3<br>P/gal<br>P/kgal<br>P/Cuft<br>P/bbl<br>P/Impgal<br>P/kImpgal |
| – | For<br>Corrected volume<br>flow<br><b>[Corr vol]</b><br>[Corrected volume<br>flow ]<br>and<br>Net corrected volume<br>flow<br><b>[Net corr vol]</b><br>[Net corrected<br>volume flow] | NmL/P<br>NmIm3/P<br>StdL/P<br>Scuft/P<br>Stdm3/P<br>P/NmL<br>P/NmIm3<br>P/StdL<br>P/Scuft<br>P/Stdm3                                                                       |
| – | For<br>Energy<br><b>[Energy]</b><br>[Energy]                                                                                                                                          | MJ/P<br>Btu/P<br>P/MJ<br>P/Btu                                                                                                                                             |



The value of this parameter depends on the parameter of the Display unit selection. Depending on the value of the Display unit selection, not all of the values of this parameter may be displayed.

| Unit      | Liquid gas select |     | Display unit selection |           |           |              |         |
|-----------|-------------------|-----|------------------------|-----------|-----------|--------------|---------|
|           | Liquid            | Gas | Metric                 | US        | UK        | Russia       | Japan   |
| g/P       | √                 | √   | g/P                    | g/P       | g/P       | г/имп.       | g/P     |
| kg/P      | √                 | √   | kg/P                   | kg/P      | kg/P      | кг/имп.      | kg/P    |
| t/P       | √                 | √   | t/P                    | t/P       | t/P       | т/имп.       | t/P     |
| lb/P      | √                 | √   |                        | lb/P      | lb/P      | фунт/имп.    | -       |
| P/g       | √                 | √   | P/g                    | P/g       | P/g       | имп./г       | P/g     |
| P/kg      | √                 | √   | P/kg                   | P/kg      | P/kg      | имп./кг      | P/kg    |
| P/t       | √                 | √   | P/t                    | P/t       | P/t       | имп./т       | P/t     |
| P/lb      | √                 | √   | -                      | P/lb      | P/lb      | имп./фунт    | -       |
| cm³/P     | √                 | √   | cm³/P                  | cm³/P     | cm³/P     | см³/имп.     | cm³/P   |
| L/P       | √                 | √   | L/P                    | l/P       | l/P       | л/имп.       | L/P     |
| m³/P      | √                 | √   | m³/P                   | m³/P      | m³/P      | м³/имп.      | m³/P    |
| gal/P     | √                 | √   | -                      | gal/P     | gal/P     | гал/имп.     | -       |
| kgal/P    | √                 | √   | -                      | kgal/P    | kgal/P    | кгал/имп.    | -       |
| ft³/P     | √                 | √   | -                      | Cuft/P    | ft³/P     | фут³/имп.    | -       |
| bbl/P     | √                 | √   | -                      | bbl/P     | -         | bbl/имп.     | -       |
| Impgal/P  | √                 | √   | -                      | Impgal/P  | Impgal/P  | Impgal/имп.  | -       |
| kImpgal/P | √                 | √   | -                      | kImpgal/P | kImpgal/P | kImpgal/имп. | -       |
| P/cm³     | √                 | √   | P/cm³                  | P/cm³     | P/cm³     | имп./см³     | P/cm³   |
| P/L       | √                 | √   | P/L                    | P/l       | P/l       | имп./л       | P/L     |
| P/m³      | √                 | √   | P/m³                   | P/m³      | P/m³      | имп./м³      | P/m³    |
| P/gal     | √                 | √   | -                      | P/gal     | P/gal     | имп./гал     | -       |
| P/kgal    | √                 | √   | -                      | P/kgal    | P/kgal    | имп./кгал    | -       |
| P/ft³     | √                 | √   | -                      | P/Cuft    | P/ft³     | имп./фут³    | -       |
| P/bbl     | √                 | √   | -                      | P/bbl     | -         | имп./bbl     | -       |
| P/Impgal  | √                 | √   | -                      | P/Impgal  | P/Impgal  | имп./Impgal  | -       |
| P/kImpgal | √                 | √   | -                      | P/kImpgal | P/kImpgal | имп./kImpgal | -       |
| NL/P      | N/A               | √   | NL/P                   | NI/P      | NI/P      | Норм.л/имп.  | L/P(N)  |
| Nm³/P     | N/A               | √   | Nm³/P                  | Nm³/P     | Nm³/P     | Норм.м³/имп. | m³/P(N) |
| SL/P      | √                 | √   | SL/P                   | SI/P      | SI/P      | Ст.л/имп.    | L/P(S)  |
| Sft³/P    | √                 | √   | -                      | Scuft/P   | Sft³/P    | Ст.фут³/имп. | -       |
| Sm³/P     | √                 | √   | Sm³/P                  | Sm³/P     | Sm³/P     | Ст.м³/имп.   | m³/P(S) |
| P/NL      | N/A               | √   | P/NL                   | P/NI      | P/NI      | имп./Норм.л  | P/L(N)  |
| P/Nm³     | N/A               | √   | P/Nm³                  | P/Nm³     | P/Nm³     | имп./Норм.м³ | P/m³(N) |

|        | Liquid gas select |   | Display unit selection |         |        |              |         |
|--------|-------------------|---|------------------------|---------|--------|--------------|---------|
| P/SL   | √                 | √ | P/SL                   | P/Sl    | P/Sl   | имп./Ст.л    | P/L(S)  |
| P/Sft³ | √                 | √ | -                      | P/Scuft | P/Sft³ | имп./Ст.фут³ | -       |
| P/Sm³  | √                 | √ | P/Sm³                  | P/Sm³   | P/Sm³  | имп./Ст.м³   | P/m³(S) |
| MJ/P   | √                 | √ | MJ/P                   | MJ/P    | MJ/P   | МДж/имп.     | MJ/P    |
| Btu/P  | √                 | √ | -                      | Btu/P   | Btu/P  | БТЕ/имп.     | -       |
| P/MJ   | √                 | √ | P/MJ                   | P/MJ    | P/MJ   | имп./МДж     | P/MJ    |
| P/Btu  | √                 | √ | -                      | P/Btu   | P/Btu  | имп./БТЕ     | -       |

**5.7.5 Analog input**

Menu for configuring Analog input functions.

The following menus/settings are available:

|   | Full name                   | Display name | [Modbus] name                 | Page   |
|---|-----------------------------|--------------|-------------------------------|--------|
| – | Analog input function       | [Func]       | [Analog input function]       | [ 500] |
| – | Analog input failure option | [Fail opt]   | [Analog input failure option] | [ 501] |
| – | Analog input low limit      | [Lo lim]     | [Analog input low limit]      | [ 501] |
| – | Analog input high limit     | [Hi lim]     | [Analog input high limit]     | [ 501] |

**Analog input function**

Ⓐ [Detailed setup] ► [AI] ► [Func]

Ⓜ [Device root menu] ► [Detailed setup] ► [Analog input] ► [Analog input function]

Sets the purpose of the Analog input.

|   | Value                                                                   | Description                                                                                                                                              |
|---|-------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | None<br>[None]<br>[None]                                                | Do nothing.<br>Default value.                                                                                                                            |
| – | Pressure compensation<br>[Pres comp]<br>[Pressure compensation]         | Set this value if a pressure sensor is attached to the analog input; used for dynamic pressure compensation.                                             |
| – | Temperature compensation<br>[Temp comp]<br>[Temperature compensation]   | Set this value if an external thermometer is to be used for temperature compensation.                                                                    |
| ⓕ | Sensor pressure alarm<br>[Snsr pres alm]<br>[Sensor pressure alarm]     | Set this value if an external pressure sensor is attached to the Rotamass Total Insight to be used for a tube leakage alarm.                             |
| ⓕ | Calorific value<br>[Cal]<br>[Calorific value]                           | Set this value if an external thermometer is used for the measurement of the calorific value. Used for cooling applications.                             |
| ⓕ | Viscosity delta pressure<br>[Visc.deltaP]<br>[Viscosity delta pressure] | Set this value, if an external differential pressure is used for the Viscosity calculation.<br>It is only available when Viscosity option(/VM) is valid. |



|   | Value                                                                                          | Description                                                                                                       |
|---|------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Ⓔ | Pressure compensa-<br>tion and NOC<br>[Pres comp/NOC]<br>[Pressure<br>compensation and<br>NOC] | An analog input is used as pressure compensation and NOC.<br>It is only available when NOC option(/C52) is valid  |
| Ⓔ | Pressure NOC<br>[NOC pres]<br>[Pressure NOC]                                                   | An analog input is used as pressure compensation and NOC.<br>It is only available when NOC option(/C52) is valid. |

### Analog input failure option

Ⓔ [Detailed setup] ► [AI] ► [Fail opt]

Ⓕ [Device root menu] ► [Detailed setup] ► [Analog input] ► [Analog  
input failure option]

Sets the value to be used when an Analog input alarm occurs.

|   | Value                                     | Description                                                                                     |
|---|-------------------------------------------|-------------------------------------------------------------------------------------------------|
| – | Fixed value<br>[Fix val]<br>[Fixed value] | Fixed value that has been defined when the purpose of the<br>Analog input was selected is used. |
| – | Hold<br>[Hold]<br>[Hold]                  | Value before Analog input alarm occurred is used.<br>Default value.                             |

### Analog input low limit

Ⓔ [Detailed setup] ► [AI] ► [Lo lim]

Ⓕ [Device root menu] ► [Detailed setup] ► [Analog input] ► [Analog  
input low limit]

Sets the lower limit current during normal operation.

|   | Value          | Description                                                  |
|---|----------------|--------------------------------------------------------------|
| – | Numeric digits | Setting range: 2.4 mA – 3.8 mA.<br>Default value is 3.60 mA. |

### Analog input high limit

Ⓔ [Detailed setup] ► [AI] ► [Hi lim]

Ⓕ [Device root menu] ► [Detailed setup] ► [Analog input] ► [Analog  
input high limit]

Sets the higher limit current during normal operations.

|   | Value          | Description                                                    |
|---|----------------|----------------------------------------------------------------|
| – | Numeric digits | Setting range: 20.5 mA – 21.6 mA<br>Default value is 21.00 mA. |

### 5.7.6 Totalizer

Menu for configuring totalizer functions.

The following menus/settings are available:

|   | Full name                       | Display name | [Modbus] name                     | Page   |
|---|---------------------------------|--------------|-----------------------------------|--------|
| – | Totalizer additional parameters | [Tt1 add]    | [Totalizer additional parameters] | [ 502] |
| – | Total density hysteresis        | [Dens hys]   | [Total density hysteresis]        | [ 502] |
| – | Total temperature hysteresis    | [Temp hys]   | [Total temperature hysteresis]    | [ 511] |
| – | Totalizer 1 – 6                 | [Total1 – 6] | [Totalizer 1 – 6]                 | [ 503] |

#### Totalizer additional parameters

Ⓐ [Detailed setup] ► [Tt1] ► [Tt1 add]

Ⓜ [Device root menu] ► [Detailed setup] ► [Totalizer] ► [Totalizer additional parameters]

Enables or disables the menu for accessing parameters that are located under the Additional function menu of Totalizer.

To access the parameters, this parameter must be set to Apply.

|   | Value                                   | Description                                                                    |
|---|-----------------------------------------|--------------------------------------------------------------------------------|
| – | Not apply<br>[Not apply]<br>[Not apply] | Menu for additional parameters of the Totalizer is disabled.<br>Default value. |
| – | Apply<br>[Apply]<br>[Apply]             | The menu is enabled.                                                           |

#### Total density hysteresis

Ⓐ [Detailed setup] ► [Tt1] ► [Dens hys]

Ⓜ [Device root menu] ► [Detailed setup] ► [Totalizer] ► [Total density hysteresis]

This parameter is only available for totalizers which is working totalizer function by density range. Available condition is when Density(Balanced), Density(Absolute), Density(Only positive) or Density(Only negative) is selected in Total option.

Even if the totalizer value return goes from out in of the range of Total density lower value and Total density upper value to in out of range of these setting, totalizer still continue to stop totalization until the value of lower value +- hysteresis(convert % to actual value) or upper value +- hysteresis(convert % to actual value).

|   | Value          | Description                                          |
|---|----------------|------------------------------------------------------|
| – | Numeric digits | Setting range: 0.0 – 10.0<br>Default value is 0.1 %. |

**Totalizer 1 – 6**

Set of menus for configuring the totalizers 1 – 6.

The following menus/settings are available:

|   | Full name                  | Display name | [Modbus] name                | Page    |
|---|----------------------------|--------------|------------------------------|---------|
| – | Total 1 – 6 channel        | [Channel]    | [Total 1 – 6 channel]        | [▶ 503] |
| – | Total 1 – 6 unit           | [Unit]       | [Total 1 – 6 unit]           | [▶ 504] |
| – | Total 1 – 6 failure option | [Fail opt]   | [Total 1 – 6 failure option] | [▶ 505] |
| – | Total 1 – 6 start/stop     | [Start/Stop] | [Total 1 – 6 start/stop]     | [▶ 506] |
| – | Additional function        | [Add func]   | [Additional function]        | [▶ 506] |

**Total 1 – 6 channel**

Ⓛ [Detailed setup] ▶ [Ttl] ▶ [Ttl 1 – 6] ▶ [Channel]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Totalizer] ▶ [Totalizer 1 – 6] ▶ [Total 1 – 6 channel]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [▶ 303]
- *Basic setup* [▶ 352]

Sets the process value for Total 1 – 6.

Net mass flow 1 – 2, Net volume flow 1 – 2 and Net corrected volume flow can only be selected if the concentration function is available on the device.

|   | Value                                                          | Description                                                                                                                                                                                                                                                                                                                                         |
|---|----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Mass flow<br>[Mass]<br>[Mass flow]                             | Sets the displayed process variables for Total 1 – 6.<br>Default value for Total 1 is Mass flow.<br>Default value for Total 2 is Volume flow.<br>Default value for Total 3 is Corrected volume flow.<br>Default value for Total 4 is Mass flow.<br>Default value for Total 5 is Volume flow.<br>Default value for Total 6 is Corrected volume flow. |
| – | Volume flow<br>[Vol]<br>[Volume flow]                          |                                                                                                                                                                                                                                                                                                                                                     |
| – | Corrected volume flow<br>[Corr vol]<br>[Corrected volume flow] |                                                                                                                                                                                                                                                                                                                                                     |
| – | Energy<br>[Energy]<br>[Energy]                                 |                                                                                                                                                                                                                                                                                                                                                     |

|   | Value                                                                      | Description                                                                                                                                                                                                                                                                                                                                         |
|---|----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓔ | Net mass flow 1<br>[Net mass1]<br>[Net mass flow 1]                        | Sets the displayed process variables for Total 1 – 6.<br>Default value for Total 1 is Mass flow.<br>Default value for Total 2 is Volume flow.<br>Default value for Total 3 is Corrected volume flow.<br>Default value for Total 4 is Mass flow.<br>Default value for Total 5 is Volume flow.<br>Default value for Total 6 is Corrected volume flow. |
| Ⓔ | Net mass flow 2<br>[Net mass2]<br>[Net mass flow 2]                        |                                                                                                                                                                                                                                                                                                                                                     |
| Ⓔ | Net volume flow 1<br>[Net vol1]<br>[Net volume flow 1]                     |                                                                                                                                                                                                                                                                                                                                                     |
| Ⓔ | Net volume flow 2<br>[Net vol2]<br>[Net volume flow 2]                     |                                                                                                                                                                                                                                                                                                                                                     |
| Ⓔ | Net corrected volume flow<br>[Net corr vol]<br>[Net corrected volume flow] |                                                                                                                                                                                                                                                                                                                                                     |
| – | Off<br>[off]<br>[Off]                                                      |                                                                                                                                                                                                                                                                                                                                                     |

### Total 1 – 6 unit

Ⓔ [Detailed setup] ► [Ttl] ► [Ttl 1 – 6] ► [Unit]

Ⓔ [Device root menu] ► [Detailed setup] ► [Totalizer] ► [Totalizer 1 – 6] ► [Total 1 – 6 unit ]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [▶ 304]
- *Basic setup* [▶ 353]

Sets the unit for Total 1 – 6.



The unit displayed on the LCD may vary depending on the setting of the parameter *Display unit selection*. During Modbus communication, the actually displayed unit may vary depending on the Modbus tool. For details, refer to *Units of the parameters* [▶ 819].

| Value                        | Description                                                                                                                                                                                                                                                                                                       |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – g                          | Sets the unit for Total 1 – 6 .<br>Default value for Total 1 is kg.<br>Default value for Total 2 is m <sup>3</sup><br>Default value for Total 3 is m <sup>3</sup><br>Default value for Total 4 is kg.<br>Default value for Total 5 is m <sup>3</sup> .<br>Default value for Total 6 is m <sup>3</sup> (standard). |
| – kg                         |                                                                                                                                                                                                                                                                                                                   |
| – t                          |                                                                                                                                                                                                                                                                                                                   |
| – ton(US)                    |                                                                                                                                                                                                                                                                                                                   |
| – ton(UK)                    |                                                                                                                                                                                                                                                                                                                   |
| – lb                         |                                                                                                                                                                                                                                                                                                                   |
| – cm <sup>3</sup>            |                                                                                                                                                                                                                                                                                                                   |
| – L                          |                                                                                                                                                                                                                                                                                                                   |
| – m <sup>3</sup>             |                                                                                                                                                                                                                                                                                                                   |
| – gal                        |                                                                                                                                                                                                                                                                                                                   |
| – kgal                       |                                                                                                                                                                                                                                                                                                                   |
| – ft <sup>3</sup>            |                                                                                                                                                                                                                                                                                                                   |
| – bbl                        |                                                                                                                                                                                                                                                                                                                   |
| – Impgal                     |                                                                                                                                                                                                                                                                                                                   |
| – kImpgal                    |                                                                                                                                                                                                                                                                                                                   |
| – L(Normal)                  |                                                                                                                                                                                                                                                                                                                   |
| – m <sup>3</sup> (Normal)    |                                                                                                                                                                                                                                                                                                                   |
| – L(standard)                |                                                                                                                                                                                                                                                                                                                   |
| – ft <sup>3</sup> (standard) |                                                                                                                                                                                                                                                                                                                   |
| – MMscuft                    |                                                                                                                                                                                                                                                                                                                   |
| – m <sup>3</sup> (standard)  |                                                                                                                                                                                                                                                                                                                   |
| – MJ                         |                                                                                                                                                                                                                                                                                                                   |
| – Btu                        |                                                                                                                                                                                                                                                                                                                   |
| – User unit                  |                                                                                                                                                                                                                                                                                                                   |

### Total 1 – 6 failure option

① [Detailed setup] ► [Tt1] ► [Tt1 1 – 6] ► [Fail opt]

② [Device root menu] ► [Detailed setup] ► [Totalizer] ► [Totalizer 1 – 6] ► [Total 1 – 6 failure option]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [► 305]
- *Basic setup* [► 354]

Defines the behavior of the totalizers when an alarm occurs.

| Value                                    | Description                                                                  |
|------------------------------------------|------------------------------------------------------------------------------|
| Run                                      | Totalizer accumulates the assigned process value anyway.<br>Default value.   |
| – [Run]<br>[Run]                         |                                                                              |
| Hold                                     | Totalizer stops accumulating the process value.                              |
| – [Hold]<br>[Hold]                       |                                                                              |
| Last Valid Value                         | Totalizer accumulates the value that was measured before the alarm occurred. |
| – [Last valid val]<br>[Last valid value] |                                                                              |

**Total 1 – 6  
start/stop**

Ⓛ [Detailed setup] ► [Tt1] ► [Tt1 1 – 6] ► [Start/Stop]

Ⓜ [Device root menu] ► [Detailed setup] ► [Totalizer] ► [Totalizer 1 – 6] ► [Total 1 – 6 start/stop]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [► 305]
- *Basic setup* [► 355]
- *Diag/Service* [► 156]

Starts or stops Totalizer 1 – 6 and shows its status.

|   | Value                       | Description                                                                                                              |
|---|-----------------------------|--------------------------------------------------------------------------------------------------------------------------|
| – | Stop<br>[Stop]<br>[Stop]    | Totalizer 1 – 6 stops accumulation of the assigned process value. When accumulation is stopped, the value is kept.       |
| – | Start<br>[Start]<br>[Start] | Totalizer starts accumulation of assigned process value. If the value is not 0, the accumulation starts from that value. |

**Additional function**

Menu for configuring the Totalizer in detail. The menu is only available when *Process variables additional parameters*, see *Process variables* [► 380] has been set to Apply.

The following menus/settings are available:

|   | Full name                           | Display name   | [Modbus] name                         | Page    |
|---|-------------------------------------|----------------|---------------------------------------|---------|
| – | Total 1 – 6 preset value            | [Preset val]   | [Total 1 – 6 preset value]            | [► 507] |
| – | Total 1 – 6 reset/preset            | [Reset/Preset] | [Total 1 – 6 reset/preset]            | [► 507] |
| – | Total 1 – 6 option                  | [Opt]          | [Total 1 – 6 option]                  | [► 507] |
| – | Total 1 – 6 set point               | [Set point]    | [Total 1 – 6 set point]               | [► 509] |
| – | Total 1 – 6 user unit               | [User unit]    | [Total 1 – 6 user unit]               | [► 509] |
| – | Total 1 – 6 conversion factor       | [Conv factor]  | [Total 1 – 6 conversion factor]       | [► 509] |
| – | Total 1 – 3 density lower value     | [Dens lo lim]  | [Total 1 – 3 density lower value]     | [► 510] |
| – | Total 1 – 3 density upper value     | [Dens hi lim]  | [Total 1 – 3 density upper value]     | [► 510] |
| – | Total 1 – 3 temperature lower value | [Temp lo lim]  | [Total 1 – 3 temperature lower value] | [► 510] |
| – | Total 1 – 3 temperature upper value | [Temp hi lim]  | [Total 1 – 3 temperature upper value] | [► 511] |
| – | Total density hysteresis            | [Dens hys]     | [Total density hysteresis]            | [► 511] |
| – | Total temperature hysteresis        | [Temp hys]     | [Total temperature hysteresis]        | [► 511] |
| – | Total 1 – 3 24 hours                | [24h]          | [Total 1 – 3 24 hours]                | [► 512] |

**Total 1 – 6  
preset value**

① [Detailed setup] ► [Ttl] ► [Ttl 1 – 6] ► [Add func] ► [Preset val]

② [Device root menu] ► [Detailed setup] ► [Totalizer] ► [Totalizer 1 – 6] ► [Additional function] ► [Total 1 – 6 preset value]

This parameter can be set in the following menu/menus:

*Diag/Service* [► 157]

Sets the value of the totalizer when preset has been selected and set in Total 1 – 6 reset/preset.

|   | Value          | Description         |
|---|----------------|---------------------|
| – | Numeric digits | Default value is 0. |

**Total 1 – 6  
reset/preset**

① [Detailed setup] ► [Ttl] ► [Ttl 1 – 6] ► [Add func] ► [Reset/Preset]

② [Device root menu] ► [Detailed setup] ► [Totalizer] ► [Totalizer 1 – 6] ► [Additional function] ► [Total 1 – 6 reset/preset]

This parameter can be set in the following menu/menus:

*Diag/Service* [► 157]

Resets or presets Totalizer.

If accessed via Modbus communication, each item that is set to gather information is set and controlled via an interactive user interface called Method.

|   | Value                                     | Description                                                                                                                                                      |
|---|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Not Execute<br>[Not exe]<br>[Not Execute] | Do nothing.<br>Default value.                                                                                                                                    |
| – | Reset<br>[Reset]<br>[Reset]               | Resets the value of the totalizer to 0. Value returns automatically to Not Execute after each operation.                                                         |
| – | Preset<br>[Preset]<br>[Preset]            | Sets the value of the totalizer to the value defined in the parameter Total 1 – 6 preset value. Value returns automatically to Not Execute after each operation. |

**Total 1 – 6  
option**

① [Detailed setup] ► [Ttl] ► [Ttl 1 – 6] ► [Add func] ► [Opt]

② [Device root menu] ► [Detailed setup] ► [Totalizer] ► [Totalizer 1 – 6] ► [Additional function] ► [Total 1 – 6 option]

Sets the totalization mode of Totalizer 1 – 6.

|   | Value                                | Description                                                                      |
|---|--------------------------------------|----------------------------------------------------------------------------------|
| – | Balanced<br>[Balanced]<br>[Balanced] | Positive and negative incoming values are added to the total.                    |
| – | Absolute<br>[Abs]<br>[Absolute]      | Absolute values of positive and negative incoming values are added to the total. |

|   | Value                                                                    | Description                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---|--------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   | Positive only                                                            | Default value.                                                                                                                                                                                                                                                                                                                                                                                                                |
| – | <b>[Positive only]</b><br>[Positive only]                                | Only positive incoming values are added to the total. Negative values are ignored.                                                                                                                                                                                                                                                                                                                                            |
|   | Negative only                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                               |
| – | <b>[Negative only]</b><br>[Negative only]                                | Only negative incoming values are added to the total. Positive values are ignored.                                                                                                                                                                                                                                                                                                                                            |
|   | Hold                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                               |
| – | <b>[Hold]</b><br>[Hold]                                                  | Value of the total is held, not changed.                                                                                                                                                                                                                                                                                                                                                                                      |
|   | Density (Balanced)                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                               |
| – | <b>[Dens (Balanced)]</b><br>[Density (Balanced)]                         | Totalization with Balanced is performed only when Density value which is indicated on communication parameter is in the range of between Total density lower value and Total density upper value. This selection is only available for Total 1 – 3.                                                                                                                                                                           |
|   | Density (Absolute)                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                               |
| – | <b>[Dens (Abs)]</b><br>[Density (Absolute)]                              | Totalization with Absolute is performed only when Density value which is indicated on communication parameter is in the range of between Total density lower value and Total density upper value. This selection is only available for Total 1 – 3.                                                                                                                                                                           |
|   | Density (Positive only)                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                               |
| – | <b>[Dens (Positive)]</b><br>[Density (Positive only)]                    | Totalization with Only Positive is performed only when Density value is in the range of between Total density lower value and Total density upper value. This selection is only available for Total 1 – 3.                                                                                                                                                                                                                    |
|   | Density (Negative only)                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                               |
| – | <b>[Dens (Negative)]</b><br>[Density (Negative only)]                    | Totalization with Only Negative is performed only when Density value is in the range of between Total density lower value and Total density upper value. This selection is only available for Total 1 – 3.                                                                                                                                                                                                                    |
|   | Density + Temperature (Balanced)                                         |                                                                                                                                                                                                                                                                                                                                                                                                                               |
| – | <b>[Dens+Temp (Balanced)]</b><br>[Density + Temperature (Balanced)]      | Totalization with Balanced is performed only when Density value and Temperature value which are indicated on communication parameters are in the range. The totalization range is set by Total density lower value and Total density upper value for the Density value, and Total temperature lower value and Total temperature upper value for the Temperature value. This selection is only available for Total 1 – 3.      |
|   | Density +Temperature (Absolute)                                          |                                                                                                                                                                                                                                                                                                                                                                                                                               |
| – | <b>[Dens+Temp (Abs)]</b><br>[Density +Temperature (Absolute)]            | Totalization with Absolute is performed only when Density value and Temperature value which are indicated on communication parameters are in the range. The totalization range is set by Total density lower value and Total density upper value for the Density value, and Total temperature lower value and Total temperature upper value for the Temperature value. This selection is only available for Total 1 – 3.      |
|   | Density + Temperature (Positive only)                                    |                                                                                                                                                                                                                                                                                                                                                                                                                               |
| – | <b>[Dens+Temp (Positive)]</b><br>[Density + Temperature (Positive only)] | Totalization with Only Positive is performed only when Density value and Temperature value which are indicated on communication parameters are in the range. The totalization range is set by Total density lower value and Total density upper value for the Density value, and Total temperature lower value and Total temperature upper value for the Temperature value. This selection is only available for Total 1 – 3. |



|   | Value                                                                                                      | Description                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---|------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Density + Temperature (Negative only)<br>[Dens+Temp (Negative)]<br>[Density + Temperature (Negative only)] | Totalization with Only Negative is performed only when Density value and Temperature value which are indicated on communication parameters are in the range. The totalization range is set by Total density lower value and Total density upper value for the Density value, and Total temperature lower value and Total temperature upper value for the Temperature value. This selection is only available for Total 1 – 3. |

**Total 1 – 6 set point**

① [Detailed setup] ► [Ttl] ► [Ttl 1 – 6] ► [Add func] ► [Set point]

Ⓜ [Device root menu] ► [Detailed setup] ► [Totalizer] ► [Totalizer 1] ► [Additional function] ► [Total 1 set point]

Sets the value of Totalizer at which an alarm is generated.

|   | Value          | Description                                                                                           |
|---|----------------|-------------------------------------------------------------------------------------------------------|
| – | Numeric digits | Default value is 0.<br>If the value is 0, no alarm is ever generated at any value of Totalizer 1 – 6. |

**Total 1 – 6 user unit**

① [Detailed setup] ► [Ttl] ► [Ttl 1 – 6] ► [Add func] ► [User unit]

Ⓜ [Device root menu] ► [Detailed setup] ► [Totalizer] ► [Totalizer 1 – 6] ► [Additional function] ► [Total 1 – 6 user unit]

Sets the user-defined unit for Totalizer 1 – 6.

|   | Value            | Description                                                |
|---|------------------|------------------------------------------------------------|
| – | ASCII characters | Maximum length is 8 characters.<br>Default value is blank. |

**Total 1 – 6 conversion factor**

① [Detailed setup] ► [Ttl] ► [Ttl 1 – 6] ► [Add func] ► [Conv factor]

Ⓜ [Device root menu] ► [Detailed setup] ► [Totalizer] ► [Totalizer 1 – 6] ► [Additional function] ► [Total 1 – 6 conversion factor]

Sets the conversion factor for the Total 1 – 6 user-defined unit.

|   | Value          | Description                                                                                                        |
|---|----------------|--------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | Default value is 1.<br>Totalizer value at user-defined unit = Totalizer n value * Total n conversion factor 1 – 6. |

**Total 1 – 3  
density lower  
value**

Ⓐ [Detailed setup] ► [Tt1] ► [Tt1 1 – 3] ► [Add func] ► [Dens lo lim]

Ⓜ [Device root menu] ► [Detailed setup] ► [Totalizer] ► [Totalizer 1 – 3] ► [Additional function] ► [Total 1 – 3 density lower value]

Setting to perform totalization. This parameter is available when the Total option parameter is set to "Density(Balanced)", "Density(Absolute)", "Density(Only positive)" or "Density(Only negative)". When Density value which is displayed in communication parameter is between Total density lower value and Total density upper value, totalization is performed.

This function is only available for Total1 – 3.

|   | Value          | Description                                          |
|---|----------------|------------------------------------------------------|
| – | Numeric digits | Setting range: 0.0 –<br>Default value is 0.8 [kg/L]. |

**Total 1 – 3  
density upper  
value**

Ⓐ [Detailed setup] ► [Tt1] ► [Tt1 1 – 3] ► [Add func] ► [Dens hi lim]

Ⓜ [Device root menu] ► [Detailed setup] ► [Totalizer] ► [Totalizer 1 – 3] ► [Additional function] ► [Total 1 – 3 density upper value]

Setting to perform totalization. This parameter is available when Total option parameter is set to "Density(Balanced)", "Density(Absolute)", "Density(Only positive)" or "Density(Only negative)". When Density value which is displayed in communication parameter is between Total density lower value and Total density upper value totalization is performed.

This function is only available for Total1 – 3.

|   | Value          | Description                                          |
|---|----------------|------------------------------------------------------|
| – | Numeric digits | Setting range: 0.0 –<br>Default value is 1.2 [kg/L]. |

**Total 1 – 3  
temperature lower  
value**

Ⓐ [Detailed setup] ► [Tt1] ► [Tt1 1 – 3] ► [Add func] ► [Temp lo lim]

Ⓜ [Device root menu] ► [Detailed setup] ► [Totalizer] ► [Totalizer 1 – 3] ► [Additional function] ► [Total 1 – 3 temperature lower value]

Setting to perform totalization. This parameter is available when Total option parameter is set to "Density + Temp (Balanced)", "Density + Temp (Absolute)", "Density + Temp (Only positive)" or "Density + Temp (Only negative)". When Density value which is displayed in communication parameter is between Total density lower value and Total density upper value, and Temperature value which is displayed in communication parameters between Total temperature upper value and Total temperature lower value, totalization is performed.

This function is only available for Total1 – 3.

|   | Value          | Description              |
|---|----------------|--------------------------|
| – | Numeric digits | Default value is 0 [°C]. |

**Total 1 – 3  
temperature upper  
value**

① [Detailed setup] ► [Ttl] ► [Ttl 1 – 3] ► [Add func] ► [Temp hi lim]

Ⓜ [Device root menu] ► [Detailed setup] ► [Totalizer] ► [Totalizer 1 – 3] ► [Additional function] ► [Total 1 – 3 temperature upper value]

Setting to perform totalization. This parameter is available when Total option parameter is set to "Density + Temp (Balanced)", "Density + Temp (Absolute)", "Density + Temp (Only positive)" or "Density + Temp (Only negative)". When Density value which is displayed in communication parameter is between Total density lower value and Total density upper value, and Temperature value which is displayed in communication parameters between Total temperature upper value and Total temperature lower value, totalization is performed.

This function is only available for Total1 – 3.

|   | Value          | Description                |
|---|----------------|----------------------------|
| – | Numeric digits | Default value is 100 [°C]. |

**Total  
density hysteresis**

① [Detailed setup] ► [Ttl] ► [Ttl 1 – 6] ► [Add func] ► [Dens hys]

Ⓜ [Device root menu] ► [Detailed setup] ► [Totalizer] ► [Totalizer 1 – 6] ► [Additional function] ► [Total density hysteresis]

This parameter is only available for totalizers which is working totalizer function by density range. Available condition is when Density(Balanced), Density(Absolute), Density(Only positive) or Density(Only negative) is selected in Total option.

If the totalizer value goes outside the setting range of Total density lower value - hysteresis (convert % to actual value) and Total density upper value + hysteresis (convert % to actual value), totalization stops until the value returns to lower value or upper value.

|   | Value          | Description                                          |
|---|----------------|------------------------------------------------------|
| – | Numeric digits | Setting range: 0.0 – 10.0<br>Default value is 0.1 %. |

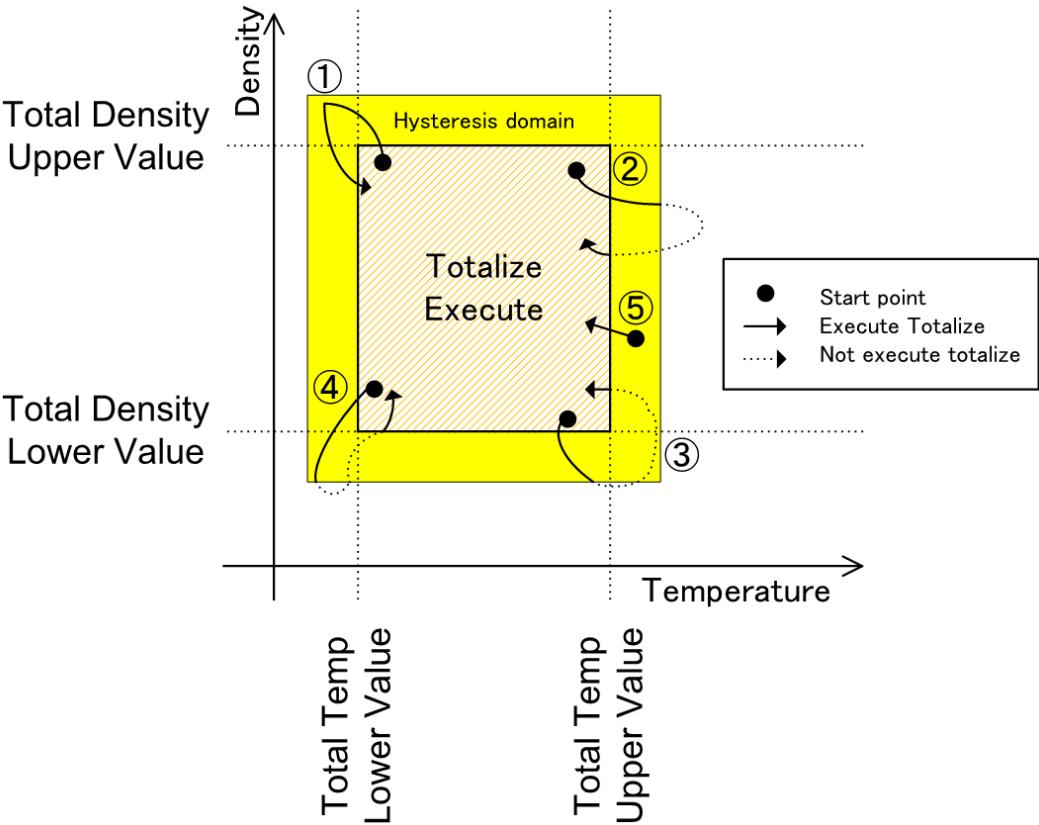
**Total  
temperature  
hysteresis**

① [Detailed setup] ► [Ttl] ► [Ttl 1 – 6] ► [Add func] ► [Temp hys]

Ⓜ [Device root menu] ► [Detailed setup] ► [Totalizer] ► [Totalizer 1 – 6] ► [Additional function] ► [Total temperature hysteresis]

This parameter is only available for totalizers which is working totalizer function by density and temperature range. Available condition is when Density + Temp (Balanced), Density + Temp (Absolute), Density + Temp (Only positive) or Density + Temp (Only negative) is selected in Total option.

If the totalizer value goes outside the setting range of Total density/temperature lower value - each hysteresis (convert % to actual value) and Total density/temperature upper value + each hysteresis (convert % to actual value), totalization stops until the value returns to lower value or upper value.



|   | Value          | Description                                          |
|---|----------------|------------------------------------------------------|
| - | Numeric digits | Setting range: 0.0 – 10.0<br>Default value is 0.1 %. |

Total 1 – 3 24 hours

Menu to configure Totalizer for 24 hours in detail. The menu is only available for Totalizer 1 – 3.

The following menus/settings are available:

|   | Full name                                      | Display name    | [Modbus] name                                    | Page   |
|---|------------------------------------------------|-----------------|--------------------------------------------------|--------|
| - | Total 1 – 3 24hours value                      | [24h val]       | [Total 1 – 3 24hours value]                      | [ 513] |
| - | Total 1 – 3 24hours start date                 | [Start date]    | [Total 1 – 3 24hours start date]                 | [ 513] |
| - | Total 1 – 3 24hours start time                 | [Start time]    | [Total 1 – 3 24hours start time]                 | [ 513] |
| - | Total 1 – 3 24hours start operation time       | [Start op time] | [Total 1 – 3 24hours start operation time]       | [ 513] |
| - | Total 1 – 3 24hours last update date           | [Last date]     | [Total 1 – 3 24hours last update date]           | [ 514] |
| - | Total 1 – 3 24hours last update time           | [Last time]     | [Total 1 – 3 24hours last update time]           | [ 514] |
| - | Total 1 – 3 24hours last update operation time | [Last op time]  | [Total 1 – 3 24hours last update operation time] | [ 514] |

**Total 1 – 3  
24hours value**

① [Detailed setup] ► [Ttl] ► [Ttl 1 – 3] ► [Add func] ► [24h] ► [24h val]

② [Device root menu] ► [Detailed setup] ► [Totalizer] ► [Totalizer 1 – 3] ► [Additional function] ► [Total 1 – 3 24 hours] ► [Total 1 – 3 24hours value]

Shows the totalization value every 24 hours after starting totalization. This value is updated every 24 hours. The totalizer value doesn't affect this parameter value. If totalization is stopped before 24hours has passed, this parameter value is NOT updated. In addition, for example, parameter value is indicated when 24hours has passed after starting totalization if totalization is stopped when 30hours has passed. In this case, when totalization is started again, totalization value is updated after 24hours has passed because totalization and time is counted from 0.

|   | Value          | Description                |
|---|----------------|----------------------------|
| – | Numeric digits | Default value is 0.0 [kg]. |

**Total 1 – 3  
24hours start date**

① [Detailed setup] ► [Ttl] ► [Ttl 1 – 3] ► [Add func] ► [24h] ► [Start date]

② [Device root menu] ► [Detailed setup] ► [Totalizer] ► [Totalizer 1 – 3] ► [Additional function] ► [Total 1 – 3 24 hours] ► [Total 1 – 3 24hours start date]

Shows the start date when Total 1 – 3 24hours value is started by starting Total 1 – 3 execution or restarted by the reset/preset function.

|   | Value | Description                                            |
|---|-------|--------------------------------------------------------|
| – | Date  | Shows the date when the 24hours totalizer was started. |

**Total 1 – 3  
24hours start time**

① [Detailed setup] ► [Ttl] ► [Ttl 1 – 3] ► [Add func] ► [24h] ► [Start time]

② [Device root menu] ► [Detailed setup] ► [Totalizer] ► [Totalizer 1 – 3] ► [Additional function] ► [Total 1 – 3 24 hours] ► [Total 1 – 3 24hours start time]

Shows the start time when Total 1 – 3 24hours value is started by starting Total 1 – 3 execution or restarted by reset/preset function.

|   | Value | Description                                        |
|---|-------|----------------------------------------------------|
| – | Time  | Shows the time when 24hours totalizer was started. |

**Total 1 – 3  
24hours start  
operation time**

① [Detailed setup] ► [Ttl] ► [Ttl 1 – 3] ► [Add func] ► [24h] ► [Start op time]

② [Device root menu] ► [Detailed setup] ► [Totalizer] ► [Totalizer 1 – 3] ► [Additional function] ► [Total 1 – 3 24 hours] ► [Total 1 – 3 24hours start operation time]

Shows the operation time when Total 1 – 3 24hours value is started by starting Total 1 – 3 execution or restarted by reset/preset function.

|   | Value          | Description                                                      |
|---|----------------|------------------------------------------------------------------|
| – | Numeric digits | Shows the operation time when the 24hours totalizer was started. |

**Total 1 – 3  
24hours last  
update date**

Ⓐ [Detailed setup] ► [Ttl] ► [Ttl 1 – 3] ► [Add func] ► [24h] ► [Last date]

Ⓜ [Device root menu] ► [Detailed setup] ► [Totalizer] ► [Totalizer 1 – 3] ► [Additional function] ► [Total 1 – 3 24 hours] ► [Total 1 – 3 24 hours last update date]

|   | Value | Description                                             |
|---|-------|---------------------------------------------------------|
| – | Date  | Shows the date when last 24hours totalizer was updated. |

**Total 1 – 3  
24hours last  
update time**

Ⓐ [Detailed setup] ► [Ttl] ► [Ttl 1 – 3] ► [Add func] ► [24h] ► [Last time]

Ⓜ [Device root menu] ► [Detailed setup] ► [Totalizer] ► [Totalizer 1 – 3] ► [Additional function] ► [Total 1 – 3 24 hours] ► [Total 1 – 3 24 hours last update time]

|   | Value | Description                                             |
|---|-------|---------------------------------------------------------|
| – | Time  | Shows the time when last 24hours totalizer was updated. |

**Total 1 – 3  
24hours last  
update operation  
time**

Ⓐ [Detailed setup] ► [Ttl] ► [Ttl 1 – 3] ► [Add func] ► [24h] ► [Last op time]

Ⓜ [Device root menu] ► [Detailed setup] ► [Totalizer] ► [Totalizer 1 – 3] ► [Additional function] ► [Total 1 – 3 24 hours] ► [Total 1 – 3 24hours last update operation time]

|   | Value          | Description         |
|---|----------------|---------------------|
| – | Numeric digits | Default value is 1. |

**5.7.7 Display**

Menu for configuring display or process variables and other information.

The following menus/settings are available:

|   | Full name                       | Display name  | [Modbus] name                     | Page   |
|---|---------------------------------|---------------|-----------------------------------|--------|
| – | Display additional parameters   | [Disp add]    | [Display additional parameters]   | [ 514] |
| Ⓜ | Display unit selection          | –             | [Display unit selection]          | [ 515] |
| – | Display select                  | [Disp sel]    | [Display select]                  | [ 516] |
| – | Display format                  | [Disp format] | [Display format]                  | [ 526] |
| – | Display operation configuration | [Disp op cfg] | [Display operation configuration] | [ 538] |

**Display additional  
parameters**

Ⓐ [Detailed setup] ► [Disp] ► [Disp add]

Ⓜ [Device root menu] ► [Detailed setup] ► [Display] ► [Display additional parameters]

Parameter to enable or disable the menu for accessing parameters that are located under the Additional function menu of Display. To access the parameters, this parameter must be set to Apply.

|   | Value                                   | Description                                                                  |
|---|-----------------------------------------|------------------------------------------------------------------------------|
| – | Not apply<br>[Not apply]<br>[Not apply] | Menu for additional parameters of the Display is disabled.<br>Default value. |
| – | Apply<br>[Apply]<br>[Apply]             | The menu is enabled.                                                         |

### Display unit selection

① [Detailed setup] ► [Disp] ► [Disp op cfg] ► [Add func] ► [Unit sel]

② [Device root menu] ► [Detailed setup] ► [Display] ► [Display operation configuration] ► [Additional function] ► [Display unit selection]

Sets the regional unit set to be used.

When this parameter is changed, the display of some process units that are not supported by the selected unit set turns blank. In that case, the process unit parameters must be reset.

If the SI option has been specified, it is fixed for Japan and cannot be changed. Refer to *Units description* [▶ 828] to confirm the units that are defined in each regional set.



When Display unit selection is changed and then units for Process variables don't meet with selected regional unit, these units are automatically changed to default unit.

When Temperature unit is set to degF and Display unit selection is changed US to Metric, Temperature unit is automatically changed to degC.

|   | Value                          | Description                                                                                         |
|---|--------------------------------|-----------------------------------------------------------------------------------------------------|
| – | Metric<br>[Metric]<br>[Metric] | Metric units.<br>Default value.                                                                     |
| – | US<br>[us]<br>[US]             | Units mainly used in the USA.                                                                       |
| – | UK<br>[uk]<br>[UK]             | Units mainly used in the UK.                                                                        |
| – | Russia<br>[Russia]<br>[Russia] | Units in Russia. Available only for language package 2.                                             |
| – | Japan<br>[Japan]<br>[Japan]    | Units for Japan to comply with the Japanese measurement law. Available only for language package 1. |

## Display measurement mode

### Display select

Menu for assigning process variables to be displayed.

Ⓐ [Detailed setup] ► [Disp] ► [Disp sel] ► [Meas mode]

Ⓜ [Device root menu] ► [Detailed setup] ► [Display] ► [Display operation configuration] ► [Additional function] ► [Display measurement mode]

This parameter can be set in the following menu/menus:

- *Diag/Service* [▶ 263]
- *Easy setup wizard* [▶ 319]
- *Basic setup* [▶ 372]
- Detailed setup
  - *Display* [▶ 516]
  - *Batch function* [▶ 563]

Sets the display mode for logging data on the LCD display of the Indicator.

|   | Value                                               | Description                                                                                                                                                                                                                                                                                                                           |
|---|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Normal<br>[Normal]<br>[Normal]                      | Normal display mode.<br>Default value.                                                                                                                                                                                                                                                                                                |
| – | Trend online<br>[Trend]<br>[Trend online]           | Real-time trend chart of process values that were specified in the parameters, Logging 1 – 4 Select. The trend chart of one of four process values is displayed. By using the Up/Down operation on the Indicator, the process value to be shown as a trend chart can be changed when the Display Scroll parameters are set to Manual. |
| Ⓜ | Batch control<br>[Batch control]<br>[Batch control] | Batch specific screen can be displayed on Indicator.                                                                                                                                                                                                                                                                                  |

## Display select 1 – 4

Ⓐ [Detailed setup] ► [Disp] ► [Disp sel] ► [Sel1 – 4]

Ⓜ [Device root menu] ► [Detailed setup] ► [Display] ► [Display select] ► [Display select 1 – 4]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [▶ 306]
- *Basic setup* [▶ 356]

Assigns process variables to display lines 1, 2, 3 and 4 of the LCD display. On display, Display measurement mode can be selected and Batch display select 1 – 4 or Logging select 1 – 4 can be selected based on the selection of Display measurement mode.



| Value                                                            | Description                                                                                                                                                                                                                                                                                                                            |
|------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| None<br>– [None]<br>[None]                                       | <p>Sets Display select 1 – 4.</p> <p>The default value for Display select 1 is Mass flow.</p> <p>None is not available for Display select 1.</p> <p>The default value for Display select 2 is Density.</p> <p>The default value for Display select 3 is Temperature.</p> <p>The default value for Display select 4 is Volume flow.</p> |
| Mass flow<br>– [Mass]<br>[Mass flow]                             |                                                                                                                                                                                                                                                                                                                                        |
| Density<br>– [Dens]<br>[Dens]                                    |                                                                                                                                                                                                                                                                                                                                        |
| Temperature<br>– [Temp]<br>[Temp]                                |                                                                                                                                                                                                                                                                                                                                        |
| Volume flow<br>– [Vol]<br>[Vol flo]                              |                                                                                                                                                                                                                                                                                                                                        |
| Reference density<br>– [Ref dens]<br>[Reference density]         |                                                                                                                                                                                                                                                                                                                                        |
| Relative density<br>– [Rel dens]<br>[Relative density]           |                                                                                                                                                                                                                                                                                                                                        |
| Corrected volume flow<br>– [Corr vol]<br>[Corrected volume flow] |                                                                                                                                                                                                                                                                                                                                        |
| Pressure<br>– [Pres]<br>[Pressure]                               |                                                                                                                                                                                                                                                                                                                                        |
| Totalizer 1<br>– [Tt11]<br>[Totalizer 1]                         |                                                                                                                                                                                                                                                                                                                                        |
| Totalizer 2<br>– [Tt12]<br>[Totalizer 2]                         |                                                                                                                                                                                                                                                                                                                                        |

|   | Value                                           | Description                                                                                                                                                                                                                                                                                                                            |
|---|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   | Totalizer 3                                     | <p>Sets Display select 1 – 4.</p> <p>The default value for Display select 1 is Mass flow.</p> <p>None is not available for Display select 1.</p> <p>The default value for Display select 2 is Density.</p> <p>The default value for Display select 3 is Temperature.</p> <p>The default value for Display select 4 is Volume flow.</p> |
| – | [Tt13]<br>[Totalizer 3]                         |                                                                                                                                                                                                                                                                                                                                        |
|   | Totalizer 4                                     |                                                                                                                                                                                                                                                                                                                                        |
| – | [Tt14]<br>[Totalizer 4]                         |                                                                                                                                                                                                                                                                                                                                        |
|   | Totalizer 5                                     |                                                                                                                                                                                                                                                                                                                                        |
| – | [Tt15]<br>[Totalizer 5]                         |                                                                                                                                                                                                                                                                                                                                        |
|   | Totalizer 6                                     |                                                                                                                                                                                                                                                                                                                                        |
| – | [Tt16]<br>[Totalizer 6]                         |                                                                                                                                                                                                                                                                                                                                        |
|   | Mass flow % graph                               |                                                                                                                                                                                                                                                                                                                                        |
| – | [Mass %]<br>[Mass flow % graph]                 |                                                                                                                                                                                                                                                                                                                                        |
|   | Volume flow % graph                             |                                                                                                                                                                                                                                                                                                                                        |
| – | [Vol %]<br>[Volume flow % graph]                |                                                                                                                                                                                                                                                                                                                                        |
|   | Corrected volume flow % graph                   |                                                                                                                                                                                                                                                                                                                                        |
| – | [Corr vol %]<br>[Corrected volume flow % graph] |                                                                                                                                                                                                                                                                                                                                        |
|   | Tag                                             |                                                                                                                                                                                                                                                                                                                                        |
| – | [Tag]<br>[Tag]                                  |                                                                                                                                                                                                                                                                                                                                        |
|   | Long tag                                        |                                                                                                                                                                                                                                                                                                                                        |
| – | [Long tag]<br>[Long tag]                        |                                                                                                                                                                                                                                                                                                                                        |
|   | Velocity                                        |                                                                                                                                                                                                                                                                                                                                        |
| – | [vel]<br>[Velocity]                             |                                                                                                                                                                                                                                                                                                                                        |
|   | Concentration                                   |                                                                                                                                                                                                                                                                                                                                        |
| Ⓕ | [Conc]<br>[Concentration]                       |                                                                                                                                                                                                                                                                                                                                        |
|   | Net mass flow 1                                 |                                                                                                                                                                                                                                                                                                                                        |
| Ⓕ | [Net mass1]<br>[Net mass flow 1]                |                                                                                                                                                                                                                                                                                                                                        |
|   | Net mass flow 2                                 |                                                                                                                                                                                                                                                                                                                                        |
| Ⓕ | [Net mass2]<br>[Net mass flow 2]                |                                                                                                                                                                                                                                                                                                                                        |

|   | Value                                                                              | Description                                                                                                                                                                                                                                                                                                                            |
|---|------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓔ | Net volume flow 1<br>[Net vol1]<br>[Net volume flow 1]                             | <p>Sets Display select 1 – 4.</p> <p>The default value for Display select 1 is Mass flow.</p> <p>None is not available for Display select 1.</p> <p>The default value for Display select 2 is Density.</p> <p>The default value for Display select 3 is Temperature.</p> <p>The default value for Display select 4 is Volume flow.</p> |
| Ⓔ | Net volume flow 2<br>[Net vol2]<br>[Net volume flow 2]                             |                                                                                                                                                                                                                                                                                                                                        |
| Ⓔ | Net corrected volume flow<br>[Net corr vol]<br>[Net corrected volume flow]         |                                                                                                                                                                                                                                                                                                                                        |
| Ⓔ | Viscosity<br>[Visc]<br>[Viscosity]                                                 |                                                                                                                                                                                                                                                                                                                                        |
| – | Drive current<br>[Drv curr]<br>[Drive current]                                     |                                                                                                                                                                                                                                                                                                                                        |
| – | 24hours totalizer 1<br>[24h tt11]<br>[24hours totalizer 1]                         |                                                                                                                                                                                                                                                                                                                                        |
| – | 24hours totalizer 2<br>[24h tt12]<br>[24hours totalizer 2]                         |                                                                                                                                                                                                                                                                                                                                        |
| – | 24hours totalizer 3<br>[24h tt13]<br>[24hours totalizer 3]                         |                                                                                                                                                                                                                                                                                                                                        |
| Ⓔ | Gas void fraction<br>[GVF]<br>[Gas void fraction]                                  |                                                                                                                                                                                                                                                                                                                                        |
| – | Display unit mass flow dual<br>[Mass flow (dual)]<br>[Display unit mass flow dual] |                                                                                                                                                                                                                                                                                                                                        |
| – | Display unit density dual<br>[Dens (dual)]<br>[Display unit density dual]          |                                                                                                                                                                                                                                                                                                                                        |

**Batch display  
select 1 – 4**

Ⓐ [Detailed setup] ► [Disp] ► [Disp sel] ► [Batch disp1 – 4]

Ⓜ [Device root menu] ► [Detailed setup] ► [Display] ► [Display select]  
► [Batch display select 1 – 4]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [ 319]
- *Basic setup* [ 373]

Sets Display select for batch, if batch variables are shown on Indicator. This is available when Batch control is selected in Display measurement mode.

|   | Value                                            | Value description                                                                                                    |
|---|--------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| – | None<br>[None]                                   |                                                                                                                      |
| Ⓜ | Batch quantity<br>[Batch quantity]               |                                                                                                                      |
| Ⓜ | Batch upwards value<br>[Batch upwards value]     |                                                                                                                      |
| Ⓜ | Batch downwards value<br>[Batch downwards value] |                                                                                                                      |
| Ⓜ | Batch total quantity<br>[Batch total quantity]   |                                                                                                                      |
| Ⓜ | Batch counter value<br>[Batch counter value]     | Sets Batch display select 1 – 4.                                                                                     |
| Ⓜ | Batch select<br>[Batch select]                   | The default value for Batch display select 1 is Batch quantity.<br>None is not available for Batch display select 1. |
| Ⓜ | Batch variable select<br>[Batch variable select] | The default value for Batch display select 2 is Batch upward value.                                                  |
| Ⓜ | Compensation value<br>[Compensation value]       | The default value for Batch display select 3 is Total batch quantity.                                                |
| Ⓜ | Internal close point<br>[Internal close point]   | The default value for Batch display select 4 is Batch counter value.                                                 |
| Ⓜ | Batch time<br>[Batch time]                       |                                                                                                                      |
| – | Mass flow<br>[Mass flow]                         |                                                                                                                      |
| – | Density<br>[Density]                             |                                                                                                                      |
| – | Temperature<br>[Temperature]                     |                                                                                                                      |
| – | Volume flow<br>[Volume flow]                     |                                                                                                                      |

|   | Value                                                    | Value description                                                                                                                                                                                                                                                                                                                                                                |
|---|----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| — | Reference density<br>[Reference density]                 | Sets Batch display select 1 – 4.<br>The default value for Batch display select 1 is Batch quantity.<br>None is not available for Batch display select 1.<br>The default value for Batch display select 2 is Batch upward value.<br>The default value for Batch display select 3 is Total batch quantity.<br>The default value for Batch display select 4 is Batch counter value. |
| — | Corrected volume flow<br>[Corrected volume flow]         |                                                                                                                                                                                                                                                                                                                                                                                  |
| — | Pressure<br>[Pressure]                                   |                                                                                                                                                                                                                                                                                                                                                                                  |
| — | Tag<br>[Tag]                                             |                                                                                                                                                                                                                                                                                                                                                                                  |
| — | Long Tag<br>[Long Tag]                                   |                                                                                                                                                                                                                                                                                                                                                                                  |
| Ⓢ | Net mass flow 1<br>[Net mass flow 1]                     |                                                                                                                                                                                                                                                                                                                                                                                  |
| Ⓢ | Net mass flow 2<br>[Net mass flow 2 ]                    |                                                                                                                                                                                                                                                                                                                                                                                  |
| Ⓢ | Net volume flow 1<br>[Net volume flow 1]                 |                                                                                                                                                                                                                                                                                                                                                                                  |
| Ⓢ | Net volume flow 2<br>[Net volume flow 2]                 |                                                                                                                                                                                                                                                                                                                                                                                  |
| Ⓢ | Net corrected volume flow<br>[Net corrected volume flow] |                                                                                                                                                                                                                                                                                                                                                                                  |

Additional function

Menu for configuring Display select in detail. The menu is only available when *Display additional parameters* has been set to Apply .

Display select  
5 – 20

Ⓛ [Detailed setup] ► [Disp] ► [Disp sel] ► [Add func] ► [Sel 5 – 20]

Ⓜ [Device root menu] ► [Detailed setup] ► [Display] ► [Display select] ► [Display select 5 – 20]

Assigns process variables to display lines 5 – 20 of the LCD display.

|   | Value                                 | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   | None                                  | Sets the unit for Display select 5 – 20.<br>Default value for Display select 5 is Reference density.<br>Default value for Display select 6 is Corrected volume flow.<br>Default value for Display select 7 is Pressure.<br>Default value for Display select 8 is Totalizer 1.<br>Default value for Display select 9 is Totalizer 2.<br>Default value for Display select 10 is Totalizer 3.<br>Default value for Display select 11 is Totalizer 4.<br>Default value for Display select 12 is Totalizer 5.<br>Default value for Display select 13 is Totalizer 6.<br>Default value for Display select 14 is Mass flow % graph.<br>Default value for Display select 15 is Volume flow % graph.<br>Default value for Display select 16 is Corrected volume flow % graph.<br>Default value for Display select 17 is Tag.<br>Default value for Display select 18 is Long tag.<br>Default value for Display select 19 is Velocity.<br>Default value for Display select 20 is Drive current.<br>Sets the unit for Display select 5 – 20. |
| – | [None]<br>[None]                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|   | Mass flow                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| – | [Mass]<br>[Mass flow]                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|   | Density                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| – | [Dens]<br>[Dens]                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|   | Temperature                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| – | [Temp]<br>[Temp]                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|   | Volume flow                           | Default value for Display select 10 is Totalizer 3.<br>Default value for Display select 11 is Totalizer 4.<br>Default value for Display select 12 is Totalizer 5.<br>Default value for Display select 13 is Totalizer 6.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| – | [Vol]<br>[Vol flo]                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|   | Reference density                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| – | [Ref dens]<br>[Reference density]     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|   | Relative density                      | Default value for Display select 17 is Tag.<br>Default value for Display select 18 is Long tag.<br>Default value for Display select 19 is Velocity.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| – | [Rel dens]<br>[Relative density]      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|   | Corrected volume flow                 | Default value for Display select 20 is Drive current.<br>Sets the unit for Display select 5 – 20.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| – | [Corr vol]<br>[Corrected volume flow] |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|   | Pressure                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| – | [Pres]<br>[Pressure]                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

|   | Value                                                  | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---|--------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   | Totalizer 1                                            | Sets the unit for Display select 5 – 20.<br>Default value for Display select 5 is Reference density.<br>Default value for Display select 6 is Corrected volume flow.<br>Default value for Display select 7 is Pressure.<br>Default value for Display select 8 is Totalizer 1.<br>Default value for Display select 9 is Totalizer 2.<br>Default value for Display select 10 is Totalizer 3.<br>Default value for Display select 11 is Totalizer 4.<br>Default value for Display select 12 is Totalizer 5.<br>Default value for Display select 13 is Totalizer 6.<br>Default value for Display select 14 is Mass flow % graph.<br>Default value for Display select 15 is Volume flow % graph.<br>Default value for Display select 16 is Corrected volume flow % graph.<br>Default value for Display select 17 is Tag.<br>Default value for Display select 18 is Long tag.<br>Default value for Display select 19 is Velocity.<br>Default value for Display select 20 is Drive current.<br>Sets the unit for Display select 5 – 20. |
| – | <b>[Tt11]</b><br>[Totalizer 1]                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|   | Totalizer 2                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| – | <b>[Tt12]</b><br>[Totalizer 2]                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|   | Totalizer 3                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| – | <b>[Tt13]</b><br>[Totalizer 3]                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|   | Totalizer 4                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| – | <b>[Tt14]</b><br>[Totalizer 4]                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|   | Totalizer 5                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| – | <b>[Tt15]</b><br>[Totalizer 5]                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|   | Totalizer 6                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| – | <b>[Tt16]</b><br>[Totalizer 6]                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|   | Mass flow % graph                                      | Sets the unit for Display select 5 – 20.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| – | <b>[Mass %]</b><br>[Mass flow % graph]                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|   | Volume flow % graph                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| – | <b>[Vol %]</b><br>[Volume flow % graph]                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|   | Corrected volume flow % graph                          | Sets the unit for Display select 5 – 20.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| – | <b>[Corr vol %]</b><br>[Corrected volume flow % graph] |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|   | Tag                                                    | Sets the unit for Display select 5 – 20.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| – | <b>[Tag]</b><br>[Tag]                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

|   | Value                                                                      | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---|----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   | Long tag<br>– [Long tag]<br>[Long tag]                                     | <p>Sets the unit for Display select 5 – 20.</p> <p>Default value for Display select 5 is Reference density.</p> <p>Default value for Display select 6 is Corrected volume flow.</p> <p>Default value for Display select 7 is Pressure.</p> <p>Default value for Display select 8 is Totalizer 1.</p> <p>Default value for Display select 9 is Totalizer 2.</p> <p>Default value for Display select 10 is Totalizer 3.</p> <p>Default value for Display select 11 is Totalizer 4.</p> <p>Default value for Display select 12 is Totalizer 5.</p> <p>Default value for Display select 13 is Totalizer 6.</p> <p>Default value for Display select 14 is Mass flow % graph.</p> <p>Default value for Display select 15 is Volume flow % graph.</p> <p>Default value for Display select 16 is Corrected volume flow % graph.</p> <p>Default value for Display select 17 is Tag.</p> <p>Default value for Display select 18 is Long tag.</p> <p>Default value for Display select 19 is Velocity.</p> <p>Default value for Display select 20 is Drive current.</p> <p>Sets the unit for Display select 5 – 20.</p> |
|   | Velocity<br>– [vel]<br>[Velocity]                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Ⓔ | Concentration<br>[Conc]<br>[Concentration]                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Ⓔ | Net mass flow 1<br>[Net mass1]<br>[Net mass flow 1]                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Ⓔ | Net mass flow 2<br>[Net mass2]<br>[Net mass flow 2]                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Ⓔ | Net volume flow 1<br>[Net vol1]<br>[Net volume flow 1]                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Ⓔ | Net volume flow 2<br>[Net vol2]<br>[Net volume flow 2]                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Ⓔ | Net corrected volume flow<br>[Net corr vol]<br>[Net corrected volume flow] |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Ⓔ | Viscosity<br>[Visc]<br>[Viscosity]                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|   | Drive current<br>– [Drv curr]<br>[Drive current]                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |



|   | Value                                                                                    | Description                                                                                                                                                                                                                       |
|---|------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | 24hours totalizer 1<br>[24h tt11]<br>[24hours<br>totalizer 1]                            | Sets the unit for Display select 5 – 20.                                                                                                                                                                                          |
| – | 24hours totalizer 2<br>[24h tt12]<br>[24hours<br>totalizer 2]                            | Default value for Display select 5 is Reference density.<br>Default value for Display select 6 is Corrected volume flow.<br>Default value for Display select 7 is Pressure.<br>Default value for Display select 8 is Totalizer 1. |
| – | 24hours totalizer 3<br>[24h tt13]<br>[24hours<br>totalizer 3]                            | Default value for Display select 9 is Totalizer 2.<br>Default value for Display select 10 is Totalizer 3.<br>Default value for Display select 11 is Totalizer 4.<br>Default value for Display select 12 is Totalizer 5.           |
| Ⓔ | Gas void fraction<br>[GVF]<br>[Gas void<br>fraction]                                     | Default value for Display select 13 is Totalizer 6.<br>Default value for Display select 14 is Mass flow % graph.<br>Default value for Display select 15 is Volume flow % graph.                                                   |
| – | Display unit mass<br>flow dual<br>[Mass flow (dual)]<br>[Display unit<br>mass flow dual] | Default value for Display select 16 is Corrected volume flow<br>% graph.<br>Default value for Display select 17 is Tag.<br>Default value for Display select 18 is Long tag.<br>Default value for Display select 19 is Velocity.   |
| – | Display unit density<br>dual<br>[Dens (dual)]<br>[Display unit<br>density dual]          | Default value for Display select 20 is Drive current.<br>Sets the unit for Display select 5 – 20.                                                                                                                                 |

**Display format**

Menu for configuring the Display format.

The following menus/settings are available:

|   | Full name                  | Display name      | [Modbus] name                | Page   |
|---|----------------------------|-------------------|------------------------------|--------|
| – | Display format mass flow   | [Format mass]     | [Display format mass flow]   | [ 526] |
| – | Display format density     | [Format dens]     | [Display format density]     | [ 527] |
| – | Display format temperature | [Format temp]     | [Display format temperature] | [ 527] |
| – | Display format volume flow | [Format vol]      | [Display format volume flow] | [ 528] |
| – | Display format total 1 – 3 | [Format ttl1 – 3] | [Display format total 1 – 3] | [ 532] |
| – | Additional function        | [Add func]        | [Additional function]        | [ 533] |

**Display format mass flow**

Ⓛ [Detailed setup] ► [Disp] ► [Disp format] ► [Format mass]

Ⓜ [Device root menu] ► [Detailed setup] ► [Display] ► [Display format] ► [Display format mass flow]

Sets the decimal point position for the mass flow value.

If the value cannot be displayed with the specified position, the warning Disp Over Wng is generated.

|   | Value                            | Description                                                                  |
|---|----------------------------------|------------------------------------------------------------------------------|
| – | Auto<br>[Auto]<br>[Auto]         | Position is automatically adjusted according to the value.<br>Default value. |
| – | 0 digit<br>[0digit]<br>[0 digit] | 0 digits from right.                                                         |
| – | 1 digit<br>[1digit]<br>[1 digit] | 1 digit from right.                                                          |
| – | 2 digit<br>[2digit]<br>[2 digit] | 2 digits from right.                                                         |
| – | 3 digit<br>[3digit]<br>[3 digit] | 3 digits from right.                                                         |
| – | 4 digit<br>[4digit]<br>[4 digit] | 4 digits from right.                                                         |
| – | 5 digit<br>[5digit]<br>[5 digit] | 5 digits from right.                                                         |

Display format density

① [Detailed setup] ► [Disp] ► [Disp format] ► [Format dens]

② [Device root menu] ► [Detailed setup] ► [Display] ► [Display format] ► [Display format density]

Sets the decimal point position for the density value.

If the value cannot be displayed with the specified position, the warning Disp Over Wng is generated.

|   | Value                 | Description                                                                  |
|---|-----------------------|------------------------------------------------------------------------------|
|   | Auto                  |                                                                              |
| – | [Auto]<br>[Auto]      | Position is automatically adjusted according to the value.<br>Default value. |
|   | 0 digit               |                                                                              |
| – | [0digit]<br>[0 digit] | 0 digits from right.                                                         |
|   | 1 digit               |                                                                              |
| – | [1digit]<br>[1 digit] | 1 digit from right.                                                          |
|   | 2 digit               |                                                                              |
| – | [2digit]<br>[2 digit] | 2 digits from right.                                                         |
|   | 3 digit               |                                                                              |
| – | [3digit]<br>[3 digit] | 3 digits from right.                                                         |
|   | 4 digit               |                                                                              |
| – | [4digit]<br>[4 digit] | 4 digits from right.                                                         |
|   | 5 digit               |                                                                              |
| – | [5digit]<br>[5 digit] | 5 digits from right.                                                         |

Display format temperature

① [Detailed setup] ► [Disp] ► [Disp format] ► [Format temp]

② [Device root menu] ► [Detailed setup] ► [Display] ► [Display format] ► [Display format temperature]

Sets the decimal point position for the temperature value.

If the value cannot be displayed with the specified position, the warning Disp Over Wng is generated.

|   | Value                 | Description                                                |
|---|-----------------------|------------------------------------------------------------|
|   | Auto                  |                                                            |
| – | [Auto]<br>[Auto]      | Position is automatically adjusted according to the value. |
|   | 0 digit               |                                                            |
| – | [0digit]<br>[0 digit] | 0 digits from right.                                       |

|   | Value                 | Description                           |
|---|-----------------------|---------------------------------------|
|   | 1 digit               |                                       |
| – | [1digit]<br>[1 digit] | 1 digit from right.<br>Default value. |
|   | 2 digit               |                                       |
| – | [2digit]<br>[2 digit] | 2 digits from right.                  |
|   | 3 digit               |                                       |
| – | [3digit]<br>[3 digit] | 3 digits from right.                  |
|   | 4 digit               |                                       |
| – | [4digit]<br>[4 digit] | 4 digits from right.                  |
|   | 5 digit               |                                       |
| – | [5digit]<br>[5 digit] | 5 digits from right.                  |

### Display format volume flow

① [Detailed setup] ► [Disp] ► [Disp format] ► [Format vol]

② [Device root menu] ► [Detailed setup] ► [Display] ► [Display format]  
► [Display format volume flow]

Sets the decimal point position for the volume flow value.

If the value cannot be displayed with the specified position, the warning Disp Over Wng is generated.

|   | Value                 | Description                                                                  |
|---|-----------------------|------------------------------------------------------------------------------|
|   | Auto                  |                                                                              |
| – | [Auto]<br>[Auto]      | Position is automatically adjusted according to the value.<br>Default value. |
|   | 0 digit               |                                                                              |
| – | [0digit]<br>[0 digit] | 0 digits from right.                                                         |
|   | 1 digit               |                                                                              |
| – | [1digit]<br>[1 digit] | 1 digit from right.                                                          |
|   | 2 digit               |                                                                              |
| – | [2digit]<br>[2 digit] | 2 digits from right.                                                         |
|   | 3 digit               |                                                                              |
| – | [3digit]<br>[3 digit] | 3 digits from right.                                                         |
|   | 4 digit               |                                                                              |
| – | [4digit]<br>[4 digit] | 4 digits from right.                                                         |

|   | Value                 | Description          |
|---|-----------------------|----------------------|
|   | 5 digit               |                      |
| – | [5digit]<br>[5 digit] | 5 digits from right. |

### Display format pressure

⌚ [Detailed setup] ► [Disp] ► [Disp format] ► [Format pres]

Ⓜ [Device root menu] ► [Detailed setup] ► [Display] ► [Display format]  
► [Additional function] ► [Display format pressure]

Sets the decimal point position for the pressure value.

If the value cannot be displayed with the specified position, the warning Disp Over Wng is generated.

|   | Value                 | Description                                                                  |
|---|-----------------------|------------------------------------------------------------------------------|
|   | Auto                  |                                                                              |
| – | [Auto]<br>[Auto]      | Position is automatically adjusted according to the value.<br>Default value. |
|   | 0 digit               |                                                                              |
| – | [0digit]<br>[0 digit] | 0 digits from right.                                                         |
|   | 1 digit               |                                                                              |
| – | [1digit]<br>[1 digit] | 1 digit from right.                                                          |
|   | 2 digit               |                                                                              |
| – | [2digit]<br>[2 digit] | 2 digits from right.                                                         |
|   | 3 digit               |                                                                              |
| – | [3digit]<br>[3 digit] | 3 digits from right.                                                         |
|   | 4 digit               |                                                                              |
| – | [4digit]<br>[4 digit] | 4 digits from right.                                                         |
|   | 5 digit               |                                                                              |
| – | [5digit]<br>[5 digit] | 5 digits from right.                                                         |

**Display format  
reference density**

Ⓛ [Detailed setup] ► [Disp] ► [Disp format] ► [Format ref dens]

Ⓜ [Device root menu] ► [Detailed setup] ► [Display] ► [Display format]  
► [Additional function] ► [Display format reference density]

Sets the decimal point position for the reference density value.

If the value cannot be displayed with the specified position, the warning Disp Over Wng is generated.

|   | Value                 | Description                                                                  |
|---|-----------------------|------------------------------------------------------------------------------|
|   | Auto                  |                                                                              |
| – | [Auto]<br>[Auto]      | Position is automatically adjusted according to the value.<br>Default value. |
|   | 0 digit               |                                                                              |
| – | [0digit]<br>[0 digit] | 0 digits from right.                                                         |
|   | 1 digit               |                                                                              |
| – | [1digit]<br>[1 digit] | 1 digit from right.                                                          |
|   | 2 digit               |                                                                              |
| – | [2digit]<br>[2 digit] | 2 digits from right.                                                         |
|   | 3 digit               |                                                                              |
| – | [3digit]<br>[3 digit] | 3 digits from right.                                                         |
|   | 4 digit               |                                                                              |
| – | [4digit]<br>[4 digit] | 4 digits from right.                                                         |
|   | 5 digit               |                                                                              |
| – | [5digit]<br>[5 digit] | 5 digits from right.                                                         |

**Display format  
relative density**

Ⓛ [Detailed setup] ► [Disp] ► [Disp format] ► [Format rel dens]

Ⓜ [Device root menu] ► [Detailed setup] ► [Display] ► [Display format]  
► [Additional function] ► [Display format relative density]

Sets decimal point position for relative density value.

If the value cannot be displayed by specified position, the warning Disp Over Wng is generated.

|   | Value                 | Description                                                                  |
|---|-----------------------|------------------------------------------------------------------------------|
|   | Auto                  |                                                                              |
| – | [Auto]<br>[Auto]      | Position is automatically adjusted according to the value.<br>Default value. |
|   | 0 digit               |                                                                              |
| – | [0digit]<br>[0 digit] | 0 digits from right.                                                         |

|   | Value                 | Description          |
|---|-----------------------|----------------------|
|   | 1 digit               |                      |
| – | [1digit]<br>[1 digit] | 1 digit from right.  |
|   | 2 digit               |                      |
| – | [2digit]<br>[2 digit] | 2 digits from right. |
|   | 3 digit               |                      |
| – | [3digit]<br>[3 digit] | 3 digits from right. |
|   | 4 digit               |                      |
| – | [4digit]<br>[4 digit] | 4 digits from right. |
|   | 5 digit               |                      |
| – | [5digit]<br>[5 digit] | 5 digits from right. |

#### Display format corrected volume flow

① [Detailed setup] ► [Disp] ► [Disp format] ► [Format corr vol]

⑧ [Device root menu] ► [Detailed setup] ► [Display] ► [Display format]  
► [Additional function] ► [Display format corrected volume flow]

Sets the decimal point position for the corrected volume flow value.

If the value cannot be displayed with the specified position, the warning Disp Over Wng is generated.

|   | Value                 | Description                                                                  |
|---|-----------------------|------------------------------------------------------------------------------|
|   | Auto                  |                                                                              |
| – | [Auto]<br>[Auto]      | Position is automatically adjusted according to the value.<br>Default value. |
|   | 0 digit               |                                                                              |
| – | [0digit]<br>[0 digit] | 0 digits from right.                                                         |
|   | 1 digit               |                                                                              |
| – | [1digit]<br>[1 digit] | 1 digit from right.                                                          |
|   | 2 digit               |                                                                              |
| – | [2digit]<br>[2 digit] | 2 digits from right.                                                         |
|   | 3 digit               |                                                                              |
| – | [3digit]<br>[3 digit] | 3 digits from right.                                                         |
|   | 4 digit               |                                                                              |
| – | [4digit]<br>[4 digit] | 4 digits from right.                                                         |

|   | Value                 | Description          |
|---|-----------------------|----------------------|
|   | 5 digit               |                      |
| – | [5digit]<br>[5 digit] | 5 digits from right. |

### Display format total 1 – 3

Ⓐ [Detailed setup] ► [Disp] ► [Disp format] ► [Format ttl1 – 3]

Ⓜ [Device root menu] ► [Detailed setup] ► [Display] ► [Display format]  
► [Display format total 1 – 3]

Sets the decimal point position for total 1 – 3.

If the value cannot be displayed with the specified position, the warning Disp Over Wng is generated.

|   | Value                 | Description                                                                  |
|---|-----------------------|------------------------------------------------------------------------------|
|   | Auto                  |                                                                              |
| – | [Auto]<br>[Auto]      | Position is automatically adjusted according to the value.<br>Default value. |
|   | 0 digit               |                                                                              |
| – | [0digit]<br>[0 digit] | 0 digits from right.                                                         |
|   | 1 digit               |                                                                              |
| – | [1digit]<br>[1 digit] | 1 digit from right.                                                          |
|   | 2 digit               |                                                                              |
| – | [2digit]<br>[2 digit] | 2 digits from right.                                                         |
|   | 3 digit               |                                                                              |
| – | [3digit]<br>[3 digit] | 3 digits from right.                                                         |
|   | 4 digit               |                                                                              |
| – | [4digit]<br>[4 digit] | 4 digits from right.                                                         |
|   | 5 digit               |                                                                              |
| – | [5digit]<br>[5 digit] | 5 digits from right.                                                         |
|   | 6 digit               |                                                                              |
| – | [6digit]<br>[6 digit] | 6 digits from right.                                                         |
|   | 7 digit               |                                                                              |
| – | [7digit]<br>[7 digit] | 7 digits from right.                                                         |



**Additional function**

Menu for configuring the Display function in detail. The menu is only available when Display additional parameters has been set to Apply.

The following menus/settings are available:

|   | Full name                                | Display name          | [Modbus] name                              | Page    |
|---|------------------------------------------|-----------------------|--------------------------------------------|---------|
| – | Display format pressure                  | [Format pres]         | [Display format pressure]                  | [▶ 529] |
| – | Display format reference density         | [Format ref dens]     | [Display format reference density]         | [▶ 530] |
| – | Display format relative density          | [Format rel dens]     | [Display format relative density]          | [▶ 530] |
| – | Display format corrected volume flow     | [Format corr vol]     | [Display format corrected volume flow]     | [▶ 531] |
| ⓔ | Display format concentration             | [Format conc]         | [Display format concentration]             | [▶ 533] |
| ⓔ | Display format net mass flow 1 – 2       | [Format net mass1]    | [Display format net mass flow 1 – 2]       | [▶ 534] |
| ⓔ | Display format net volume flow 1 – 2     | [Format net vol1]     | [Display format net volume flow 1 – 2]     | [▶ 535] |
| ⓔ | Display format net corrected volume flow | [Format net corr vol] | [Display format net corrected volume flow] | [▶ 535] |
| – | Display format total 4 – 6               | [Format ttl 4 – 6]    | [Display format total 4 – 6]               | [▶ 536] |
| ⓔ | Display format batch                     | [Format batch]        | [Display format batch]                     | [▶ 537] |
| ⓔ | Display format viscosity                 | [Visc]                | [Display format viscosity]                 | [▶ 538] |

**Display format concentration**

① [Detailed setup] ▶ [Disp] ▶ [Disp format] ▶ [Add func] ▶ [Format conc]

ⓔ [Device root menu] ▶ [Detailed setup] ▶ [Display] ▶ [Display format] ▶ [Additional function] ▶ [Display format concentration]

Sets the decimal point position for the concentration value.

If the value cannot be displayed with the specified position, the warning Disp Over Wng is generated.

|   | Value                            | Description                                                              |
|---|----------------------------------|--------------------------------------------------------------------------|
| ⓔ | Auto<br>[Auto]<br>[Auto]         | Position is automatically adjusted according to value.<br>Default value. |
| ⓔ | 0 digit<br>[0digit]<br>[0 digit] | 0 digit from right.                                                      |
| ⓔ | 1 digit<br>[1digit]<br>[1 digit] | 1 digit from right.                                                      |
| ⓔ | 2 digit<br>[2digit]<br>[2 digit] | 2 digits from right.                                                     |

|   | Value                            | Description          |
|---|----------------------------------|----------------------|
| ⑤ | 3 digit<br>[3digit]<br>[3 digit] | 3 digits from right. |
| ⑤ | 4 digit<br>[4digit]<br>[4 digit] | 4 digits from right. |
| ⑤ | 5 digit<br>[5digit]<br>[5 digit] | 5 digits from right. |

### Display format net mass flow 1 – 2

④ [Detailed setup] ► [Disp] ► [Disp format] ► [Add func] ► [Format net mass1 – 2]

④ [Device root menu] ► [Detailed setup] ► [Display] ► [Display format] ► [Additional function] ► [Display format net mass flow 1 – 2]

Sets the decimal point position for net mass 1 – 2 values.

If the value cannot be displayed with the specified position, the warning Disp Over Wng is generated.

|   | Value                            | Description                                                              |
|---|----------------------------------|--------------------------------------------------------------------------|
| ⑤ | Auto<br>[Auto]<br>[Auto]         | Position is automatically adjusted according to value.<br>Default value. |
| ⑤ | 0 digit<br>[0digit]<br>[0 digit] | 0 digit from right.                                                      |
| ⑤ | 1 digit<br>[1digit]<br>[1 digit] | 1 digit from right.                                                      |
| ⑤ | 2 digit<br>[2digit]<br>[2 digit] | 2 digits from right.                                                     |
| ⑤ | 3 digit<br>[3digit]<br>[3 digit] | 3 digits from right.                                                     |
| ⑤ | 4 digit<br>[4digit]<br>[4 digit] | 4 digits from right.                                                     |
| ⑤ | 5 digit<br>[5digit]<br>[5 digit] | 5 digits from right.                                                     |

**Display format net volume flow 1 – 2**

① [Detailed setup] ► [Disp] ► [Disp format] ► [Add func] ► [Format net vol1 – 2]

② [Device root menu] ► [Detailed setup] ► [Display] ► [Display format] ► [Additional function] ► [Display format net volume flow 1 – 2]

Sets the decimal point position for the net volume flow 1 – 2 values.

If the value cannot be displayed with specified position, the warning Disp Over Wng is generated.

|   | Value                            | Description                                                              |
|---|----------------------------------|--------------------------------------------------------------------------|
| ② | Auto<br>[Auto]<br>[Auto]         | Position is automatically adjusted according to value.<br>Default value. |
| ② | 0 digit<br>[0digit]<br>[0 digit] | 0 digit from right.                                                      |
| ② | 1 digit<br>[1digit]<br>[1 digit] | 1 digit from right.                                                      |
| ② | 2 digit<br>[2digit]<br>[2 digit] | 2 digits from right.                                                     |
| ② | 3 digit<br>[3digit]<br>[3 digit] | 3 digits from right.                                                     |
| ② | 4 digit<br>[4digit]<br>[4 digit] | 4 digits from right.                                                     |
| ② | 5 digit<br>[5digit]<br>[5 digit] | 5 digits from right.                                                     |

**Display format net corrected volume flow**

① [Detailed setup] ► [Disp] ► [Disp format] ► [Add func] ► [Format net corr vol]

② [Device root menu] ► [Detailed setup] ► [Display] ► [Display format] ► [Additional function] ► [Display format net corrected volume flow]

Sets the decimal point position for the net corrected volume flow 1 – 2 values.

If the value cannot be displayed with the specified position, the warning Disp Over Wng is generated.

|   | Value                    | Description                                                              |
|---|--------------------------|--------------------------------------------------------------------------|
| ② | Auto<br>[Auto]<br>[Auto] | Position is automatically adjusted according to value.<br>Default value. |

|   | Value                            | Description          |
|---|----------------------------------|----------------------|
| ⑥ | 0 digit<br>[0digit]<br>[0 digit] | 0 digit from right.  |
| ⑥ | 1 digit<br>[1digit]<br>[1 digit] | 1 digit from right.  |
| ⑥ | 2 digit<br>[2digit]<br>[2 digit] | 2 digits from right. |
| ⑥ | 3 digit<br>[3digit]<br>[3 digit] | 3 digits from right. |
| ⑥ | 4 digit<br>[4digit]<br>[4 digit] | 4 digits from right. |
| ⑥ | 5 digit<br>[5digit]<br>[5 digit] | 5 digits from right. |

### Display format total 4 – 6

④ [Detailed setup] ► [Disp] ► [Disp format] ► [Format ttl 4 – 6]

④ [Device root menu] ► [Detailed setup] ► [Display] ► [Display format]  
► [Additional function] ► [Display format total 4 – 6]

Sets the decimal point position for the total 4 – 6 values.

If the value cannot be displayed with the specified position, the warning Disp Over Wng is generated.

|   | Value                            | Description                                                                  |
|---|----------------------------------|------------------------------------------------------------------------------|
| – | Auto<br>[Auto]<br>[Auto]         | Position is automatically adjusted according to the value.<br>Default value. |
| – | 0 digit<br>[0digit]<br>[0 digit] | 0 digits from right.                                                         |
| – | 1 digit<br>[1digit]<br>[1 digit] | 1 digit from right.                                                          |
| – | 2 digit<br>[2digit]<br>[2 digit] | 2 digits from right.                                                         |
| – | 3 digit<br>[3digit]<br>[3 digit] | 3 digits from right.                                                         |

|   | Value                 | Description          |
|---|-----------------------|----------------------|
|   | 4 digit               |                      |
| – | [4digit]<br>[4 digit] | 4 digits from right. |
|   | 5 digit               |                      |
| – | [5digit]<br>[5 digit] | 5 digits from right. |
|   | 6 digit               |                      |
| – | [6digit]<br>[6 digit] | 6 digits from right. |
|   | 7 digit               |                      |
| – | [7digit]<br>[7 digit] | 7 digits from right. |

### Display format batch

④ [Detailed setup] ► [Disp] ► [Disp format] ► [Add func] ► [Format batch]

⑧ [Device root menu] ► [Detailed setup] ► [Display] ► [Display format]  
► [Additional function] ► [Display format batch]

Sets decimal point position for batch value.

If the value cannot be displayed with the specified position, the warning Disp Over Wng is generated.

|   | Value                 | Description                                                              |
|---|-----------------------|--------------------------------------------------------------------------|
|   | Auto                  |                                                                          |
| Ⓕ | [Auto]<br>[Auto]      | Position is automatically adjusted according to value.<br>Default value. |
|   | 0 digit               |                                                                          |
| Ⓕ | [0digit]<br>[0 digit] | 0 digit from right.                                                      |
|   | 1 digit               |                                                                          |
| Ⓕ | [1digit]<br>[1 digit] | 1 digit from right.                                                      |
|   | 2 digit               |                                                                          |
| Ⓕ | [2digit]<br>[2 digit] | 2 digits from right.                                                     |
|   | 3 digit               |                                                                          |
| Ⓕ | [3digit]<br>[3 digit] | 3 digits from right.                                                     |
|   | 4 digit               |                                                                          |
| Ⓕ | [4digit]<br>[4 digit] | 4 digits from right.                                                     |
|   | 5 digit               |                                                                          |
| Ⓕ | [5digit]<br>[5 digit] | 5 digits from right.                                                     |

**Display format  
viscosity**

Ⓐ [Detailed setup] ► [Disp] ► [Disp format] ► [Add func] ► [Visc]

Ⓜ [Device root menu] ► [Detailed setup] ► [Display] ► [Display format]  
► [Additional function] ► [Display format viscosity]

Sets decimal point position for the viscosity value.

If the value cannot be displayed with the specified position, the warning Disp Over Wng is generated.

|   | Value                            | Description                                                              |
|---|----------------------------------|--------------------------------------------------------------------------|
| Ⓜ | Auto<br>[Auto]<br>[Auto]         | Position is automatically adjusted according to value.<br>Default value. |
| Ⓜ | 0 digit<br>[0digit]<br>[0 digit] | 0 digit from right.                                                      |
| Ⓜ | 1 digit<br>[1digit]<br>[1 digit] | 1 digit from right.                                                      |
| Ⓜ | 2 digit<br>[2digit]<br>[2 digit] | 2 digits from right.                                                     |
| Ⓜ | 3 digit<br>[3digit]<br>[3 digit] | 3 digits from right.                                                     |
| Ⓜ | 4 digit<br>[4digit]<br>[4 digit] | 4 digits from right.                                                     |
| Ⓜ | 5 digit<br>[5digit]<br>[5 digit] | 5 digits from right.                                                     |

**Display operation configuration**

Menu for configuring the LCD display.

The following menus/settings are available:

|   | Full name           | Display name | [Modbus] name         | Page   |
|---|---------------------|--------------|-----------------------|--------|
| – | Display contrast    | [Contrast]   | [Display contrast]    | [ 538] |
| – | Display line        | [Line]       | [Display line]        | [ 539] |
| – | Display period      | [Period]     | [Display period]      | [ 540] |
| – | Additional function | [Add func]   | [Additional function] | [ 541] |

**Display contrast**

Ⓐ [Detailed setup] ► [Disp] ► [Disp op cfg] ► [Contrast]

Ⓜ [Device root menu] ► [Detailed setup] ► [Display] ► [Display  
operation configuration] ► [Display contrast]

Sets the contrast of the LCD.

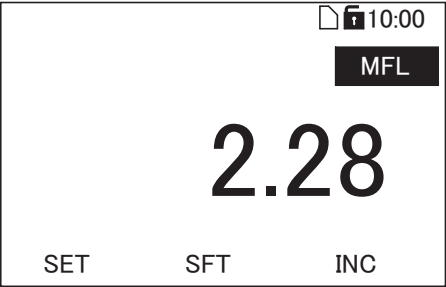
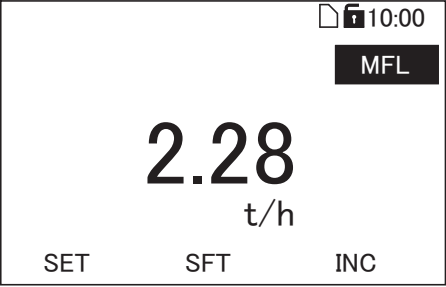
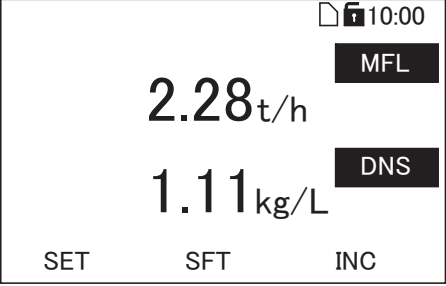
|   | Value | Description                                     |
|---|-------|-------------------------------------------------|
| – | -5    | -5 ≡ bright to +5 ≡ dark<br>Default value is 0. |
| – | -4    |                                                 |
| – | -3    |                                                 |
| – | -2    |                                                 |
| – | -1    |                                                 |
| – | 0     |                                                 |
| – | 1     |                                                 |
| – | 2     |                                                 |
| – | 3     |                                                 |
| – | 4     |                                                 |
| – | 5     |                                                 |

Display line

⌚ [Detailed setup] ▶ [Disp] ▶ [Disp op cfg] ▶ [Line]

⊕ [Device root menu] ▶ [Detailed setup] ▶ [Display] ▶ [Display operation configuration] ▶ [Display line]

Sets the number of display lines on the LCD.

|  | Value                                           | Description                                                                                                                  |
|--|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
|  | 1line (big)<br>– [1line (big)]<br>[1line (big)] | 1line display big font, without unit.<br> |
|  | 1line<br>– [1line]<br>[1line]                   | 1line display of value with unit.<br>    |
|  | 2line<br>– [2line]<br>[2line]                   | 2line display of values with units.<br>  |

|  | Value                         | Description                                                                                                                                                                                                                 |
|--|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | 3line<br>– [3line]<br>[3line] | 3line display of values with units.<br><div><div>10:00</div><div>MFL</div><div>2.28t/h</div><div>1.11 kg/L</div><div>DNS</div><div>14.76°C</div><div>TMP</div><div>SET SFT INC</div></div>                                  |
|  | 4line<br>– [4line]<br>[4line] | 4line display of values with units.<br><div><div>10:00</div><div>MFL</div><div>2.28t/h</div><div>1.11 kg/L</div><div>DNS</div><div>14.76°C</div><div>TMP</div><div>2.09m³/h</div><div>VFL</div><div>SET SFT INC</div></div> |

Display period

|                                                                                                            |
|------------------------------------------------------------------------------------------------------------|
| ⌚ [Detailed setup] ▶ [Disp] ▶ [Disp op cfg] ▶ [Period]                                                     |
| Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Display] ▶ [Display operation configuration] ▶ [Display period] |

Sets the refresh rate of the display.

|  | Value                       | Description                                    |
|--|-----------------------------|------------------------------------------------|
|  | 0.2s<br>– [0.2s]<br>[0.2 s] | Refresh rate is 0.2 seconds.                   |
|  | 0.4s<br>– [0.4s]<br>[0.4 s] | Refresh rate is 0.4 seconds.                   |
|  | 1.0s<br>– [1.0s]<br>[1.0 s] | Refresh rate is 1.0 seconds.<br>Default value. |
|  | 2.0s<br>– [2.0s]<br>[2.0 s] | Refresh rate is 2.0 seconds.                   |
|  | 4.0s<br>– [4.0s]<br>[4.0 s] | Refresh rate is 4.0 seconds.                   |
|  | 8.0s<br>– [8.0s]<br>[8.0 s] | Refresh rate is 8.0 seconds.                   |



**Additional function**

Menu for configuring LCD display in detail. The menu is only available when *Display additional parameters* has been set to Apply.

The following menus/settings are available:

|   | Full name                   | Display name        | [Modbus] name                 | Page    |
|---|-----------------------------|---------------------|-------------------------------|---------|
| – | Display NE 107              | [NE107 disp]        | [Display NE 107]              | [▶ 541] |
| – | Display alarm               | [Alarm disp]        | [Display alarm]               | [▶ 541] |
| Ⓜ | IRSW operation              |                     | [IRSW operation]              | [▶ 542] |
| – | Display scroll              | [Scroll]            | [Display scroll]              | [▶ 542] |
| – | Display damping             | [Disp damp]         | [Display damping]             | [▶ 543] |
| – | Display format date         | [Date format]       | [Display format date]         | [▶ 543] |
| Ⓜ | Language                    |                     | [Language]                    | [▶ 543] |
| – | Language package            | [Lang pack]         | [Language package]            | [▶ 544] |
| – | Display unit selection      | [Unit sel]          | [Display unit selection]      | [▶ 544] |
| – | Display measurement mode    | [Meas mode]         | [Display measurement mode]    | [▶ 545] |
| – | Trend offline LRV           | [Trend offln LRV]   | [Trend offline LRV]           | [▶ 546] |
| – | Trend offline URV           | [Trend offln URV]   | [Trend offline URV]           | [▶ 546] |
| – | Display total health result | [Ttl health result] | [Display total health result] | [▶ 546] |
| – | Display rotation            | [Rotate]            | [Display rotation]            | [▶ 547] |
| – | Display inversion           | [Inversion]         | [Display inversion]           | [▶ 547] |

**Display NE 107**

⌚ [Detailed setup] ▶ [Disp] ▶ [Disp op cfg] ▶ [Add func] ▶ [NE107 disp]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Display] ▶ [Display operation configuration] ▶ [Additional function] ▶ [Display NE 107]

Sets the NE 107 code in an alarm message.

|   | Value                          | Description                                                 |
|---|--------------------------------|-------------------------------------------------------------|
| – | Normal<br>[Normal]<br>[Normal] | Without NE 107 code in the alarm message.<br>Default value. |
| – | NE 107<br>[NE107]<br>[NE 107]  | With NE 107 code in the alarm message.                      |

**Display alarm**

⌚ [Detailed setup] ▶ [Disp] ▶ [Disp op cfg] ▶ [Add func] ▶ [Alarm disp]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Display] ▶ [Display operation configuration] ▶ [Additional function] ▶ [Display alarm]

Sets the alarm display on the LCD.

|   | Value                          | Description                                                                                     |
|---|--------------------------------|-------------------------------------------------------------------------------------------------|
| – | Normal<br>[Normal]<br>[Normal] | Alarm information is displayed on one line at the bottom of the LCD.<br>Default value.          |
| – | Detail<br>[Detail]<br>[Detail] | Alarm information is displayed in the entire LCD display area together with the countermeasure. |

## IRSW operation

Ⓜ [Device root menu] ► [Detailed setup] ► [Display] ► [Display operation configuration] ► [Additional function] ► [IRSW operation]

Sets the IR switch on the Indicator.

|   | Value                | Description                                                                |
|---|----------------------|----------------------------------------------------------------------------|
| Ⓜ | Enable<br>[Enable]   | IR switches on the Indicator are enabled; this means they can be used.     |
| Ⓜ | Inhibit<br>[Inhibit] | IR switches on the Indicator are disabled; this means they cannot be used. |

## Display scroll

Ⓜ [Detailed setup] ► [Disp] ► [Disp op cfg] ► [Add func] ► [Scroll]

Ⓜ [Device root menu] ► [Detailed setup] ► [Display] ► [Display operation configuration] ► [Additional function] ► [Display scroll]

Sets the scroll mode of the LCD display line.

|   | Value                                        | Description                                                                       |
|---|----------------------------------------------|-----------------------------------------------------------------------------------|
| – | Off<br>[off]<br>[Off]                        | Scrolling the display line is disabled; this means it is fixed.<br>Default value. |
| – | Manual<br>[Man]<br>[Manual]                  | Display line is manually scrolled using IR switches on the Indicator.             |
| – | Auto(2.0s)<br>[Auto (2.0s)]<br>[Auto (2.0s)] | Display line is scrolled up every 2 seconds automatically.                        |
| – | Auto(4.0s)<br>[Auto (4.0s)]<br>[Auto (4.0s)] | Display line is scrolled up every 4 seconds automatically.                        |
| – | Auto(8.0s)<br>[Auto (8.0s)]<br>[Auto (8.0s)] | Display line is scrolled up every 8 seconds automatically.                        |

**Display damping**

⌚ [Detailed setup] ► [Disp] ► [Disp op cfg] ► [Add func] ► [Disp damp]

Ⓜ [Device root menu] ► [Detailed setup] ► [Display] ► [Display operation configuration] ► [Additional function] ► [Display damping]

Sets the damping constant for the display. This damping is valid only for the display and not for the output signals or totalizers. The value is the time it takes for this value to become 63.2% of the total amount of change.

|   | Value          | Description                                              |
|---|----------------|----------------------------------------------------------|
| – | Numeric digits | Setting range: 0.0 – 200.0 s.<br>Default value is 3.0 s. |

**Display format date**

⌚ [Detailed setup] ► [Disp] ► [Disp format] ► [Add func] ► [Date format]

Ⓜ [Device root menu] ► [Detailed setup] ► [Display] ► [Display operation configuration] ► [Additional function] ► [Display format date]

Sets format to display date.

|   | Value                                      | Description                                                                  |
|---|--------------------------------------------|------------------------------------------------------------------------------|
| – | MM/DD/YYYY<br>[MM/DD/YYYY]<br>[MM/DD/YYYY] | MM ≡ 2-digit month, DD ≡ 2-digit day, YYYY ≡ 4-digit year.<br>Default value. |
| – | DD/MM/YYYY<br>[DD/MM/YYYY]<br>[DD/MM/YYYY] | DD ≡ 2-digit day, MM ≡ 2-digit month, YYYY ≡ 4-digit year.                   |
| – | YYYY/MM/DD<br>[YYYY/MM/DD]<br>[YYYY/MM/DD] | YYYY ≡ 4-digit year, MM ≡ 2-digit month, DD ≡ 2-digit day.                   |

**Language**

⌚ [Detailed setup] ► [Disp] ► [Disp op cfg] ► [Add func] ► [Lang]

Ⓜ [Device root menu] ► [Detailed setup] ► [Display] ► [Display operation configuration] ► [Additional function] ► [Language]

This parameter can be set in the following menu/menus:

*Language* [▶ 107]

Only available if the device is equipped with a display.

Sets the language to be used on the LCD display.

|   | Value                      | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ⓜ | English<br>[English]       | The desired display language can be selected. Available languages depend on the language package that was ordered:<br><br><i>Package 1:</i> <ul style="list-style-type: none"> <li>English</li> <li>French</li> <li>German</li> <li>Italian</li> <li>Spanish</li> <li>Portuguese</li> <li>Japanese</li> </ul> <i>Package 2:</i> <ul style="list-style-type: none"> <li>English</li> <li>German</li> <li>Russian</li> <li>Kazakh</li> <li>Polish</li> </ul> <i>Package 3:</i> <ul style="list-style-type: none"> <li>English</li> <li>French</li> <li>German</li> <li>Italian</li> <li>Spanish</li> <li>Portuguese</li> <li>Chinese</li> </ul> |
| Ⓜ | French<br>[French]         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Ⓜ | German<br>[German]         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Ⓜ | Italian<br>[Italian]       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Ⓜ | Spanish<br>[Spanish]       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Ⓜ | Portuguese<br>[Portuguese] |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Ⓜ | Russian<br>[Russian]       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Ⓜ | Kazakh<br>[Kazakh]         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Ⓜ | Chinese<br>[Chinese]       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Ⓜ | Japanese<br>[Japanese]     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Ⓜ | Polish<br>[Polish]         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

## Display unit selection

Ⓜ [Detailed setup] ► [Disp] ► [Disp op cfg] ► [Add func] ► [Unit sel]

Ⓜ [Device root menu] ► [Detailed setup] ► [Display] ► [Display operation configuration] ► [Additional function] ► [Display unit selection]

Sets the regional unit set to be used.

When this parameter is changed, the display of some process units that are not supported by the selected unit set turns blank. In that case, the process unit parameters must be reset.

If the SI option has been specified, it is fixed for Japan and cannot be changed. Refer to *Units description* [ 828] to confirm the units that are defined in each regional set.



When Display unit selection is changed and then units for Process variables don't meet with selected regional unit, these units are automatically changed to default unit.

When Temperature unit is set to degF and Display unit selection is changed US to Metric, Temperature unit is automatically changed to degC.

|   | Value                | Description                                                                                         |
|---|----------------------|-----------------------------------------------------------------------------------------------------|
|   | Metric               | Metric units.                                                                                       |
| – | [Metric]<br>[Metric] | Default value.                                                                                      |
|   | US                   | Units mainly used in the USA.                                                                       |
| – | [us]<br>[US]         |                                                                                                     |
|   | UK                   | Units mainly used in the UK.                                                                        |
| – | [uk]<br>[UK]         |                                                                                                     |
|   | Russia               | Units in Russia. Available only for language package 2.                                             |
| – | [Russia]<br>[Russia] |                                                                                                     |
|   | Japan                | Units for Japan to comply with the Japanese measurement law. Available only for language package 1. |
| – | [Japan]<br>[Japan]   |                                                                                                     |

### Display measurement mode

① [Detailed setup] ► [Disp] ► [Disp sel] ► [Meas mode]

② [Device root menu] ► [Detailed setup] ► [Display] ► [Display operation configuration] ► [Additional function] ► [Display measurement mode]

This parameter can be set in the following menu/menus:

- *Diag/Service* [► 263]
- *Easy setup wizard* [► 319]
- *Basic setup* [► 372]
- Detailed setup
  - *Display* [► 545]
  - *Batch function* [► 563]

Sets the display mode for logging data on the LCD display of the Indicator.

|   | Value                             | Description                                                                                                                                                                                                                                                                                                                           |
|---|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   | Normal                            | Normal display mode.                                                                                                                                                                                                                                                                                                                  |
| – | [Normal]<br>[Normal]              | Default value.                                                                                                                                                                                                                                                                                                                        |
|   | Trend online                      | Real-time trend chart of process values that were specified in the parameters, Logging 1 – 4 Select. The trend chart of one of four process values is displayed. By using the Up/Down operation on the Indicator, the process value to be shown as a trend chart can be changed when the Display Scroll parameters are set to Manual. |
| – | [Trend]<br>[Trend online]         |                                                                                                                                                                                                                                                                                                                                       |
| ③ | Batch control                     | Batch specific screen can be displayed on Indicator.                                                                                                                                                                                                                                                                                  |
|   | [Batch control]<br>[Batch contol] |                                                                                                                                                                                                                                                                                                                                       |

## Trend offline LRV

Ⓐ [Detailed setup] ► [Disp] ► [Disp op cfg] ► [Add func] ► [Trend offln LRV]

Ⓜ [Device root menu] ► [Detailed setup] ► [Display] ► [Display operation configuration] ► [Additional function] ► [Trend offline LRV]

This parameter can be set in the following menu/menus:

- *Diag/Service* [► 263]
- *Detailed Setup* [► 546]

Sets the LRV for the trend display of logging data to a microSD card on the LCD of the Indicator.

|   | Value          | Description         |
|---|----------------|---------------------|
| – | Numeric digits | Default value is 0. |

## Trend offline URV

Ⓐ [Detailed setup] ► [Disp] ► [Disp op cfg] ► [Add func] ► [Trend offln URV]

Ⓜ [Device root menu] ► [Detailed setup] ► [Display] ► [Display operation configuration] ► [Additional function] ► [Trend offline URV]

This parameter can be set in the following menu/menus:

- *Diag/Service* [► 263]
- *Detailed Setup* [► 546]

Sets the URV for the trend display of logging data from the microSD card on the LCD of the Indicator.

|   | Value          | Description          |
|---|----------------|----------------------|
| – | Numeric digits | Default value is 10. |

## Display total health result

Ⓐ [Detailed setup] ► [Disp] ► [Disp op cfg] ► [Add func] ► [Ttl health result]

Ⓜ [Device root menu] ► [Detailed setup] ► [Display] ► [Display operation configuration] ► [Additional function] ► [Display total health result]

Selects the icon for Total health result on Indicator.

*Diag/Service* [► 263]

|   | Value                 | Description                                             |
|---|-----------------------|---------------------------------------------------------|
| – | Off<br>[off]<br>[Off] | Icon for Total health result is not shown on Indicator. |
| – | On<br>[on]<br>[On]    | Icon for Total health result is shown on Indicator.     |

**Display rotation**

① [Detailed setup] ► [Disp] ► [Disp op cfg] ► [Add func] ► [Rotate]

② [Device root menu] ► [Detailed setup] ► [Display] ► [Display operation configuration] ► [Additional function] ► [Display rotation]

Sets the vertical configuration (vertical display direction) of the LCD display.

|   | Value                             | Description                                                                                                           |
|---|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| – | Normal<br>[Normal]<br>[Normal]    | Display space close to the YOKOGAWA logo is on top and the other side is the bottom of the display.<br>Default value. |
| – | Reverse<br>[Reverse]<br>[Reverse] | Display space close to the IR switches is at top and the other side is the bottom of the display.                     |

**Display inversion**

① [Detailed setup] ► [Disp] ► [Disp op cfg] ► [Add func] ► [Inversion]

② [Device root menu] ► [Detailed setup] ► [Display] ► [Display operation configuration] ► [Additional function] ► [Display inversion]

Sets the LCD to either normal or inverted display mode.

|   | Value                          | Description                                                                      |
|---|--------------------------------|----------------------------------------------------------------------------------|
| – | Normal<br>[Normal]<br>[Normal] | Normal display mode; this means characters/icons are in black.<br>Default value. |
| – | Invert<br>[Invert]<br>[Invert] | Inverted display mode; this means reverse of normal display mode.                |

**5.7.8 Date/Time**

Menu for configuring the date and time on the transmitter.

The following menus/settings are available:

|   | Full name        | Display name | [Modbus] name      | Page    |
|---|------------------|--------------|--------------------|---------|
| – | Set current date | [Set date]   | [Set current date] | [▶ 547] |
| – | Set current time | [Set time]   | [Set current time] | [▶ 548] |

**Set current date**

① [Detailed setup] ► [Date/Time] ► [Set date]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [▶ 310]

Sets the date.

|   | Value | Description                                                                                                                              |
|---|-------|------------------------------------------------------------------------------------------------------------------------------------------|
| – | Date  | The date format on the LCD is defined in the parameter Display format date.<br>The format is MM/DD/YYYY.<br>Default value is 01/01/2015. |

## Set current time

① [Detailed setup] ► [Date/Time] ► [Set time]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [► 310]

Sets the time.

|   | Value | Description                                            |
|---|-------|--------------------------------------------------------|
| – | Time  | Time format is hh:mm:ss.<br>Default value is 00:00.00. |

## 5.7.9 User access configuration

Configures user access or the user role.

The following menus/settings are available:

|   | Full name               | Display name     | [Modbus] name         | Page    |
|---|-------------------------|------------------|-----------------------|---------|
| – | Write access status     | [Write sts]      | [Write access status] | [► 548] |
| – | Write lock setting      | [Write lock set] | [Write lock setting]  | [► 549] |
| ① | User role               | [User role]      | –                     | [► 549] |
| ① | Change maintenance code | [Chg Mainte]     | –                     | [► 549] |
| ① | Change specialist code  | [Chg Special]    | –                     | [► 550] |

## Write access status

① [Detailed setup] ► [Access cfg] ► [Write sts]

② [Device root menu] ► [Detailed setup] ► [User access configuration] ► [Write access status]

Shows possible parameter operations when write protect is enabled and status of write protect.

|   | Value                                                   | Description                                                                           |
|---|---------------------------------------------------------|---------------------------------------------------------------------------------------|
| – | All locked<br>[All locked]<br>[All locked]              | Transmitter is read-only and parameter values cannot be changed.                      |
| – | Display only<br>[Disp only]<br>[Display only]           | Transmitter is read-only and only display-related parameters can be changed.          |
| – | Autozero only<br>[AZ only]<br>[Autozero only]           | Transmitter is read-only and only Autozero-related parameters can be changed.         |
| – | Display + Autozero<br>[Disp+AZ]<br>[Display + Autozero] | Transmitter is read-only and display- and Autozero-related parameters can be changed. |
| – | Not locked<br>[See User role param.]<br>[Not locked]    | Transmitter is not read-only.                                                         |



**Write lock setting**

① [Detailed setup] ► [Access cfg] ► [Write lock set]

② [Device root menu] ► [Detailed setup] ► [User access configuration] ► [Write lock setting]

Sets possible parameter operations when read-only is enabled.

|   | Value                                                   | Description                                                                           |
|---|---------------------------------------------------------|---------------------------------------------------------------------------------------|
| – | All locked<br>[All locked]<br>[All locked]              | Transmitter is read-only and parameter values cannot be changed.<br>Default value.    |
| – | Display only<br>[Disp only]<br>[Display only]           | Transmitter is read-only and only display-related parameters can be changed.          |
| – | Autozero only<br>[AZ only]<br>[Autozero only]           | Transmitter is read-only and only Autozero-related parameters can be changed.         |
| – | Display + Autozero<br>[Disp+AZ]<br>[Display + Autozero] | Transmitter is read-only and display- and Autozero-related parameters can be changed. |

**User role**

① [Detailed setup] ► [Access cfg] ► [User role]

Shows the user role for limiting some of the operations available on the Indicator.

Depending on the selected user role, some of the operations on parameters performed by using switches on the Indicator are restricted. However, all parameters can be read independent of this setting. If the transmitter is read-only, restrictions based on the read-only status have priority.

|   | Value                        | Description                                                                |
|---|------------------------------|----------------------------------------------------------------------------|
| ① | Operator<br>[Operator]       | Language and display parameters can be used.                               |
| ① | Maintenance<br>[Maintenance] | In addition to Operator, Basic Setup and Auto Zero parameters can be used. |
| ① | Specialist<br>[Specialist]   | All customer parameters can be used.                                       |

**Change maintenance code**

① [Detailed setup] ► [Access cfg] ► [Chg Mainte]

Sets the pass code for setting the parameter User role to Maintenance.



The user with this access level may perform an autozero in addition to the configuration of the display.

|   | Value           | Description                                    |
|---|-----------------|------------------------------------------------|
| ① | Numeric digits. | Setting range: 0 – 9999<br>Default value is 0. |

**Change specialist code**

⌚ [Detailed setup] ► [Access cfg] ► [Chg Special]

Sets the pass code for setting the parameter User Role to Specialist.



The specialist user has write access to the entire configuration menu of the transmitter.

|   | Value           | Description                                    |
|---|-----------------|------------------------------------------------|
| ⌚ | Numeric digits. | Setting range: 0 – 9999<br>Default value is 0. |

**5.7.10 Batch function**

*Batch function* configures batching.

The following menus/settings are available:

Batch function is available only for batch option /BT.

|        | Full name                   | Display name       | [Modbus] name                 | Page    |
|--------|-----------------------------|--------------------|-------------------------------|---------|
| Ⓢ      | Batch mode                  | [Mode]             | [Batch mode]                  | [▶ 550] |
| Ⓢ      | Batch additional parameters | [Batch add]        | [Batch additional parameters] | [▶ 551] |
| Ⓢ<br>Ⓜ | Batch common                | [Batch cmn]        | [Batch common]                | [▶ 551] |
| Ⓢ      | Batch No. 1 – 5             | [Batch 1 – 5]      | [Batch No. 1 – 5]             | [▶ 554] |
| Ⓢ<br>Ⓜ | Batch status output         | [Batch sts in/out] | [Batch status output]         | [▶ 562] |
| Ⓢ<br>Ⓜ | Batch display               | [Batch disp]       | [Batch display]               | [▶ 563] |
| Ⓢ      | Batch information           | [Batch Info]       | [Batch information]           | [▶ 567] |

**Batch mode**

⌚ [Detailed setup] ► [Batch] ► [Mode]

Ⓜ [Device root menu] ► [Detailed setup] ► [Batch function] ► [Batch mode]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [▶ 311]
- *Basic setup* [▶ 364]

Activates the Batch function.

|   | Value                 | Description    |
|---|-----------------------|----------------|
| – | No<br>[No]<br>[No]    | Default value. |
| – | Yes<br>[Yes]<br>[Yes] |                |

Batch additional parameters

- ① [Detailed setup] ► [Batch] ► [Batch add]
- ⑧ [Device root menu] ► [Detailed setup] ► [Batch function] ► [Batch additional parameters]

*Batch additional parameters* enables or disables the menu for accessing parameters that are located under *Additional function* menu of each Batch function . To access the parameters, this parameter must be set to Apply.

|   | Value                                   | Description                                                                              |
|---|-----------------------------------------|------------------------------------------------------------------------------------------|
| ⑥ | Apply<br>[Apply]<br>[Apply]             | The menu for Additional parameters of each Batch function is enabled.                    |
| ⑥ | Not Apply<br>[Not apply]<br>[Not Apply] | The menu for Additional parameters of each Batch function is disabled.<br>Default value. |

Batch common

Menu for configuring the values of Batch-related common parameters.

The following menus/settings are available:

The following overview shows the selectable settings within the submenu *Batch common*.

|   | Full name            | Display name  | [Modbus] name          | Page    |
|---|----------------------|---------------|------------------------|---------|
| ⑥ | Batch select         | [Batch sel]   | [Batch select]         | [▶ 551] |
| ⑥ | Batch up down select | [Up down sel] | [Batch up down select] | [▶ 552] |
| ⑥ | Batch start/stop     | [Start/Stop]  | [Batch start/stop]     | [▶ 553] |
| ⑥ | Batch reset          | [Reset]       | [Batch reset]          | [▶ 553] |

Batch select

- ① [Detailed setup] ► [Batch] ► [Batch sel]
- ⑧ [Device root menu] ► [Detailed setup] ► [Batch function] ► [Batch common] ► [Batch select]

This parameter can be set in the following menu/menus:

- *Basic setup* [▶ 364]

Sets the used batch setting in Batch 1 – 5.

|  | Value                              | Description                   |
|--|------------------------------------|-------------------------------|
|  | Batch 1<br>– [Batch1]<br>[Batch 1] | The default value is Batch 1. |
|  | Batch 2<br>[Batch2]<br>[Batch 2]   |                               |
|  | Batch 3<br>[Batch3]<br>[Batch 3]   |                               |
|  | Batch 4<br>[Batch4]<br>[Batch 4]   |                               |
|  | Batch 5<br>– [Batch5]<br>[Batch 5] |                               |

### Batch up down select

Ⓐ [Detailed setup] ► [Batch] ► [Up down sel]

Ⓜ [Device root menu] ► [Detailed setup] ► [Batch function] ► [Batch common] ► [Batch up down select]

Sets the quantity mode whether quantity value is started from 0 by upward or from Batch quantity 1 – 5 by downward.

|  | Value                                                              | Description                               |
|--|--------------------------------------------------------------------|-------------------------------------------|
|  | Batch upwards value<br>– [Upward val]<br>[Batch upwards value]     | The default value is Batch upwards value. |
|  | Batch downwards value<br>[Downward val]<br>[Batch downwards value] |                                           |

Batch start/stop

① [Detailed setup] ► [Batch] ► [Start/Stop]

② [Device root menu] ► [Detailed setup] ► [Batch function] ► [Batch common] ► [Batch start/stop]

This parameter can be set in the following menu/menus:

- *Diag/Service* [► 157]
- *Basic setup* [► 365]

Sets batch operation in Start, Stop, Hold or Resume.

|   | Value                          | Description                |
|---|--------------------------------|----------------------------|
| – | Stop<br>[stop]<br>[Stop]       | The default value is Stop. |
| – | Start<br>[start]<br>[Start]    |                            |
| – | Hold<br>[hold]<br>[Hold]       |                            |
| – | Resume<br>[Resume]<br>[Resume] |                            |

Batch reset

① [Detailed setup] ► [Batch] ► [Reset]

② [Device root menu] ► [Detailed setup] ► [Batch function] ► [Batch common] ► [Batch reset]

This parameter can be set in the following menu/menus:

- *Basic setup* [► 366]

Sets batch operation in Start, Stop, Hold or Resume.

|   | Value                       | Description              |
|---|-----------------------------|--------------------------|
| – | No<br>[No]<br>[No]          | The default value is No. |
| – | Reset<br>[Reset]<br>[Reset] |                          |

**Batch No.1 – 5**

Menu for configuring the Batch function.

The following menus/settings are available:

|   | Full name                       | Display name      | [Modbus] name                     | Page    |
|---|---------------------------------|-------------------|-----------------------------------|---------|
| ⓔ | Batch variable select 1 – 5     | [Var sel]         | [Batch variable select 1 – 5]     | [▶ 554] |
| ⓔ | Batch quantity 1 – 5            | [Qty]             | [Batch quantity 1 – 5]            | [▶ 555] |
| ⓔ | Batch 1 – 5 unit                | [Unit]            | [Batch 1 – 5 unit]                | [▶ 556] |
| ⓔ | Batch primary valve close 1 – 5 | [1st valve close] | [Batch primary valve close 1 – 5] | [▶ 556] |
| ⓔ | Fixed compensation value 1 – 5  | [Fix comp val]    | [Fixed compensation value 1 – 5]  | [▶ 557] |
| ⓔ | Batch end judgment value 1 – 5  | [End judge val]   | [Batch end judgment value 1 – 5]  | [▶ 557] |
| ⓔ | Max batch quantity 1 – 5        | [Max qty]         | [Max batch quantity 1 – 5]        | [▶ 557] |
| ⓔ | Additional function             | [Add func]        | [Additional function]             | [▶ 558] |

**Batch variable select 1 – 5**

ⓐ [Detailed setup] ▶ [Batch] ▶ [Batch 1 – 5] ▶ [Var sel]

ⓑ [Device root menu] ▶ [Detailed setup] ▶ [Batch function] ▶ [Batch No.1 – 5] ▶ [Batch variable select 1 – 5]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [▶ 311]
- *Basic setup* [▶ 366]

Sets the Process variable which is used in Batch function.

|   | Value                                                                      | Value description               |
|---|----------------------------------------------------------------------------|---------------------------------|
| – | Mass flow<br>[Mass]<br>[Mass flow]                                         | The default value is Mass flow. |
| – | Volume flow<br>[Vol]<br>[Volume flow]                                      |                                 |
| – | Corrected volume flow<br>[Corr vol]<br>[Corrected volume flow]             |                                 |
| Ⓢ | Net mass flow 1<br>[Net mass1]<br>[Net mass flow 1]                        |                                 |
| Ⓢ | Net mass flow 2<br>[Net mass2]<br>[Net mass flow 2]                        |                                 |
| Ⓢ | Net volume flow 1<br>[Net vol1]<br>[Net volume flow 1]                     |                                 |
| Ⓢ | Net volume flow 2<br>[Net vol2]<br>[Net volume flow 2]                     |                                 |
| Ⓢ | Net corrected volume flow<br>[Net corr vol]<br>[Net corrected volume flow] |                                 |

### Batch quantity 1 – 5

Ⓛ [Detailed setup] ► [Batch] ► [Batch 1 – 5] ► [Qty 1 – 5]

Ⓜ [Detailed setup] ► [Batch function] ► [Batch No.1 – 5] ► [Batch quantity 1 – 5]

This parameter can be set in the following menu/menus:

- *Easy setup* [▶ 314]
- *Basic setup* [▶ 368]

Sets the quantity for the Batch function.

|   | Value          | Description                |
|---|----------------|----------------------------|
| – | Numeric digits | Default value is 100.0 kg. |

## Batch 1 – 5 unit

Ⓒ [Detailed setup] ► [Batch] ► [Batch 1 – 5] ► [Unit]

Ⓗ [Device root menu] ► [Detailed setup] ► [Batch function] ► [Batch No.1 – 5] ► [Batch 1 – 5 unit]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [ 313]
- *Basic setup* [ 367]

Sets the unit for Batch.

| Value                        | Description                                          |
|------------------------------|------------------------------------------------------|
| – g                          | Sets the unit for Batch.<br>The default value is kg. |
| – kg                         |                                                      |
| – t                          |                                                      |
| – ton(US)                    |                                                      |
| – ton(UK)                    |                                                      |
| – cm <sup>3</sup>            |                                                      |
| – L                          |                                                      |
| – m <sup>3</sup>             |                                                      |
| – gal                        |                                                      |
| – kgal                       |                                                      |
| – ft <sup>3</sup>            |                                                      |
| – bbl                        |                                                      |
| – Impgal                     |                                                      |
| – kImpgal                    |                                                      |
| – N(normal)                  |                                                      |
| – m <sup>3</sup> (normal)    |                                                      |
| – L(standard)                |                                                      |
| – ft <sup>3</sup> (standard) |                                                      |
| – Mmscft                     |                                                      |
| – m <sup>3</sup> (standard)  |                                                      |
| – User unit                  |                                                      |

## Batch primary valve close 1 – 5

Ⓒ [Detailed setup] ► [Batch] ► [Batch 1 – 5] ► [Valve1 – 5 close]

Ⓗ [Device root menu] ► [Detailed setup] ► [Batch function] ► [Batch No.1 – 5] ► [Batch primary valve close 1 – 5]

This parameter can be set in the following menu/menus:

- *Basic setup* [ 368]

Shows the quantity when the primary valve is closed.

Setting of valve control function is set by the Status output 1 – 3 function.

| Value            | Description             |
|------------------|-------------------------|
| – Numeric digits | Default value is 0.0 kg |



**Fix compensation value 1 – 5**

① [Detailed setup] ► [Batch] ► [Batch 1 – 5] ► [Fix comp val]

Ⓜ [Device root menu] ► [Detailed setup] ► [Batch function] ► [Batch No.1 – 5] ► [Fix compensation value 1 – 5]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [► 314]
- *Basic setup* [► 368]

Sets the leakage compensation value.

Valve is closed when quantity reaches Batch qty - Fix comp val.

|   | Value          | Description              |
|---|----------------|--------------------------|
| – | Numeric digits | Default value is 0.0 kg. |

**Batch end judgment value 1 – 5**

① [Detailed setup] ► [Batch] ► [Batch 1 – 5] ► [End judge val]

Ⓜ [Device root menu] ► [Detailed setup] ► [Batch function] ► [Batch No.1 – 5] ► [Batch end judgment value 1 – 5]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [► 315]
- *Basic setup* [► 369]

Sets the judgment value of leakage value. The unit is depend on Process variable which is selected by Batch variable select.

|   | Value          | Description           |
|---|----------------|-----------------------|
| – | Numeric digits | Default value 5 kg/h. |

**Max batch quantity 1 – 5**

① [Detailed setup] ► [Batch] ► [Batch 1 – 5] ► [Max qty]

Ⓜ [Detailed setup] ► [Batch function] ► [Batch No.1 – 5] ► [Max batch quantity 1 – 5]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [► 315]
- *Basic setup* [► 369]

Sets threshold value of maximum flow.

When the flow rate for batch operation is bigger than the parameter value, 208:Batch overrun/underrun alarm occurs.

If this value is set to 0, this threshold is not active.

|   | Value          | Description              |
|---|----------------|--------------------------|
| – | Numeric digits | Default value is 0.0 kg. |

**Additional function**

Menu for confirming the values of Batch-related No. 1 – 5 additional parameters.

|   | Full name                               | Display name      | [Modbus] name                             | Page    |
|---|-----------------------------------------|-------------------|-------------------------------------------|---------|
| Ⓔ | Batch user unit 1 – 5                   | [User unit]       | [Batch user unit 1 – 5]                   | [▶ 558] |
| Ⓔ | Batch user unit conversion factor 1 – 5 | [Conv factor]     | [Batch user unit conversion factor 1 – 5] | [▶ 558] |
| Ⓔ | Batch type select 1 – 5                 | [Type sel]        | [Batch type select 1 – 5]                 | [▶ 559] |
| Ⓔ | Batch primary valve open 1 – 5          | [1st valve open]  | [Batch primary valve open 1 – 5]          | [▶ 559] |
| Ⓔ | Batch secondary valve open 1 – 5        | [2nd valve open]  | [Batch secondary valve open 1 – 5]        | [▶ 559] |
| Ⓔ | Batch secondary valve close 1 – 5       | [2nd valve close] | [Batch secondary valve close 1 – 5]       | [▶ 559] |
| Ⓔ | Compensation mode select 1 – 5          | [Comp mode sel]   | [Compensation mode select 1 – 5]          | [▶ 560] |
| Ⓔ | Averaging data number 1 – 5             | [Avg data]        | [Averaging data number 1 – 5]             | [▶ 560] |
| Ⓔ | Leakage hysteresis time 1 – 5           | [Lkg hys time]    | [Leakage hysteresis time 1 – 5]           | [▶ 560] |
| Ⓔ | Max leakage time 1 – 5                  | [Max lkg time]    | [Max leakage time 1 – 5]                  | [▶ 561] |
| Ⓔ | Auto compensation 1 – 5                 | [Auto comp]       | [Auto compensation 1 – 5]                 | [▶ 561] |
| Ⓔ | Max batch time 1 – 5                    | [Max time]        | [Max batch time 1 – 5]                    | [▶ 561] |
| Ⓔ | Min batch quantity 1 – 5                | [Min qty]         | [Min batch quantity 1 – 5]                | [▶ 561] |
| Ⓔ | Max batch flow 1 – 5                    | [Max flow]        | [Max batch flow 1 – 5]                    | [▶ 562] |
| Ⓔ | Progress indication 1 – 5               | [Progress]        | [Progress indication 1 – 5]               | [▶ 562] |

**Batch user unit  
1 – 5**

Ⓔ [Detailed setup] ▶ [Batch] ▶ [Batch 1 – 5] ▶ [Add func] ▶ [User unit]

Ⓕ [Device root menu] ▶ [Detailed setup] ▶ [Batch function] ▶ [Batch No.1 – 5] ▶ [Additional function] ▶ [Batch user unit 1 – 5]

Sets the user-defined unit for Batch 1 – 5.

|   | Value            | Description                                                |
|---|------------------|------------------------------------------------------------|
| – | ASCII characters | Maximum length is 8 characters.<br>Default value is blank. |

**Batch user unit  
conversion factor  
1 – 5**

Ⓔ [Detailed setup] ▶ [Batch] ▶ [Batch 1 – 5] ▶ [Add func] ▶ [Conv factor]

Ⓕ [Device root menu] ▶ [Detailed setup] ▶ [Batch function] ▶ [Batch No.1 – 5] ▶ [Additional function] ▶ [Batch user unit conversion factor 1 – 5]

Sets the conversion factor for the Batch 1 – 5 user-defined unit.

|   | Value          | Description                                                                                                        |
|---|----------------|--------------------------------------------------------------------------------------------------------------------|
| – | Numeric digits | Default value is 1.<br>Batch value at user-defined unit = Batch n value * Batch user unit conversion factor 1 – 5. |

**Batch type select 1 – 5**

⌚ [Detailed setup] ► [Batch] ► [Batch 1 – 5] ► [Add func] ► [Type sel]

Ⓜ [Device root menu] ► [Detailed setup] ► [Batch function] ► [Batch No.1 – 5] ► [Additional function] ► [Batch type select 1 – 5]

Sets the type of Batch in 1 stage batch or 2 stage batch.

|   | Value                               | Description                         |
|---|-------------------------------------|-------------------------------------|
| – | 1 stage batch<br>[1stage batch]     | The default value is 1 stage batch. |
| – | 2 stage batch<br>[301:Mass cfg ERR] |                                     |

**Batch primary valve open 1 – 5**

⌚ [Detailed setup] ► [Batch] ► [Batch 1 – 5] ► [Add func] ► [1st valve open]

Ⓜ [Device root menu] ► [Detailed setup] ► [Batch function] ► [Batch No.1 – 5] ► [Additional function] ► [Batch primary valve open 1 – 5]

Sets the quantity when the primary valve is openend.

Setting of valve control function is set by Status output 1 – 3 function.

|   | Value          | Description              |
|---|----------------|--------------------------|
| – | Numeric digits | Default value is 0.0 kg. |

**Batch secondary valve open 1 – 5**

⌚ [Detailed setup] ► [Batch] ► [Batch 1 – 5] ► [Add func] ► [2nd valve open]

Ⓜ [Device root menu] ► [Detailed setup] ► [Batch function] ► [Batch No.1 – 5] ► [Additional function] ► [Batch secondary valve open 1 – 5]

Sets the quantity when the secondary valve is opened.

This parameter is available when 2 stage batch is selected in Batch type select 1 – 5.

Setting valve control function is set by Status output 1 – 3 function.

|   | Value          | Description              |
|---|----------------|--------------------------|
| – | Numeric digits | Default value is 0.0 kg. |

**Batch secondary valve close 1 – 5**

⌚ [Detailed setup] ► [Batch] ► [Batch 1 – 5] ► [Add func] ► [2nd valve close]

Ⓜ [Device root menu] ► [Detailed setup] ► [Batch function] ► [Batch No.1 – 5] ► [Additional function] ► [Batch secondary valve close 1 – 5]

Sets the quantity when the secondary valve is closed.

This parameter is available when 2 stage batch is selected in Batch type select 1 – 5.

Setting of valve control function is set by Status output 1 – 3 function.

|   | Value          | Description              |
|---|----------------|--------------------------|
| – | Numeric digits | Default value is 0.0 kg. |

### Compensation mode select 1 – 5

Ⓐ [Detailed setup] ► [Batch] ► [Batch 1 – 5] ► [Add func] ► [Comp mode sel]

Ⓜ [Device root menu] ► [Detailed setup] ► [Batch function] ► [Batch No.1 – 5] ► [Additional function] ► [Compensation mode select 1 – 5]

Sets the mode to calculate leakage value.

|   | Value                       | Description                                                                                                                     |
|---|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| – | Off<br>[Off]<br>[Off]       | The default value is Off.                                                                                                       |
|   | Mode1<br>[Mode1]<br>[Mode1] | Mode 1: A leakage value until crossing the first leakage judgment value after valve is closed.                                  |
|   | Mode2<br>[Mode2]<br>[Mode2] | Mode 2: A leakage value that it becomes less than the leakage judgment value for leakage hysteresis time after valve is closed. |
| – | Mode3<br>[Mode3]<br>[Mode3] | Mode 3: A leakage value until it goes through mode 3 leakage time from the point which first-crosses leakage judgment value.    |

### Averaging data number 1 – 5

Ⓐ [Detailed setup] ► [Batch] ► [Batch 1 – 5] ► [Add func] ► [Avg data]

Ⓜ [Device root menu] ► [Detailed setup] ► [Batch function] ► [Batch No. 1 – 5] ► [Additional function] ► [Averaging data number 1 – 5]

Sets the number of data for average value calculation of a leakage value.

This value is used when Calculation mode sel 1 – 5 is set to Select.

If value of this parameter is 2 or less, then average value is calculated using All data.

|   | Value          | Description         |
|---|----------------|---------------------|
| – | Numeric digits | Default value is 1. |

### Leakage hysteresis time 1 – 5

Ⓐ [Detailed setup] ► [Batch] ► [Batch 1 – 5] ► [Add func] ► [Lkg hys time]

Ⓜ [Device root menu] ► [Detailed setup] ► [Batch function] ► [Batch No.1 – 5] ► [Additional function] ► [Leakage hysteresis time 1 – 5]

Sets the hysteresis value for leakage when Mode 2 in Compensation mode select 1 – 5 is selected.

|   | Value          | Description         |
|---|----------------|---------------------|
| – | Numeric digits | Default value is 0. |

**Max leakage time  
1 – 5**

① [Detailed setup] ► [Batch] ► [Batch 1 – 5] ► [Add func] ► [Max lkg time]

② [Detailed setup] ► [Batch function] ► [Batch No.1 – 5] ► [Additional function] ► [Max leakage time 1 – 5]

Sets the end judgment value when Mode 3 in Compensation mode select 1 – 5 is selected.

|   | Value          | Description         |
|---|----------------|---------------------|
| – | Numeric digits | Default value is 0. |

**Auto  
compensation  
1 – 5**

① [Detailed setup] ► [Batch] ► [Batch 1 – 5] ► [Add func] ► [Auto comp]

② [Device root menu] ► [Detailed setup] ► [Batch function] ► [Batch No.1 – 5] ► [Additional function] ► [Auto compensation 1 – 5]

Sets whether Primary valve close point is automatically corrected or not in internal algorithm.

This setting is available when Mode 1 – 3 is selected in Compensation mode select 1 – 5.

|   | Value                 | Description              |
|---|-----------------------|--------------------------|
| – | No<br>[No]<br>[No]    | The default value is No. |
|   | Yes<br>[Yes]<br>[Yes] |                          |

**Max batch time  
1 – 5**

① [Detailed setup] ► [Batch] ► [Batch 1 – 5] ► [Add func] ► [Max time]

② [Device root menu] ► [Detailed setup] ► [Batch function] ► [Batch No.1 – 5] ► [Additional function] ► [Max batch time 1 – 5]

Sets threshold value of maximum batch time.

When batch operation time is larger than the parameter value, 207:Batch time exceeded alarm occurs.

If this value is to 0, this threshold is not active.

|   | Value          | Description           |
|---|----------------|-----------------------|
| – | Numeric digits | Default value is 0 s. |

**Min batch quantity  
1 – 5**

① [Detailed setup] ► [Batch] ► [Batch 1 – 5] ► [Add func] ► [Min qty]

② [Device root menu] ► [Detailed setup] ► [Batch function] ► [Batch No.1 – 5] ► [Additional function] ► [Min batch quantity 1 – 5]

Sets the threshold value of minimum batch quantity.

When quantity is smaller than the parameter value, 208:Batch overrun/underrun alarm occurs.

If this value is set to 0, this threshold is not active.

|   | Value          | Description            |
|---|----------------|------------------------|
| – | Numeric digits | Default value is 0 kg. |

### Max batch flow 1 – 5

Ⓛ [Detailed setup] ► [Batch] ► [Batch 1 – 5] ► [Add func] ► [Max flow]

Ⓜ [Device root menu] ► [Detailed setup] ► [Batch function] ► [Batch No.1 – 5] ► [Additional function] ► [Max batch flow 1 – 5]

Sets threshold value of maximum flow rate for batch.

When flow rate is larger than the parametr value, 209:Max flow while batching alarm occurs.

If this value is set to 0, this threshold is not active.

|   | Value          | Description              |
|---|----------------|--------------------------|
| – | Numeric digits | Default value is 0 kg/h. |

### Progress indication 1 – 5

Ⓛ [Detailed setup] ► [Batch] ► [Batch 1 – 5] ► [Add func] ► [Progress]

Ⓜ [Device root menu] ► [Detailed setup] ► [Batch function] ► [Batch No.1 – 5] ► [Additional function] ► [Progress indication 1 – 5]

Sets threshold value to inform the current quantity of batch

When quantity is larger than the parameter value, 732:Batch progress indication alarm occurs.

If this value is set to 0, this threshold is not active.

|   | Value          | Description            |
|---|----------------|------------------------|
| – | Numeric digits | Default value is 0 kg. |

### Batch status output

Menu for confirming the values of Batch-related status input/output parameters.

The following menus/settings are available:

|   | Full name                 | Display name    | [Modbus] name               | Page    |
|---|---------------------------|-----------------|-----------------------------|---------|
| Ⓜ | Batch status output 1 – 2 | [Sts out 1 – 2] | [Batch status output 1 – 2] | [▶ 562] |

### Batch status output 1 – 2

Ⓛ [Detailed setup] ► [Batch] ► [Batch 1 – 5] ► [Add func] ► [Sts out 1 – 2]

Ⓜ [Device root menu] ► [Detailed setup] ► [Batch function] ► [Batch status output] ► [Batch status output 1 – 2]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [▶ 318]
- *Basic setup* [▶ 371]

Sets the Status output function for Batch.

|   | Value                                         | Description                       |
|---|-----------------------------------------------|-----------------------------------|
|   | No function                                   | The default value is No function. |
| – | [No func]<br>[No function]                    |                                   |
|   | Primary valve control                         |                                   |
| – | [1st valve ctrl]<br>[Primary valve control]   |                                   |
|   | Secondary valve control                       |                                   |
| – | [2nd valve ctrl]<br>[Secondary valve control] |                                   |
|   | Batch running                                 |                                   |
| – | [Batch run]<br>[Batch running]                |                                   |
|   | Batch ended                                   |                                   |
| – | [Batch end]<br>[Batch ended]                  |                                   |

### Batch display

Menu for confirming the values of Batch-related display parameters.

The following menus/settings are available:

|        | Full name                  | Display name | [Modbus] name                | Page    |
|--------|----------------------------|--------------|------------------------------|---------|
| Ⓜ<br>ⓕ | Display measurement mode   | –            | [Display measurement mode]   | [▶ 563] |
| Ⓜ<br>ⓕ | Batch display select 1 – 4 | –            | [Batch display select 1 – 4] | [▶ 564] |
| Ⓜ<br>ⓕ | Display format batch       | –            | [Display format batch]       | [▶ 566] |

### Display measurement mode

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Batch function] ▶ [Batch display] ▶ [Display measure mode]

This parameter can be set in the following menu/menus:

- *Diag/Service* [▶ 263]
- *Easy setup wizard* [▶ 319]
- *Basic setup* [▶ 372]
- Detailed setup
  - *Display* [▶ 516]
  - *Batch function* [▶ 563]

Sets the display mode for logging data on the LCD display of the Indicator.

|   | Value                | Description                            |
|---|----------------------|----------------------------------------|
| Ⓜ | Normal               | Normal display mode.<br>Default value. |
|   | [Normal]<br>[Normal] |                                        |

|   | Value                                               | Description                                                                                                                                                                                                                                                                                                                      |
|---|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ⊕ | Trend online<br>[Trend]<br>[Trend online]           | Real-time trend chart of process values which were specified in the parameters, Logging 1 – 4 select. The trend chart of one of four process values is displayed. By using Up/Down operation on the Indicator, the process value to be shown as trend chart can be changed when the Display scroll parameters are set to Manual. |
| ⊕ | Batch control<br>[Batch control]<br>[Batch control] | Batch specific screen can be displayed on Indicator.                                                                                                                                                                                                                                                                             |

### Batch display select 1 – 4

⊕ [Device root menu] ► [Detailed setup] ► [Batch function] ► [Batch display] ► [Batch display select 1 – 4]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [► 319]
- *Basic setup* [► 373]

Sets Display select for batch, if batch variables are shown on Indicator. This is available when Batch control is selected in Display measurement mode.



|   | Value                                                   | Value description                                                                                                                                                                                                                                                                                                                                                                                           |
|---|---------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| — | <b>None</b><br>[None]                                   | <p>Sets Batch display select 1 – 4.</p> <p>The default value for Batch display select 1 is Batch quantity.</p> <p>None is not available for Batch display select 1.</p> <p>The default value for Batch display select 2 is Batch upward value.</p> <p>The default value for Batch display select 3 is Total batch quantity.</p> <p>The default value for Batch display select 4 is Batch counter value.</p> |
| Ⓢ | <b>Batch quantity</b><br>[Batch quantity]               |                                                                                                                                                                                                                                                                                                                                                                                                             |
| Ⓢ | <b>Batch upwards value</b><br>[Batch upwards value]     |                                                                                                                                                                                                                                                                                                                                                                                                             |
| Ⓢ | <b>Batch downwards value</b><br>[Batch downwards value] |                                                                                                                                                                                                                                                                                                                                                                                                             |
| Ⓢ | <b>Batch total quantity</b><br>[Batch total quantity]   |                                                                                                                                                                                                                                                                                                                                                                                                             |
| Ⓢ | <b>Batch counter value</b><br>[Batch counter value]     |                                                                                                                                                                                                                                                                                                                                                                                                             |
| Ⓢ | <b>Batch select</b><br>[Batch select]                   |                                                                                                                                                                                                                                                                                                                                                                                                             |
| Ⓢ | <b>Batch variable select</b><br>[Batch variable select] |                                                                                                                                                                                                                                                                                                                                                                                                             |
| Ⓢ | <b>Compensation value</b><br>[Compensation value]       |                                                                                                                                                                                                                                                                                                                                                                                                             |
| Ⓢ | <b>Internal close point</b><br>[Internal close point]   |                                                                                                                                                                                                                                                                                                                                                                                                             |
| Ⓢ | <b>Batch time</b><br>[Batch time]                       |                                                                                                                                                                                                                                                                                                                                                                                                             |
| — | <b>Mass flow</b><br>[Mass flow]                         |                                                                                                                                                                                                                                                                                                                                                                                                             |
| — | <b>Density</b><br>[Density]                             |                                                                                                                                                                                                                                                                                                                                                                                                             |
| — | <b>Temperature</b><br>[Temperature]                     |                                                                                                                                                                                                                                                                                                                                                                                                             |
| — | <b>Volume flow</b><br>[Volume flow]                     |                                                                                                                                                                                                                                                                                                                                                                                                             |

|   | Value                                                    | Value description                                                                                                                                                                                                                                                                                                                                                                                    |
|---|----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Reference density<br>[Reference density]                 | <p>Sets Batch display select 1 – 4.</p> <p>The default value for Batch display select 1 is Batch quantity. None is not available for Batch display select 1.</p> <p>The default value for Batch display select 2 is Batch upward value.</p> <p>The default value for Batch display select 3 is Total batch quantity.</p> <p>The default value for Batch display select 4 is Batch counter value.</p> |
| – | Corrected volume flow<br>[Corrected volume flow]         |                                                                                                                                                                                                                                                                                                                                                                                                      |
| – | Pressure<br>[Pressure]                                   |                                                                                                                                                                                                                                                                                                                                                                                                      |
| – | Tag<br>[Tag]                                             |                                                                                                                                                                                                                                                                                                                                                                                                      |
| – | Long Tag<br>[Long Tag]                                   |                                                                                                                                                                                                                                                                                                                                                                                                      |
| ⓔ | Net mass flow 1<br>[Net mass flow 1]                     |                                                                                                                                                                                                                                                                                                                                                                                                      |
| ⓔ | Net mass flow 2<br>[Net mass flow 2]                     |                                                                                                                                                                                                                                                                                                                                                                                                      |
| ⓔ | Net volume flow 1<br>[Net volume flow 1]                 |                                                                                                                                                                                                                                                                                                                                                                                                      |
| ⓔ | Net volume flow 2<br>[Net volume flow 2]                 |                                                                                                                                                                                                                                                                                                                                                                                                      |
| ⓔ | Net corrected volume flow<br>[Net corrected volume flow] |                                                                                                                                                                                                                                                                                                                                                                                                      |

### Display format batch

ⓔ [Device root menu] ► [Detailed setup] ► [Batch function] ► [Batch display] ► [Display format batch]

This parameter can be set in the following menu/menus:

- *Easy setup wizard* [ 321]
- *Basic setup* [ 375]

Sets the decimal format of batch relevant values which are set in *Display format batch* 1 – 4.

|   | Value                            | Description                                                           |
|---|----------------------------------|-----------------------------------------------------------------------|
| – | Auto<br>[Auto]<br>[Auto]         | Position is automatically adjusted according to value. Default value. |
| – | 0 digit<br>[0digit]<br>[0 digit] | 0 digit from right.                                                   |
| – | 1 digit<br>[1digit]<br>[1 digit] | 1 digit from right.                                                   |

|   | Value                 | Description         |
|---|-----------------------|---------------------|
|   | 2 digit               |                     |
| – | [2digit]<br>[2 digit] | 2 digit from right. |
|   | 3 digit               |                     |
| – | [3digit]<br>[3 digit] | 3 digit from right. |
|   | 4 digit               |                     |
| – | [4digit]<br>[4 digit] | 4 digit from right. |
|   | 5 digit               |                     |
| – | [5digit]<br>[5 digit] | 5 digit from right. |

### Batch information

Menu for confirming the values of Batch-related information parameters.

The following menus/settings are available:

|   | Full name                      | Display name        | [Modbus] name                    | Page    |
|---|--------------------------------|---------------------|----------------------------------|---------|
| Ⓢ | Batch time                     | [Batch time]        | [Batch time]                     | [▶ 567] |
| Ⓢ | Batch upwards value            | [Upward val]        | [Batch upwards value]            | [▶ 567] |
| Ⓢ | Batch downwards value          | [Downward val]      | [Batch downwards value]          | [▶ 568] |
| Ⓢ | Batch total quantity           | [Ttl qty]           | [Batch total quantity]           | [▶ 568] |
| Ⓢ | Batch counter value            | [Cnt val]           | [Batch counter value]            | [▶ 568] |
| Ⓢ | Batch compensation value       | [Comp val]          | [Batch compensation value]       | [▶ 568] |
| Ⓢ | Batch mode 1 – 3 leakage value | [Mode1 - 3 lkg val] | [Batch mode 1 - 3 leakage value] | [▶ 569] |

### Batch time

Ⓖ [Detailed setup] ▶ [Batch] ▶ [Batch Info] ▶ [Batch time]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Batch function] ▶ [Batch information] ▶ [Batch time]

Shows the 1 batch time from Batch start.

When batch is started, this value is cleared to 0 and value is fixed when batch is stopped.

|   | Value           | Description           |
|---|-----------------|-----------------------|
| – | Numeric digits. | Default value is 0 s. |

### Batch upwards value

Ⓖ [Detailed setup] ▶ [Batch] ▶ [Batch Info] ▶ [Upward val]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Batch function] ▶ [Batch information] ▶ [Batch upwards value]

Shows the batch quantity for counting up.

When batch is started, this value is cleared to 0.

|   | Value           | Description         |
|---|-----------------|---------------------|
| – | Numeric digits. | Default value is 0. |

**Batch downwards value**

① [Detailed setup] ► [Batch] ► [Batch Info] ► [Dwnward val]

② [Device root menu] ► [Detailed setup] ► [Batch function] ► [Batch information] ► [Batch downwards value]

Shows the batch quantity for counting down.

When batch is started, this value is set to Batch quantity parameter value.

|   | Value           | Description         |
|---|-----------------|---------------------|
| – | Numeric digits. | Default value is 0. |

**Batch total quantity**

① [Detailed setup] ► [Batch] ► [Batch Info] ► [Ttl qty]

② [Device root menu] ► [Detailed setup] ► [Batch function] ► [Batch information] ► [Batch total quantity]

Shows the batch total quantity.

Resetting the batch, this value is cleared to 0.

|   | Value           | Description         |
|---|-----------------|---------------------|
| – | Numeric digits. | Default value is 0. |

**Batch counter value**

① [Detailed setup] ► [Batch] ► [Batch Info] ► [Cnt val]

② [Device root menu] ► [Detailed setup] ► [Batch function] ► [Batch information] ► [Batch counter value]

Shows the total number of batch operation.

Resetting the batch, this value is cleared to 0.

|   | Value           | Description         |
|---|-----------------|---------------------|
| – | Numeric digits. | Default value is 0. |

**Batch compensation value**

① [Detailed setup] ► [Batch] ► [Batch Info] ► [Comp val]

② [Device root menu] ► [Detailed setup] ► [Batch function] ► [Batch information] ► [Batch compensation value]

Shows the compensation value which is selected in Mode 1 – 3 of Compensation mode select.

|   | Value           | Description         |
|---|-----------------|---------------------|
| – | Numeric digits. | Default value is 0. |

**Batch mode 1 – 3  
leakage value**

Ⓐ [Detailed setup] ► [Batch] ► [Batch Info] ► [Model – 3 lkg val]

Ⓜ [Device root menu] ► [Detailed setup] ► [Batch function] ► [Batch information] ► [Batch mode 1 – 3 leakage value]

Shows the leakage value each mode.

This value is cleared when Batch is started.

|   | Value           | Description         |
|---|-----------------|---------------------|
| – | Numeric digits. | Default value is 0. |

**5.7.11 Proving**

Configures automatically some parameters related to Proving.

The following menus/settings are available:

|   | Full name            | Display name | [Modbus] name          | Page    |
|---|----------------------|--------------|------------------------|---------|
| – | Auto proving setting | [Auto prove] | [Auto proving setting] | [▶ 569] |

**Proving**

Ⓐ [Detailed setup] ► [Proving] ► [Auto prove]

Ⓜ [Device root menu] ► [Detailed setup] ► [Proving] ► [Auto proving setting]

Sets automatically parameter setting commands to use for proving. When proving, it's very important to read related process variables with fast access and disable related damping value. To easily set these parameters at one time, the following parameters are set when this parameter is set to Execute.

- Flex input register select 01 is Mass flow
- Flex input register select 02 is Mass flow unit
- Flex input register select 03 is Volume flow
- Flex input register select 04 is Volume flow unit
- \*Other flexible input registers are not changed.
- Mass flow damping: 0sec
- Density damping: 0sec
- Volume flow damping: 0sec
- Pulse/Status output 1 select: Frequency output
- Max frequency 1: 10000Hz
- Min frequency 1: 0Hz

When Restore is selected, these parameters return to the value before doing "Execute".

|   | Value                                     | Description                                                                                                           |
|---|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| – | Not execute<br>[Not exe]<br>[Not execute] | Automatic parameter setting for proving is not executed.                                                              |
| – | Execute<br>[Exe]<br>[Execute]             | Automatic parameter setting for proving is executed. After executing, this value is automatically set to Not execute. |

**5.7.12 Sensor constants**

Menu for defining sensor constants.

The following menus/settings are available:

|   | Full name | Display name | [Modbus] name | Page   |
|---|-----------|--------------|---------------|--------|
| – | Mass flow | [Mass]       | [Mass flow]   | [ 570] |
| – | Density   | [Dens]       | [Density]     | [ 572] |

**Mass flow**

Menu for defining sensor constants for mass flow measurement.

The following menus/settings are available:

|   | Full name    | Display name   | [Modbus] name  | Page   |
|---|--------------|----------------|----------------|--------|
| – | SK20         | [SK20]         | [SK20]         | [ 570] |
| – | SK20 reverse | [SK20 reverse] | [SK20 reverse] | [ 570] |
| – | SKT          | [SKT]          | [SKT]          | [ 570] |
| – | SKTK         | [SKTK]         | [SKTK]         | [ 571] |
| – | Qmax         | [Qmax]         | [Qmax]         | [ 571] |
| – | Qnom         | [Qnom]         | [Qnom]         | [ 571] |
| Ⓜ | SKT1         | –              | [SKT1]         | [ 571] |
| Ⓜ | SKT2         | –              | [SKT2]         | [ 571] |
| Ⓜ | SKT3         | –              | [SKT3]         | [ 571] |

**SK20**

Ⓜ [Detailed setup] ► [Snsr cnst] ► [Mass] ► [SK20]

Ⓜ [Device root menu] ► [Detailed setup] ► [Sensor constants] ► [Mass flow] ► [SK20]

Sets the sensor value for mass flow measurement.

|   | Value          | Description                                     |
|---|----------------|-------------------------------------------------|
| – | Numeric digits | Default value depends on model and sensor size. |

**SK20 reverse**

Ⓜ [Detailed setup] ► [Snsr cnst] ► [Mass] ► [SK20 reverse]

Ⓜ [Device root menu] ► [Detailed setup] ► [Sensor constants] ► [Mass flow] ► [SK20 reverse]

Sets the sensor value for reverse mass flow measurement.

|   | Value          | Description                                     |
|---|----------------|-------------------------------------------------|
| – | Numeric digits | Default value depends on model and sensor size. |

**SKT**

Ⓜ [Detailed setup] ► [Snsr cnst] ► [Mass] ► [SKT]

Ⓜ [Device root menu] ► [Detailed setup] ► [Sensor constants] ► [Mass flow] ► [SKT]

Sets the sensor value for a temperature coefficient.

|   | Value          | Description                                     |
|---|----------------|-------------------------------------------------|
| – | Numeric digits | Default value depends on model and sensor size. |

**SKTK**

① [Detailed setup] ► [Snsr cnst] ► [Mass] ► [SKTK]

Ⓜ [Device root menu] ► [Detailed setup] ► [Sensor constants] ► [Mass flow] ► [SKTK]

Sets the sensor value for a second-order temperature coefficient.

|   | Value          | Description                                     |
|---|----------------|-------------------------------------------------|
| – | Numeric digits | Default value depends on model and sensor size. |

**Qmax**

① [Detailed setup] ► [Snsr cnst] ► [Mass] ► [Qmax]

Ⓜ [Device root menu] ► [Detailed setup] ► [Sensor constants] ► [Mass flow] ► [Qmax]

Shows the upper sensor limit.

|   | Value          | Description                                |
|---|----------------|--------------------------------------------|
| – | Numeric digits | Default value depends on the sensor model. |

**Qnom**

① [Detailed setup] ► [Snsr cnst] ► [Mass] ► [Qnom]

Ⓜ [Device root menu] ► [Detailed setup] ► [Sensor constants] ► [Mass flow] ► [Qnom]

Shows the water flow rate at about 1 bar pressure drop.

|   | Value          | Description                                |
|---|----------------|--------------------------------------------|
| – | Numeric digits | Default value depends on the sensor model. |

**SKT1**

Ⓜ [Device root menu] ► [Detailed setup] ► [Sensor constants] ► [Mass flow] ► [SKT1]

Sets the temperature coefficient 1 of sensor constant.

|   | Value          | Description                                     |
|---|----------------|-------------------------------------------------|
| Ⓜ | Numeric digits | Default value depends on model and sensor size. |

**SKT2**

Ⓜ [Device root menu] ► [Detailed setup] ► [Sensor constants] ► [Mass flow] ► [SKT2]

Sets the temperature coefficient 2 of sensor constant.

|   | Value          | Description                                     |
|---|----------------|-------------------------------------------------|
| Ⓜ | Numeric digits | Default value depends on model and sensor size. |

**SKT3**

Ⓜ [Device root menu] ► [Detailed setup] ► [Sensor constants] ► [Mass flow] ► [SKT3]

Sets the temperature coefficient 3 of sensor constant.

|   | Value          | Description                                     |
|---|----------------|-------------------------------------------------|
| Ⓜ | Numeric digits | Default value depends on model and sensor size. |

### Density

Menu for defining sensor constants for density measurement.

The following menus/settings are available:

|   | Full name | Display name | [Modbus] name | Page    |
|---|-----------|--------------|---------------|---------|
| – | KD        | [KD]         | [KD]          | [▶ 572] |
| – | FL20      | [FL20]       | [FL20]        | [▶ 572] |
| – | FTC1      | [FTC1]       | [FTC1]        | [▶ 572] |
| – | FTCK      | [FTCK]       | [FTCK]        | [▶ 573] |
| Ⓜ | FT1       | –            | [FT1]         | [▶ 573] |
| Ⓜ | FT2       | –            | [FT2]         | [▶ 573] |
| Ⓜ | FT3       | –            | [FT3]         | [▶ 573] |

#### KD

⌚ [Detailed setup] ▶ [Snsr cnst] ▶ [Dens] ▶ [KD]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Sensor constants] ▶ [Density] ▶ [KD]

Sets the sensor value for the compensation coefficient for density.

|   | Value          | Description                                     |
|---|----------------|-------------------------------------------------|
| – | Numeric digits | Default value depends on model and sensor size. |

#### FL20

⌚ [Detailed setup] ▶ [Snsr cnst] ▶ [Dens] ▶ [FL20]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Sensor constants] ▶ [Density] ▶ [FL20]

Sets the sensor value for the resonance frequency of the measuring tube.

|   | Value          | Description                                     |
|---|----------------|-------------------------------------------------|
| – | Numeric digits | Default value depends on model and sensor size. |

#### FTC1

⌚ [Detailed setup] ▶ [Snsr cnst] ▶ [Dens] ▶ [FTC1]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Sensor constants] ▶ [Density] ▶ [FTC1]

Sets the sensor value for the linear temperature compensation coefficient for the resonance frequency of the measuring tube.

|   | Value          | Description                                     |
|---|----------------|-------------------------------------------------|
| – | Numeric digits | Default value depends on model and sensor size. |



FTCK

 [Detailed setup] ► [Snsr cnst] ► [Dens] ► [FTCK]

 [Device root menu] ► [Detailed setup] ► [Sensor constants] ► [Density] ► [FTCK]

Sets the sensor value for the quadratic temperature compensation coefficient for the resonance frequency of the measuring tube.

|   | Value          | Description                                     |
|---|----------------|-------------------------------------------------|
| – | Numeric digits | Default value depends on model and sensor size. |

FT1

 [Device root menu] ► [Detailed setup] ► [Sensor constants] ► [Density] ► [FT1]

Sets the temperature coefficient 1 of frequency.

|                                                                                   | Value          | Description                                     |
|-----------------------------------------------------------------------------------|----------------|-------------------------------------------------|
|  | Numeric digits | Default value depends on model and sensor size. |

FT2

 [Device root menu] ► [Detailed setup] ► [Sensor constants] ► [Density] ► [FT2]

Sets the temperature coefficient 2 of frequency.

|                                                                                     | Value          | Description                                     |
|-------------------------------------------------------------------------------------|----------------|-------------------------------------------------|
|  | Numeric digits | Default value depends on model and sensor size. |

FT3

 [Device root menu] ► [Detailed setup] ► [Sensor constants] ► [Density] ► [FT3]

Sets the temperature coefficient 3 of frequency.

|                                                                                     | Value          | Description                                     |
|-------------------------------------------------------------------------------------|----------------|-------------------------------------------------|
|  | Numeric digits | Default value depends on model and sensor size. |

5.7.13 Compensation

Menu for defining compensation.

The following menus/settings are available:

|                                                                                     | Full name       | Display name | [Modbus] name     | Page    |
|-------------------------------------------------------------------------------------|-----------------|--------------|-------------------|---------|
| –                                                                                   | Gas             | [Gas]        | [Gas]             | [► 574] |
|  | Reynolds number | –            | [Reynolds number] | [► 575] |

**Gas**

Menu for defining compensation for gas.

The following menus/settings are available:

|   | Full name                                | Display name         | [Modbus] name                              | Page   |
|---|------------------------------------------|----------------------|--------------------------------------------|--------|
| – | Sound velocity at reference temperature  | [Snd vel]            | [Sound velocity at reference temperature]  | [ 574] |
| – | Reference temperature for sound velocity | [Snd vel Ref Temp]   | [Reference temperature for sound velocity] | [ 574] |
| – | Sound velocity temperature coefficient   | [Snd vel Temp Coeff] | [Sound velocity temperature coefficient]   | [ 574] |

**Sound velocity at reference temperature**

Ⓐ [Detailed setup] ► [Compensation] ► [Gas] ► [Snd vel]

Ⓜ [Device root menu] ► [Detailed setup] ► [Compensation] ► [Gas] ► [Sound velocity at reference temperature]

Sets the sound velocity at reference temperature for the gas compensation.

|   | Value          | Description                                                         |
|---|----------------|---------------------------------------------------------------------|
| Ⓜ | Numeric digits | Setting range: 0 - no check.<br>Default value is 450 m/s (Methane). |

Tab. 33: Examples for sound velocity as below

| Gas      | Sound velocity at reference temperature | Reference temperature |
|----------|-----------------------------------------|-----------------------|
| Methane  | 430 m/s                                 | 0 °C                  |
| Hydrogen | 1260 m/s                                | 0 °C                  |

**Reference temperature for sound velocity**

Ⓐ [Detailed setup] ► [Compensation] ► [Gas] ► [Snd vel Ref Temp]

Ⓜ [Device root menu] ► [Detailed setup] ► [Compensation] ► [Gas] ► [Reference temperature for sound velocity]

Sets the reference temperature for sound velocity.

|   | Value          | Description               |
|---|----------------|---------------------------|
| Ⓜ | Numeric digits | Default value is 20 degC. |

See examples for reference temperature at sound velocity parameter.

**Sound velocity temperature coefficient**

Ⓐ [Detailed setup] ► [Compensation] ► [Gas] ► [Snd vel Temp Coeff]

Ⓜ [Device root menu] ► [Detailed setup] ► [Compensation] ► [Gas] ► [Sound velocity temperature coefficient]

Sets the sound velocity temperature coefficient.

|   | Value          | Description         |
|---|----------------|---------------------|
| Ⓜ | Numeric digits | Default value is 0. |



Parameter setting has direct impact onto mass flow measurement. Wrong values can lead to measurement failure.

Temperature coefficient can be calculated approximately with two measurement points with following formula:

$$\alpha = \frac{c_2 - c_1}{c_1 \times (T_2 - T_1)}$$

|          |                                              |
|----------|----------------------------------------------|
| $c_1$    | Sound velocity [m/s] at $T_1$                |
| $c_2$    | Sound velocity [m/s] at $T_2$                |
| $\alpha$ | Sound velocity temperature coefficient [1/K] |
| $T_1$    | Temperature point 1 [°C]                     |
| $T_2$    | Temperature point 2 [°C]                     |

Tab. 34: Examples for temperature coefficient

| Gas      | Sound velocity at reference temperature ( $c_1$ ) | Reference temperature ( $T_1$ ) | Sound velocity at designed temperature ( $c_2$ ) | Designed Temperature ( $T_2$ ) | Temperature coefficient ( $\alpha$ ) |
|----------|---------------------------------------------------|---------------------------------|--------------------------------------------------|--------------------------------|--------------------------------------|
| Methane  | 430 m/s                                           | 0 °C                            | 461 m/s                                          | 40 °C                          | 0.001                                |
| Hydrogen | 1260 m/s                                          | 0 °C                            | 1349 m/s                                         | 40 °C                          | 0.001                                |

### Reynolds number

Menu for defining compensation for Reynolds number. These parameters are available when set to ON at the factory.

The following menus/settings are available:

|   | Full name                           | Display name | [Modbus] name                     | Page    |
|---|-------------------------------------|--------------|-----------------------------------|---------|
| Ⓜ | Viscosity fixed value               | —            | [Viscosity fixed value]           | [▶ 575] |
| Ⓜ | Viscosity value select              | —            | [Viscosity value select]          | [▶ 576] |
| Ⓜ | Re compensation viscosity value     | —            | [Re compensation viscosity value] | [▶ 576] |
| Ⓜ | Re compensation viscosity unit      | —            | [Re compensation viscosity unit]  | [▶ 576] |
| Ⓜ | Fluid constant                      | —            | [VK0]                             | [▶ 576] |
| Ⓜ | Viscosity temperature coefficient 1 | —            | [VKT1]                            | [▶ 577] |
| Ⓜ | Viscosity temperature coefficient 2 | —            | [VKT2]                            | [▶ 577] |

### Viscosity fixed value

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Compensation] ▶ [Reynolds number] ▶ [Viscosity fixed value]

Sets the viscosity fixed value. If fixed value is selected with viscosity value select, this parameter will be used in the calculation of Reynolds number compensation.

|   | Value          | Description                                         |
|---|----------------|-----------------------------------------------------|
| Ⓜ | Numeric digits | Setting range: 0 - no check.<br>Default value is 0. |

**Viscosity value select**

Ⓜ [Device root menu] ► [Detailed setup] ► [Compensation] ► [Reynolds number] ► [Viscosity value select]

Selects the viscosity value to use for Reynolds number compensation.

|   | Value                   | Description                                                                                            |
|---|-------------------------|--------------------------------------------------------------------------------------------------------|
| Ⓜ | Fixed value             | Use viscosity fixed value for Reynolds number compensation.                                            |
| Ⓜ | Calculated value (ASTM) | Value calculated from the ASTM D341 method is used for Reynolds number compensation.<br>Default value. |
| Ⓜ | Measured value          | Use measured viscosity value for Reynolds number compensation.                                         |

**Re compensation viscosity value**

Ⓜ [Device root menu] ► [Detailed setup] ► [Compensation] ► [Reynolds number] ► [Re compensation viscosity value]

Shows the viscosity value used by Reynolds number compensation.

|   | Value          | Description                                                     |
|---|----------------|-----------------------------------------------------------------|
| Ⓜ | Numeric digits | Shows the viscosity value used by Reynolds number compensation. |

**Re compensation viscosity unit**

Ⓜ [Device root menu] ► [Detailed setup] ► [Compensation] ► [Reynolds number] ► [Re compensation viscosity unit]

Sets the re compensation viscosity unit.

|   | Value              | Description                                                                            |
|---|--------------------|----------------------------------------------------------------------------------------|
| Ⓜ | mPas               | Sets the viscosity unit for re compensation viscosity value.<br>Default value is mPas. |
| Ⓜ | Pas                |                                                                                        |
| Ⓜ | cP                 |                                                                                        |
| Ⓜ | Ns/m <sup>2</sup>  |                                                                                        |
| Ⓜ | kg/ms              |                                                                                        |
| Ⓜ | cSt                |                                                                                        |
| Ⓜ | St                 |                                                                                        |
| Ⓜ | mm <sup>2</sup> /s |                                                                                        |
| Ⓜ | cm <sup>2</sup> /s |                                                                                        |
| Ⓜ | dm <sup>2</sup> /s |                                                                                        |
| Ⓜ | m <sup>2</sup> /s  |                                                                                        |

**Fluid constant**

Ⓜ [Device root menu] ► [Detailed setup] ► [Compensation] ► [Reynolds number] ► [VK0]

Sets the fluid constant. This parameter is used in ASTM D341 calculation.

|   | Value          | Description                                           |
|---|----------------|-------------------------------------------------------|
| Ⓜ | Numeric digits | Setting range: 0 - no check.<br>Default value is 0.7. |

Default value for fluid constant complies to hydrocarbons according to ASTM D341.

When Reynolds compensation coefficients are set enabling compensation function, fluid constant, viscosity temperature coefficient 1 and 2 default value setting cover water characteristics from 2..40 °C.

**Viscosity temperature coefficient 1**

④ [Device root menu] ► [Detailed setup] ► [Compensation] ► [Reynolds number] ► [VKT1]

Sets the viscosity temperature coefficient 1. This parameter is used in ASTM D341 calculation.

|   | Value          | Description              |
|---|----------------|--------------------------|
| ④ | Numeric digits | Default value is 19.149. |

When Reynolds compensation coefficients are set enabling compensation function, fluid constant, viscosity temperature coefficient 1 and 2 default value setting cover water characteristics from 2..40 °C.

**Viscosity temperature coefficient 2**

④ [Device root menu] ► [Detailed setup] ► [Compensation] ► [Reynolds number] ► [VKT2]

Sets the viscosity temperature coefficient 2. This parameter is used in ASTM D341 calculation.

|   | Value          | Description             |
|---|----------------|-------------------------|
| ④ | Numeric digits | Default value is 8.025. |

When Reynolds compensation coefficients are set enabling compensation function, fluid constant, viscosity temperature coefficient 1 and 2 default value setting cover water characteristics from 2..40 °C.

**5.7.14 Device information**

Menu for showing transmitter information.

The following menus/settings are available:

|   | Full name                     | Display name   | [Modbus] name                | Page    |
|---|-------------------------------|----------------|------------------------------|---------|
| – | Order information             | [Order info]   | [Order information]          | [▶ 577] |
| – | Capability information        | [Cpblty info]  | [Capability information]     | [▶ 587] |
| – | Version/Number information    | [Ver/Num info] | [Version/Number information] | [▶ 588] |
| – | [Modbus]-specific information | [Modbus info]  | [MODBUS information]         | [▶ 590] |

**Order information**

Menu for showing order information.

The following menus/settings are available:

|   | Full name        | Display name  | [Modbus] name      | Page    |
|---|------------------|---------------|--------------------|---------|
| – | Tag              | [Tag]         | [Tag]              | [▶ 578] |
| – | Long tag         | [Long tag]    | [Long tag]         | [▶ 578] |
| – | MS code 1        | [MS code1]    | [MS code 1]        | [▶ 578] |
| – | MS code 2        | [MS code2]    | [MS code 2]        | [▶ 579] |
| – | MS code 3        | [MS code3]    | [MS code 3]        | [▶ 579] |
| – | Release date     | [Rls date]    | [Release date]     | [▶ 579] |
| – | Transmitter type | [Trsmtr type] | [Transmitter type] | [▶ 579] |
| – | IO type          | [IO type]     | [IO type]          | [▶ 580] |
| – | Terminal state 1 | [Term state1] | [Terminal state 1] | [▶ 580] |

|   |                                  |                 |                                    |        |
|---|----------------------------------|-----------------|------------------------------------|--------|
| – | Terminal state 2                 | [Term state2]   | [Terminal state 2]                 | [ 581] |
| – | Terminal state 3                 | [Term state3]   | [Terminal state 3]                 | [ 581] |
| – | Terminal state 4                 | [Term state4]   | [Terminal state 4]                 | [ 582] |
| – | Display installation             | [Disp install]  | [Display installation]             | [ 582] |
| – | Liquid gas select                | [Liq gas sel]   | [Liquid gas select]                | [ 582] |
| – | Concentration measurement select | [Conc sel]      | [Concentration measurement select] | [ 583] |
| – | Function option code             | [Func opt code] | [Function option code]             | [ 583] |
| – | Function option status           | [Func opt sts]  | [Function option status]           | [ 584] |
| – | Option activation key            | [Opt act key]   | [Option activation key]            | [ 585] |
| – | Extra number 1                   | [Extra1]        | [Extra number 1]                   | [ 585] |
| – | Extra number 2                   | [Extra2]        | [Extra number 2]                   | [ 585] |
| – | SI option                        | [SI opt]        | [SI option]                        | [ 586] |

**Tag**

⌚ [Detailed setup] ► [Dev info] ► [Order info] ► [Tag]

Ⓜ [Device root menu] ► [Detailed setup] ► [Device information] ► [Order information] ► [Tag]

Sets the tag number of the device.

|   | Value            | Description                                                                                                                                                                                                                      |
|---|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | ASCII characters | Maximum length is 8 characters.<br>@, A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z, [, \, ], ^, _, SP, !, ", #, \$, %, &, ', (, *, +, ,, -, ., /, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, :, ;, <, =, >, ? |

**Long tag**

⌚ [Detailed setup] ► [Dev info] ► [Order info] ► [Long tag]

Ⓜ [Device root menu] ► [Detailed setup] ► [Device information] ► [Order information] ► [Long tag]

|   | Value            | Description                      |
|---|------------------|----------------------------------|
| – | ASCII characters | Maximum length is 32 characters. |

**MS code 1**

⌚ [Detailed setup] ► [Dev info] ► [Order info] ► [MS code1]

Ⓜ [Device root menu] ► [Detailed setup] ► [Device information] ► [Order information] ► [MS code 1]

Shows the MS-Code of the product. The MS-Code is divided into 3 parts because of its length. This is the 1st part of the MS-Code.



Do not change this parameter.

|   | Value            | Description        |
|---|------------------|--------------------|
| – | ASCII characters | 32 characters max. |

**MS code 2**

① [Detailed setup] ► [Dev info] ► [Order info] ► [MS code2]

Ⓜ [Device root menu] ► [Detailed setup] ► [Device information] ► [Order information] ► [MS code 2]

Shows the MS-Code of the product. The MS-Code is divided into 3 parts because of its length. This is the 2nd part of the MS-Code.



Do not change this parameter.

|   | Value            | Description        |
|---|------------------|--------------------|
| – | ASCII characters | 32 characters max. |

**MS code 3**

① [Detailed setup] ► [Dev info] ► [Order info] ► [MS code3]

Ⓜ [Device root menu] ► [Detailed setup] ► [Device information] ► [Order information] ► [MS code 3]

Show the MS-Code of the product. The MS-Code is divided into 3 parts because of its length. This is the 3rd part of the MS-Code.



Do not change this parameter.

|   | Value            | Description        |
|---|------------------|--------------------|
| – | ASCII characters | 32 characters max. |

**Release date**

① [Detailed setup] ► [Dev info] ► [Order info] ► [Rls date]

Ⓜ [Device root menu] ► [Detailed setup] ► [Device information] ► [Order information] ► [Release date]

Shows the date when the transmitter was shipped from the factory.

|   | Value          | Description                                               |
|---|----------------|-----------------------------------------------------------|
| ① | Numeric digits | Date format depends on <i>Display format date</i> [ 543]. |
| Ⓜ | Numeric digits | Date format is MM/DD/YYYY.                                |

**Transmitter type**

① [Detailed setup] ► [Dev info] ► [Order info] ► [Trsmtr type]

Ⓜ [Device root menu] ► [Detailed setup] ► [Device information] ► [Order information] ► [Transmitter type]

Shows the transmitter type.

|   | Value                                   | Description            |
|---|-----------------------------------------|------------------------|
| – | Essential<br>[Essential]<br>[Essential] | Essential transmitter. |

|   | Value                                | Description           |
|---|--------------------------------------|-----------------------|
| – | Ultimate<br>[Ultimate]<br>[Ultimate] | Ultimate transmitter. |

## IO type

Ⓐ [Detailed setup] ► [Dev info] ► [Order info] ► [IO type]

Ⓜ [Device root menu] ► [Detailed setup] ► [Device information] ► [Order information] ► [IO type]

Shows the IO type of the transmitter.

|   | Value              | Description                                                                                                                                                                                  |
|---|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | M0<br>[M0]<br>[M0] | Terminal state 1 : None<br>Terminal state 2 : Pulse/Status output (Passive)<br>Terminal state 3 : Modbus(GND, (-)only)<br>Terminal state 4 : Modbus                                          |
| – | M2<br>[M2]<br>[M2] | Terminal state 1 : Analog input (Active)<br>Terminal state 2 : Pulse/Status output (Passive)<br>Terminal state 3 : Modbus(GND, (-)only)<br>Terminal state 4 : Modbus                         |
| – | M3<br>[M3]<br>[M3] | Terminal state 1 : Pulse/Status output (Passive)<br>Terminal state 2 : Pulse/Status output (Passive)<br>Terminal state 3 : Modbus(GND, (-)only)<br>Terminal state 4 : Modbus                 |
| – | M4<br>[M4]<br>[M4] | Terminal state 1 : Pulse/Status output (Active, No pull-up R)<br>Terminal state 2 : Pulse/Status output (Passive)<br>Terminal state 3 : Modbus(GND, (-)only)<br>Terminal state 4 : Modbus    |
| – | M5<br>[M5]<br>[M5] | Terminal state 1 : Pulse/Status output (Active, Inner pull-up R)<br>Terminal state 2 : Pulse/Status output (Passive)<br>Terminal state 3 : Modbus(GND, (-)only)<br>Terminal state 4 : Modbus |
| – | M6<br>[M6]<br>[M6] | Terminal state 1 : Analog output (Active)<br>Terminal state 2 : Pulse/Status output (Passive)<br>Terminal state 3 : Modbus(GND, (-)only)<br>Terminal state 4 : Modbus                        |
| – | M7<br>[M7]<br>[M7] | Terminal state 1 : Analog input (Passive)<br>Terminal state 2 : Pulse/Status output (Passive)<br>Terminal state 3 : Modbus(GND, (-)only)<br>Terminal state 4 : Modbus                        |

## Terminal state 1

Ⓐ [Detailed setup] ► [Dev info] ► [Order info] ► [Term state1]

Ⓜ [Device root menu] ► [Detailed setup] ► [Device information] ► [Order information] ► [Terminal state 1]

Shows the assignment of IO terminal 1.



|   | Value                                                                                                                  | Description                                     |
|---|------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| – | Analog output (Active)<br>[AO (act)]<br>[Analog output (Active)]                                                       | Analog output (Active)                          |
| – | Pulse/Status output (Passive)<br>[Pls/Sts (pas)]<br>[Pulse/Status output (Passive)]                                    | Pulse/Status output 2 (Passive)                 |
| – | Pulse/Status output (Active, No pull-up R)<br>[Pls/Sts act,no p-up]<br>[Pulse/Status output (Active, No pull-up R)]    | Pulse/Status output 2 (Active, No pull-up R)    |
| – | Pulse/Status output (Active, Inner pull-up R)<br>[Pls/Sts act,p-up]<br>[Pulse/Status output (Active, Inner pull-up R)] | Pulse/Status output 2 (Active, Inner pull-up R) |
| – | Analog input (Active)<br>[Iin (act)]<br>[Analog input (Active)]                                                        | Analog input (Active)                           |
| – | Analog input (Passive)<br>[Iin (pas)]<br>[Analog input (Passive)]                                                      | Analog input (Passive)                          |
| – | None (Not used)<br>[None]<br>[None ]                                                                                   | None                                            |

## Terminal state 2

① [Detailed setup] ► [Dev info] ► [Order info] ► [Term state2]

Ⓜ [Device root menu] ► [Detailed setup] ► [Device information] ► [Order information] ► [Terminal state 2]

Shows the assignment of IO terminal 2.

|   | Value                                                                               | Description                                                                                                                                                             |
|---|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Pulse/Status output (Passive)<br>[Pls/Sts (pas)]<br>[Pulse/Status output (Passive)] | Pulse/Status output up to a frequency of 10000 Hz or pulse sequence of up to 10000 p/s.<br>External power supply necessary.<br>Also for intrinsically safe application. |

## Terminal state 3

① [Detailed setup] ► [Dev info] ► [Order info] ► [Term state3]

Ⓜ [Device root menu] ► [Detailed setup] ► [Device information] ► [Order information] ► [Terminal state 3]

Shows the assignment of IO terminal 3. The value can be one of the following:

|   | Value                                                                       | Description                      |
|---|-----------------------------------------------------------------------------|----------------------------------|
| – | Modbus (GND,<br>(-)only)<br>[Modbus (GND) ]<br>[Modbus (GND,<br>(-) only) ] | Modbus GND (only - side is used) |

**Terminal state 4**

Ⓐ [Detailed setup] ► [Dev info] ► [Order info] ► [Term state4]

Ⓜ [Device root menu] ► [Detailed setup] ► [Device information] ► [Order information] ► [Terminal state 4]

Shows the assignment of IO terminal 4.

|   | Value  | Description          |
|---|--------|----------------------|
| – | Modbus | Modbus communication |

**Display installation**

Ⓐ [Detailed setup] ► [Dev info] ► [Order info] ► [Disp install]

Ⓜ [Device root menu] ► [Detailed setup] ► [Device information] ► [Order information] ► [Display installation]

Shows whether or not the transmitter has an LCD display.

|   | Value                                         | Description                                   |
|---|-----------------------------------------------|-----------------------------------------------|
| – | No Display<br>[No disp]<br>[No Display]       | The transmitter does not have an LCD display. |
| – | With Display<br>[With disp]<br>[With Display] | The transmitter has an LCD display.           |

**Liquid gas select**

Ⓐ [Detailed setup] ► [Dev info] ► [Order info] ► [Liq gas sel]

Ⓜ [Device root menu] ► [Detailed setup] ► [Device information] ► [Order information] ► [Liquid gas select]

Sets the fluid type.

|   | Value                          | Description                                                                                                                                                                                                                                                       |
|---|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| – | Liquid<br>[Liquid]<br>[Liquid] | Fluid to be measured is liquid.<br>Selectable units for corrected volume flow are all standard units.                                                                                                                                                             |
| – | Gas<br>[Gas]<br>[Gas]          | Fluid to be measured is gas.<br>Selectable units for corrected volume flow are all standard units and normal units.<br>Switching from gas to liquid is not possible if normal unit is used (e.g., m <sup>3</sup> /h(Normal), m <sup>3</sup> (Normal), Nml Cum/P). |

**Concentration measurement select**

① [Detailed setup] ► [Dev info] ► [Order info] ► [Conc sel]

② [Device root menu] ► [Detailed setup] ► [Device information] ► [Order information] ► [Concentration measurement select]

Shows the type of concentration measurement that is possible.

|   | Value                                                                         | Description                                      |
|---|-------------------------------------------------------------------------------|--------------------------------------------------|
| – | Inhibit<br>[Inhibit]<br>[Inhibit]                                             | Concentration measurement is not available.      |
| – | Standard<br>[Std]<br>[Standard]                                               | Standard concentration measurement is available. |
| – | Advanced<br>[Adv]<br>[Advanced]                                               | Advanced concentration measurement is available. |
| – | Net oil computing API<br>[NOC]<br>[Net oil computing API]                     | Net Oil Computing is available.                  |
| – | Net oil computing API and GVF<br>[NOC GVF]<br>[Net oil computing API and GVF] | Net Oil Computing and GVF are available.         |

**Function option code**

① [Detailed setup] ► [Dev info] ► [Order info] ► [Func opt code]

② [Device root menu] ► [Detailed setup] ► [Device information] ► [Order information] ► [Function option code]

Shows available options on the transmitter.

|   | Value                                                                          | Description                                |
|---|--------------------------------------------------------------------------------|--------------------------------------------|
| – | Tube Health Check<br>[Tube health chk]<br>[Tube Health Check]                  | Tube Health Check is available.            |
| – | Batch function<br>[Batch]<br>[Batch function ]                                 | Batch function is available.               |
| – | Analog Input Calorific value<br>[Cal via AI]<br>[Analog input Calorific value] | Analog Input Calorific value is available. |

|   | Value                                       | Description                          |
|---|---------------------------------------------|--------------------------------------|
|   | Tube leakage detection                      |                                      |
| – | [Bhvr tube lkg]<br>[Tube leakage detection] | Tube leakage detection is available. |
|   | Viscosity                                   |                                      |
| – | [Visc]<br>[Viscosity ]                      | Viscosity is available.              |

## Function option status

④ [Detailed setup] ► [Dev info] ► [Order info] ► [Func opt sts]

④ [Device root menu] ► [Detailed setup] ► [Device information] ► [Order information] ► [Function option status]

Shows the option that is available or activated on the transmitter.

|   | Value                                          | Description                                      |
|---|------------------------------------------------|--------------------------------------------------|
|   | Tube Health Check                              |                                                  |
| – | [Tube health chk]<br>[Tube Health Check]       | Tube Health Check is available.                  |
|   | Batch function                                 |                                                  |
| – | [Batch]<br>[Batch function ]                   | Batch function is available.                     |
|   | Analog Input Calorific Value                   |                                                  |
| – | [Cal via AI]<br>[Analog input calorific value] | Analog Input Calorific Value is available.       |
|   | Tube leakage detection                         |                                                  |
| – | [Bhvr tube lkg]<br>[Tube leakage detection]    | Tube leakage detection is available.             |
|   | Viscosity                                      |                                                  |
| – | [Visc]<br>[Viscosity ]                         | Viscosity is available.                          |
|   | Concentration Standard                         |                                                  |
| – | [Conc std]<br>[Concentration standard]         | Standard concentration measurement is available. |
|   | Concentration Advanced                         |                                                  |
| – | [Conc adv]<br>[Concentration advanced]         | Advanced concentration measurement is available. |

|   | Value                                                   | Description                              |
|---|---------------------------------------------------------|------------------------------------------|
|   | Net oil computing API                                   |                                          |
| – | <b>[NOC API]</b><br>[Net oil computing API]             | Net Oil Computing is available.          |
|   | Net oil computing API and GVF                           |                                          |
| – | <b>[NOC API GVF]</b><br>[Net oil computing API and GVF] | Net Oil Computing and GVF are available. |

### Option activation key

① [Detailed setup] ► [Dev info] ► [Order info] ► [Opt act key]

Ⓜ [Device root menu] ► [Detailed setup] ► [Device information] ► [Order information] ► [Option activation key]

Activates optional functions of the device.

Some transmitter functions can be activated after purchase as a feature on demand (FOD). If the correct activation key to activate a specific option is set in this parameter, the option becomes available. The necessary keys can be obtained from your sales representative. After setting the key, show the *Function option status* to make sure that the target option has been activated.

|   | Value                                                       | Description                                                                                                                                                                    |
|---|-------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   | 32 alphanumeric digits                                      |                                                                                                                                                                                |
| – | <b>[32 alphanumeric digits]</b><br>[32 alphanumeric digits] | Set the keyword in 32 digits of alphanumeric code to activate each optional target. The key is provided depending on an additional order after the product has been delivered. |

### Extra number 1

① [Detailed setup] ► [Dev info] ► [Order info] ► [Extra1]

Ⓜ [Device root menu] ► [Detailed setup] ► [Device information] ► [Order information] ► [Extra number 1]

Shows the identification number of a special specification, if the transmitter has a special or customized specification.

|   | Value            | Description   |
|---|------------------|---------------|
| – | ASCII characters | Extra number. |

### Extra number 2

① [Detailed setup] ► [Dev info] ► [Order info] ► [Extra2]

Ⓜ [Device root menu] ► [Detailed setup] ► [Device information] ► [Order information] ► [Extra number 2]

Shows the identification number of a special specification, if the transmitter has a special or customized specification.

|   | Value            | Description   |
|---|------------------|---------------|
| – | ASCII characters | Extra number. |

SI option

Ⓐ [Detailed setup] ▶ [Dev info] ▶ [Order info] ▶ [SI opt]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Device information] ▶ [Order information] ▶ [SI option]

Shows whether or not the configuration for unit display complies with Japanese measurement law.

|   | Value                 | Description                                 |
|---|-----------------------|---------------------------------------------|
| – | On<br>[on]<br>[On]    | Units comply with Japanese measurement law. |
| – | Off<br>[off]<br>[Off] | General configuration.                      |

**Capability information**

Menu for showing the physical capabilities of the sensor.

The following menus/settings are available:

|   | Full name                   | Display name      | [Modbus] name                 | Page    |
|---|-----------------------------|-------------------|-------------------------------|---------|
| – | Max permissible temperature | [Max permit temp] | [Max permissible temperature] | [▶ 587] |
| – | Max permissible pressure    | [Max permit pres] | [Max permissible pressure]    | [▶ 587] |
| – | Temperature lower limit     | [Temp lo lim]     | [Temperature lower limit]     | [▶ 587] |
| – | Temperature upper limit     | [Temp hi lim]     | [Temperature upper limit]     | [▶ 587] |

**Max permissible temperature**

① [Detailed setup] ▶ [Dev info] ▶ [Cpblty info] ▶ [Max permit temp]

② [Device root menu] ▶ [Detailed setup] ▶ [Device information] ▶ [Capability information] ▶ [Max permissible temperature]

Shows the maximum temperature as required by the PED (Pressure Equipment Directive).

|   | Value          | Description |
|---|----------------|-------------|
| – | Numeric digits | Unit is °C. |

**Max permissible pressure**

① [Detailed setup] ▶ [Dev info] ▶ [Cpblty info] ▶ [Max permit pres]

② [Device root menu] ▶ [Detailed setup] ▶ [Device information] ▶ [Capability information] ▶ [Max permissible pressure]

Shows the maximum pressure as required by the PED (Pressure Equipment Directive).

|   | Value          | Description  |
|---|----------------|--------------|
| – | Numeric digits | Unit is bar. |

**Temperature lower limit**

① [Detailed setup] ▶ [Dev info] ▶ [Cpblty info] ▶ [Temp lo lim]

② [Device root menu] ▶ [Detailed setup] ▶ [Device information] ▶ [Capability information] ▶ [Temperature lower limit]

Shows the lower limit of the temperature measurement.

|   | Value          | Description                                                       |
|---|----------------|-------------------------------------------------------------------|
| – | Numeric digits | Unit depends on the selection in <i>Temperature unit</i> [▶ 392]. |

**Temperature upper limit**

① [Detailed setup] ▶ [Dev info] ▶ [Cpblty info] ▶ [Temp hi lim]

② [Device root menu] ▶ [Detailed setup] ▶ [Device information] ▶ [Capability information] ▶ [Temperature upper limit]

Shows the upper limit of the temperature measurement.

|   | Value          | Description                                                       |
|---|----------------|-------------------------------------------------------------------|
| – | Numeric digits | Unit depends on the selection in <i>Temperature unit</i> [▶ 392]. |

**Version/Number information**

Menu for showing firmware and hardware revision information.

The following menus/settings are available:

|   | Full name                       | Display name           | [Modbus] name                     | Page    |
|---|---------------------------------|------------------------|-----------------------------------|---------|
| – | Sensor serial number            | [Snsr serial]          | [Sensor serial number]            | [▶ 588] |
| – | Complete device serial number   | [Cmplt ser num]        | [Complete device serial number]   | [▶ 588] |
| – | Transmitter spare serial number | [Trsmtr spare ser num] | [Transmitter spare serial number] | [▶ 589] |
| – | Sensor spare serial number      | [Snsr spare ser num]   | [Sensor spare serial number]      | [▶ 589] |
| – | Main software revision          | [Main soft rev]        | [Main software revision]          | [▶ 589] |
| – | Sensor software revision        | [Snsr soft rev]        | [Sensor software revision]        | [▶ 589] |
| – | Indicator software revision     | [Ind soft rev]         | [Indicator software revision]     | [▶ 589] |
| – | Hardware revision               | [Hard rev]             | [Hardware revision]               | [▶ 590] |
| – | Device ID                       | [Dev id]               | [Dev ID]                          | [▶ 590] |

**Sensor serial number**

Ⓐ [Detailed setup] ▶ [Dev info] ▶ [Ver/Num info] ▶ [Snsr serial]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Device information] ▶ [Version/Number information] ▶ [Sensor serial number]

Shows the serial number of the sensor.



Do not change this parameter.

|   | Value             | Description          |
|---|-------------------|----------------------|
| – | ASCII characters. | Sensor serial number |

**Complete device serial number**

Ⓐ [Detailed setup] ▶ [Dev info] ▶ [Ver/Num info] ▶ [Cmplt ser num]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Device information] ▶ [Version/Number information] ▶ [Complete device serial number]

Shows the original serial number of the device that is not a spare transmitter and is combined with the sensor.

|   | Value             | Description                   |
|---|-------------------|-------------------------------|
| – | ASCII characters. | Complete device serial number |



**Transmitter spare serial number**

① [Detailed setup] ► [Dev info] ► [Ver/Num info] ► [Trsmtr spare ser num]

② [Device root menu] ► [Detailed setup] ► [Device information] ► [Version/Number information] ► [Transmitter spare serial number]

Shows the serial number of the spare transmitter. When the transmitter is exchanged, this parameter should be appropriately written with the transmitter serial number that is exchanged.

|   | Value             | Description                     |
|---|-------------------|---------------------------------|
| – | ASCII characters. | Transmitter spare serial number |

**Sensor spare serial number**

① [Detailed setup] ► [Dev info] ► [Ver/Num info] ► [Snsr spare ser num]

② [Device root menu] ► [Detailed setup] ► [Device information] ► [Version/Number information] ► [Sensor spare serial number]

Shows the serial number of the spare sensor. When sensor is exchanged, this parameter should be appropriately written with the sensor serial number that is exchanged.

|   | Value             | Description                |
|---|-------------------|----------------------------|
| – | ASCII characters. | Sensor spare serial number |

**Main software revision**

① [Detailed setup] ► [Dev info] ► [Ver/Num info] ► [Main soft rev]

② [Device root menu] ► [Detailed setup] ► [Device information] ► [Version/Number information] ► [Main software revision]

Shows the software revision of the main software.

|   | Value             | Description            |
|---|-------------------|------------------------|
| – | ASCII characters. | Main software revision |

**Sensor software revision**

① [Detailed setup] ► [Dev info] ► [Ver/Num info] ► [Snsr soft rev]

② [Device root menu] ► [Detailed setup] ► [Device information] ► [Version/Number information] ► [Sensor software revision]

Shows the software revision of the firmware for the sensor.

|   | Value             | Description              |
|---|-------------------|--------------------------|
| – | ASCII characters. | Sensor software revision |

**Indicator software revision**

① [Detailed setup] ► [Dev info] ► [Ver/Num info] ► [Ind soft rev]

② [Device root menu] ► [Detailed setup] ► [Device information] ► [Version/Number information] ► [Indicator software revision]

Shows the software revision of the indicator firmware.

|   | Value             | Description                 |
|---|-------------------|-----------------------------|
| – | ASCII characters. | Indicator software revision |

## Hardware revision

Ⓛ [Detailed setup] ► [Dev info] ► [Ver/Num info] ► [Hard rev]

Ⓜ [Device root menu] ► [Detailed setup] ► [Device information] ►  
[Version/Number information] ► [Hardware revision]

Shows the revision of the hardware.

|   | Value             | Description       |
|---|-------------------|-------------------|
| – | ASCII characters. | Hardware revision |

## Device ID

Ⓛ [Detailed setup] ► [Dev info] ► [Ver/Num info] ► [Dev id]

Ⓜ [Device root menu] ► [Detailed setup] ► [Device information] ►  
[Version/Number information] ► [Dev ID]

Shows the ID number of the transmitter.

|   | Value          | Description |
|---|----------------|-------------|
| – | Numeric digits | Device ID   |

## Modbus specific information

## Communication setting

Menu for Modbus parameters.

The following overview shows the selectable menu items within the submenu *Modbus information*.

|   | Full name                            | Display name         | [Modbus] name                         | Page    |
|---|--------------------------------------|----------------------|---------------------------------------|---------|
| – | Modbus init                          | [Init]               | [Modbus init]                         | [▶ 591] |
| – | Modbus baud rate                     | [Baud rate]          | [Modbus baud rate]                    | [▶ 592] |
| – | Modbus transfer mode                 | [Trans mode]         | [Modbus transfer mode]                | [▶ 592] |
| – | Modbus parity                        | [Parity]             | [Modbus parity]                       | [▶ 593] |
| – | Modbus stop bit                      | [Stop bit]           | [Modbus stop bit]                     | [▶ 593] |
| – | Modbus response delay time           | [Resp delay]         | [Modbus response delay time]          | [▶ 594] |
| – | Modbus device address                | [Dev addr]           | [Modbus device address]               | [▶ 594] |
| – | Modbus data format (32bit-integer)   | [Format integer32]   | [Modbus data format(32bit-integer)]   | [▶ 595] |
| – | Modbus data format (Floating-point)  | [Format float]       | [Modbus data format(Floating-point)]  | [▶ 596] |
| – | Modbus data format (8,16bit-integer) | [Format integer8/16] | [Modbus data format(8,16bit-integer)] | [▶ 597] |
| – | Modbus data format (String)          | [Format string]      | [Modbus data format(String)]          | [▶ 597] |
| – | Communication setting                | –                    | [Communication setting]               |         |
| – | Flexible input register              | –                    | [Flexible input register]             | [▶ 599] |
| – | Flexible holding register            | –                    | [Flexible holding register]           | [▶ 599] |

Modbus init

⌚ [Detailed setup] ► [Dev info] ► [Modbus info] ► [Init]

Ⓜ [Device root menu] ► [Detailed setup] ► [Device information] ► [Modbus information] ► [Communication setting] ► [Modbus init]

Parameters for related Modbus communication can be reflected by executing this parameter value. Following are the relevant Modbus communication parameters. The following parameter settings can also be reflected by Function Code 8 (Sub Code 01) of the Modbus command or Power off/on the transmitter.

- Modbus baud rate
- Modbus transfer mode
- Modbus parity
- Modbus stop bit
- Modbus response delay time
- Modbus device address
- Modbus data format (32bit-integer)
- Modbus data format (Floating-point)
- Modbus data format (8,16bit-integer)
- Modbus data format (String)

|   | Value                                     | Description                                                                              |
|---|-------------------------------------------|------------------------------------------------------------------------------------------|
| – | Not execute<br>[Not exe]<br>[Not execute] | Modbus init is not executed.                                                             |
| – | Execute<br>[Exe]<br>[Execute]             | Modbus init is executed. After executing, this value is automatically set to Not execute |

## Modbus baud rate

⌚ [Detailed setup] ► [Dev info] ► [Modbus info] ► [Baud rate]

Ⓜ [Device root menu] ► [Detailed setup] ► [Device information] ► [Modbus information] ► [Communication setting] ► [Modbus baud rate]

Baud rate for Modbus communication is set. To reflect this setting, Modbus init, restart or Function Code8 (Sub Code 01) needs to be sent after setting this value.

|   | Value                                     | Description                 |
|---|-------------------------------------------|-----------------------------|
| – | 1200 bps<br>[1200bps]<br>[1200 bps]       | Default value is 19200 bps. |
| – | 2400 bps<br>[2400bps]<br>[2400 bps]       |                             |
| – | 4800 bps<br>[4800bps]<br>[4800 bps]       |                             |
| – | 9600 bps<br>[9600bps]<br>[9600 bps]       |                             |
| – | 19200 bps<br>[19200bps]<br>[19200 bps]    |                             |
| – | 38400 bps<br>[38400bps]<br>[38400 bps]    |                             |
| – | 57600 bps<br>[57600bps]<br>[57600 bps]    |                             |
| – | 115200 bps<br>[115200bps]<br>[115200 bps] |                             |

## Modbus transfer mode

⌚ [Detailed setup] ► [Dev info] ► [Modbus info] ► [Trans mode]

Ⓜ [Device root menu] ► [Detailed setup] ► [Device information] ► [Modbus information] ► [Communication setting] ► [Modbus transfer mode]

Transfer mode for Modbus communication is set. RTU or ASCII can be selected. To reflect this setting, Modbus init, restart or Function Code8 (Sub Code 01) needs to be sent after setting this value.

|   | Value   | Description           |
|---|---------|-----------------------|
|   | RTU     | Default value is RTU. |
| – | [RTU]   |                       |
|   | [RTU]   |                       |
|   | ASCII   |                       |
| – | [ASCII] |                       |
|   | [ASCII] |                       |

**Modbus parity**

① [Detailed setup] ► [Dev info] ► [Modbus info] ► [Parity]

② [Device root menu] ► [Detailed setup] ► [Device information] ► [Modbus information] ► [Communication setting] ► [Modbus parity]

The parity for Modbus communication is set. Even, Odd or None (No parity) can be selected. To reflect this setting, Modbus init, restart or Function Code8 (Sub Code 01) needs to be sent after setting this value.

|   | Value  | Description            |
|---|--------|------------------------|
|   | None   | Default value is Even. |
| – | [None] |                        |
|   | [None] |                        |
|   | Odd    |                        |
| – | [odd]  |                        |
|   | [Odd]  |                        |
|   | Even   |                        |
| – | [Even] |                        |
|   | [Even] |                        |

**Modbus stop bit**

① [Detailed setup] ► [Dev info] ► [Modbus info] ► [Stop bit]

② [Device root menu] ► [Detailed setup] ► [Device information] ► [Modbus information] ► [Communication setting] ► [Modbus stop bit]

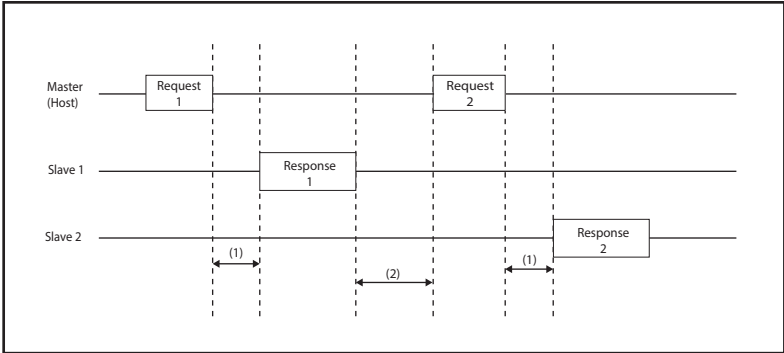
Stop bit for Modbus communication is set. 1 or 2 stop bit can be selected. To reflect this setting, Modbus init, restart or Function Code8 (Sub Code 01) needs to be sent after setting this value.

|   | Value       | Description                 |
|---|-------------|-----------------------------|
|   | 1stop bit   | Default value is 1stop bit. |
| – | [1stop bit] |                             |
|   | [1stop bit] |                             |
|   | 2stop bit   |                             |
| – | [2stop bit] |                             |
|   | [2stop bit] |                             |

Modbus response delay time

- ⌚ [Detailed setup] ▶ [Dev info] ▶ [Modbus info] ▶ [Resp delay]
- Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Device information] ▶ [Modbus information] ▶ [Communication setting] ▶ [Modbus response delay time]

The response delay time for Modbus communication is set by msec unit. To reflect this setting, Modbus init, restart or Function Code8 (Sub Code 01) needs to be sent after setting this value. The following graphic shows the Modbus communication:



Reaction time

This time is processing time to analyze received data and prepare transmission data for device. Received and Transmission processing time is not included. This time is faster than 10ms (called by fast access).

- (1) faster than 10ms (called by fast access).

This time can set the delay time. Response delay time includes Reaction time. If Response delay time is shorter than Reaction time, Reaction time equals Response delay time.

Host communication period

- (2) This time is period between completion of slave transmission and starting Master(Host) processing to receive data. If Modbus is used as Multi-drop, this timeout period in host is set for 3sec or more is recommended.

|   | Value          | Description             |
|---|----------------|-------------------------|
| – | Numeric digits | Default value is 0[ms]. |

Modbus device address

- ⌚ [Detailed setup] ▶ [Dev info] ▶ [Modbus info] ▶ [Dev addr]
- Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Device information] ▶ [Modbus information] ▶ [Communication setting] ▶ [Modbus device address]

Device address for Modbus communication is set. A value between 1 and 247 can be set from this parameters. To reflect this setting, Modbus init, restart or Function Code8 (Sub Code 01) needs to be sent after setting this value.

|   | Value          | Description         |
|---|----------------|---------------------|
| – | Numeric digits | Default value is 0. |

Modbus data format (32bit-integer)

[Detailed setup] ▶ [Dev info] ▶ [Modbus info] ▶ [Format integer32]

[Device root menu] ▶ [Detailed setup] ▶ [Device information] ▶ [Modbus information] ▶ [Communication setting] ▶ [Modbus data format (32bit-integer)]

Data format for Modbus communication is set. The following selection is available and number in selection shows “Byte”. For example, Byte3 (MSB), Byte2, Byte1, Byte0 (LSB) format is used in case of ABCD.

This setting is applied for Integer-32bit, but data in data type “Date”, “Time” and Function code 43 is not included. To reflect this setting, Modbus init, restart or Function Code8 (Sub Code 01) needs to be sent after setting this value.

|       |       |       |       |
|-------|-------|-------|-------|
| Byte3 | Byte2 | Byte1 | Byte0 |
| MSB   |       |       | LSB   |

|       |       |       |       |
|-------|-------|-------|-------|
| Byte1 | Byte0 | Byte3 | Byte2 |
| MSB   |       |       | LSB   |

|       |       |       |       |
|-------|-------|-------|-------|
| Byte2 | Byte3 | Byte0 | Byte1 |
| MSB   |       |       | LSB   |

|       |       |       |       |
|-------|-------|-------|-------|
| Byte0 | Byte1 | Byte2 | Byte3 |
| MSB   |       |       | LSB   |

| Response data | Sequence | Detail                      |
|---------------|----------|-----------------------------|
| 1             | Byte3    | Most significant byte(MSB)  |
| 2             | Byte2    |                             |
| 3             | Byte1    |                             |
| 4             | Byte0    | Least significant byte(LSB) |

|   | Value            | Description            |
|---|------------------|------------------------|
|   | ABCD             | Default value is ABCD. |
| – | [ABCD]<br>[ABCD] |                        |
|   | CDAB             |                        |
| – | [CDAB]<br>[CDAB] |                        |
|   | BADC             |                        |
| – | [BADC]<br>[BADC] |                        |
|   | DCBA             |                        |
| – | [DCBA]<br>[DCBA] |                        |

**Modbus data format (Floating-point)**

Ⓛ [Detailed setup] ► [Dev info] ► [Modbus info] ► [Format float]

Ⓜ [Device root menu] ► [Detailed setup] ► [Device information] ► [Modbus information] ► [Communication setting] ► [Modbus data format (Floating point)]

Data format for Modbus communication is set. The following selection is available and number in selection shows “Byte”. For example, Byte3 (MSB), Byte2, Byte1, Byte0 (LSB) format is used in case of ABCD.

This setting is applied for Floating-point, but data in Function code 43 is not included. To reflect this setting, Modbus init, restart or Function Code8 (Sub Code 01) needs to be sent after setting this value.

| Byte3    | Byte2    | Byte1   | Byte0   |
|----------|----------|---------|---------|
| SEEEEEEE | EEEEFFFF | FFFFFFF | FFFFFFF |

| Byte0   | Byte1   | Byte2    | Byte3    |
|---------|---------|----------|----------|
| FFFFFFF | FFFFFFF | EEEEFFFF | SEEEEEEE |

| Byte2    | Byte3    | Byte0   | Byte1   |
|----------|----------|---------|---------|
| EEEEFFFF | SEEEEEEE | FFFFFFF | FFFFFFF |

| Byte1   | Byte0   | Byte3    | Byte2   |
|---------|---------|----------|---------|
| FFFFFFF | FFFFFFF | SEEEEEEE | FFFFFFF |

S: sign, E: exponential, F: Fraction

| Response data | Sequence | Detail                      |
|---------------|----------|-----------------------------|
| 1             | Byte3    | Most significant byte(MSB)  |
| 2             | Byte2    |                             |
| 3             | Byte1    |                             |
| 4             | Byte0    | Least significant byte(LSB) |

|   | Value  | Description            |
|---|--------|------------------------|
|   | ABCD   | Default value is ABCD. |
| – | [ABCD] |                        |
|   | [ABCD] |                        |
|   | CDAB   |                        |
| – | [CDAB] | Default value is ABCD. |
|   | [CDAB] |                        |
|   | BADC   |                        |
| – | [BADC] |                        |
|   | [BADC] | Default value is ABCD. |
|   | DCBA   |                        |
| – | [DCBA] |                        |
|   | [DCBA] |                        |



Modbus data format (Data format(INT8,16))

① [Detailed setup] ▶ [Dev info] ▶ [Modbus info] ▶ [Format integer8/16]

⑧ [Device root menu] ▶ [Detailed setup] ▶ [Device information] ▶ [Modbus information] ▶ [Communication setting] ▶ [Modbus data format (INT8,16)]

Data format for Modbus communication is set. The following selection is available and number in selection shows “Byte”. For example, Byte1 (MSB), Byte0 (LSB) format is used in case of AB.

This setting is applied for Integer-8/16bit including the Enum and Bit-Enum data type, but Function code 43 is not included. To reflect this setting, Modbus init, restart or Function Code8 (Sub Code 01) needs to be sent after setting this value.

| Byte1 | Byte0 |
|-------|-------|
| MSB   | LSB   |

| Byte0 | Byte1 |
|-------|-------|
| MSB   | LSB   |

| Response data | Sequence | Detail                       |
|---------------|----------|------------------------------|
| 1             | Byte1    | Most significant byte (MSB)  |
| 2             | Byte0    | Least significant byte (LSB) |

|   | Value              | Description          |
|---|--------------------|----------------------|
| - | AB<br>[AB]<br>[AB] | Default value is AB. |
|   | BA<br>[BA]<br>[BA] |                      |

Modbus data format (String)

① [Detailed setup] ▶ [Dev info] ▶ [Modbus info] ▶ [Format string]

⑧ [Device root menu] ▶ [Detailed setup] ▶ [Device information] ▶ [Modbus information] ▶ [Communication setting] ▶ [Modbus data format (String)]

in selection shows “Byte”. For example, Byte1 (MSB), Byte0 (LSB) format is used in case of AB. In addition, Byte2, Byte3, Byte0, Byte1 format is used when BA is selected in 4 byte data.

This setting is applied for String, but Function code 43 is not included. To reflect this setting, Modbus init, restart or Function Code8 (Sub Code 01) needs to be sent after setting this value.

| Byte7 | Byte6 | Byte5 | Byte4 | Byte3 | Byte2 | Byte1 | Byte0 |
|-------|-------|-------|-------|-------|-------|-------|-------|
| MSB   |       |       |       |       |       |       | LSB   |

| Byte6 | Byte7 | Byte4 | Byte5 | Byte2 | Byte3 | Byte0 | Byte1 |
|-------|-------|-------|-------|-------|-------|-------|-------|
| MSB   |       |       |       |       |       |       | LSB   |

| Response data | Sequence | Detail                      |
|---------------|----------|-----------------------------|
| 1             | Byte7    | Most significant byte(MSB)  |
| 2             | Byte6    |                             |
| 3             | Byte5    |                             |
| 4             | Byte4    |                             |
| 5             | Byte3    |                             |
| 6             | Byte2    |                             |
| 7             | Byte1    |                             |
| 8             | Byte0    | Least significant byte(LSB) |

|   | Value | Description          |
|---|-------|----------------------|
|   | AB    | Default value is AB. |
| – | [AB]  |                      |
|   | [AB]  |                      |
|   | BA    |                      |
| – | [BA]  |                      |
|   | [BA]  |                      |

**Flexible input register**

Menu for Modbus communication flexible parameters.

The following overview shows the selectable menu items within the submenu *Flexible input register*

|   | Full name                              | Display name | [Modbus] name                            | Page    |
|---|----------------------------------------|--------------|------------------------------------------|---------|
| – | Flexible input register select 01 – 20 | –            | [Flexible input register select 01 – 20] | [▶ 599] |

**Flexible input register select 01 – 20**

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Device information] ▶ [Modbus information] ▶ [Flexible input register] ▶ [Flexible input register select 01 – 20]

Fixed register format parameters and flexible register parameters are supported. Can set favorite parameters on the flexible register areas and read these parameters collectively from master which Modbus is supported.

|   | Value          | Description                        |
|---|----------------|------------------------------------|
| – | Numeric digits | Address for each parameter is set. |

**Flexible holding register**

Menu for Modbus communication flexible parameters.

The following menus/settings are available:

|   | Full name                                | Display name | [Modbus] name                              | Page    |
|---|------------------------------------------|--------------|--------------------------------------------|---------|
| – | Flexible holding register select 01 – 20 | –            | [Flexible holding register select 01 – 20] | [▶ 599] |

**Flexible holding register select 01 – 20**

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Device information] ▶ [Modbus information] ▶ [Flexible holding register] ▶ [Flexible holding register select 01 – 20]

Fixed register format parameters and flexible register parameters are supported. Can set favorite parameters on the flexible register areas and write these parameters collectively from master which Modbus is supported.

Write access faster than 10ms is supported until 5 parameters in a row.

|   | Value          | Description                        |
|---|----------------|------------------------------------|
| – | Numeric digits | Address for each parameter is set. |

**5.7.15 Write protect**

There are two types of write protection: one is set by hardware switches (located in two separate places, see instruction manual) and the other one is set by software parameters. Parameters can only be set if both types of write protection (hardware and software) are switched off.

The following menus/settings are available:

|   | Full name           | Display name   | [Modbus] name        | Page    |
|---|---------------------|----------------|----------------------|---------|
| – | Write protect       | [Protect]      | [Write protect]      | [▶ 600] |
| – | New password        | [New pwd]      | [New password]       | [▶ 600] |
| – | Enable write 10 min | [Enable 10min] | [Enable write 10min] | [▶ 600] |
| – | Software seal       | [Soft seal]    | [Software seal]      | [▶ 600] |

## Write protect

Ⓐ [Detailed setup] ► [Protect] ► [Protect]

Ⓜ [Device root menu] ► [Detailed setup] ► [Write protect] ► [Write protect]

Sets the write protection status.

|   | Value                 | Description                                                                  |
|---|-----------------------|------------------------------------------------------------------------------|
| – | Yes<br>[Yes]<br>[Yes] | Write protection is enabled, the parameters of the device cannot be changed. |
| – | No<br>[No]<br>[No]    | Write protection is disabled, the parameters of the device can be changed.   |

## New password

Ⓐ [Detailed setup] ► [Protect] ► [New pwd]

Ⓜ [Device root menu] ► [Detailed setup] ► [Write protect] ► [New password]

Enables or disables the write protection function and allows for setting a new password to cancel write protection.

|   | Value               | Description                                       |
|---|---------------------|---------------------------------------------------|
| – | Alphanumeric digits | Sets new password.<br>Maximum length is 8 digits. |
| – | 8 blank spaces      | Disables write protection.                        |

## Enable write 10 min

Ⓐ [Detailed setup] ► [Protect] ► [Enable 10min]

Ⓜ [Device root menu] ► [Detailed setup] ► [Write protect] ► [Enable 10min]

Cancels the write protection temporarily for 10 minutes by entering the password set previously. Parameters can be changed during that time.

|   | Value               | Description                                                |
|---|---------------------|------------------------------------------------------------|
| – | Alphanumeric digits | Password as previously set.<br>Maximum length is 8 digits. |

## Software seal

Ⓐ [Detailed setup] ► [Protect] ► [Soft seal]

Ⓜ [Device root menu] ► [Detailed setup] ► [Write protect] ► [Software seal]

Shows what kind of password is set.

|   | Value                       | Description                                                            |
|---|-----------------------------|------------------------------------------------------------------------|
| – | Break<br>[Break]<br>[Break] | Protect is canceled by the wild-card password, that is 8 blank spaces. |

|   | Value                    | Description                                                              |
|---|--------------------------|--------------------------------------------------------------------------|
| – | Keep<br>[Keep]<br>[Keep] | Setting reverts to Keep if the protection is canceled by a new password. |

### 5.7.16 Others

Menu for other parameters.

The following menus/settings are available:

|   | Full name                    | Display name  | [Modbus] name                  | Page    |
|---|------------------------------|---------------|--------------------------------|---------|
| – | Signal gain                  | [Signal gain] | [Signal gain]                  | [▶ 601] |
| – | Memo 1                       | [Memo1]       | [Memo 1]                       | [▶ 601] |
| – | Memo 2                       | [Memo2]       | [Memo 2]                       | [▶ 602] |
| – | Memo 3                       | [Memo3]       | [Memo 3]                       | [▶ 602] |
| – | Configuration change counter | [Cfg cnt]     | [Configuration change counter] | [▶ 602] |

#### Signal gain

⌚ [Detailed setup] ▶ [Others] ▶ [Signal gain]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Others] ▶ [Signal gain]

Sets the signal gain of the sensor signal. It can be selected and set according to the following values.

Ask Yokogawa for advice before changing this parameter.

|   | Value                        | Description                            |
|---|------------------------------|----------------------------------------|
| – | Gain1<br>[Gain1]<br>[Gain 1] | Tubes oscillation amplitude 100%.      |
| – | Gain2<br>[Gain2]<br>[Gain 2] | Tubes oscillation amplitude about 60%. |
| – | Gain3<br>[Gain3]<br>[Gain 3] | Tubes oscillation amplitude about 30%. |
| – | Gain4<br>[Gain4]<br>[Gain 4] | Tubes oscillation amplitude about 15%. |

#### Memo 1

⌚ [Detailed setup] ▶ [Others] ▶ [Memo1]

Ⓜ [Device root menu] ▶ [Detailed setup] ▶ [Others] ▶ [Memo 1]

Sets a general purpose memo.

|   | Value            | Description                            |
|---|------------------|----------------------------------------|
| – | ASCII characters | Maximum length is 16 ASCII characters. |

Memo 2

[Detailed setup] ► [Others] ► [Memo2]

[Device root menu] ► [Detailed setup] ► [Others] ► [Memo 2]

Sets a general purpose memo.

|   | Value            | Description                            |
|---|------------------|----------------------------------------|
| – | ASCII characters | Maximum length is 16 ASCII characters. |

Memo 3

[Detailed setup] ► [Others] ► [Memo3]

[Device root menu] ► [Detailed setup] ► [Others] ► [Memo 3]

Sets a general purpose memo.

|   | Value            | Description                            |
|---|------------------|----------------------------------------|
| – | ASCII characters | Maximum length is 16 ASCII characters. |

Configuration  
change counter

[Detailed setup] ► [Others] ► [Cfg cnt]

[Device root menu] ► [Detailed setup] ► [Others] ► [Configuration  
change counter]

Shows the change counter for configuration relevant parameters.

|   | Value    | Description     |
|---|----------|-----------------|
| – | Quantity | Numeric digits. |

## 5.8 microSD

Menu for microSD card parameters.

The following menus/settings are available:

|   | Full name         | Display name | [Modbus] name | Page    |
|---|-------------------|--------------|---------------|---------|
| ⌚ | microSD contents  | [Contents]   | —             | [▶ 603] |
| ⌚ | microSD unmount   | [Unmount]    | —             | [▶ 603] |
| ⌚ | microSD format    | [Format]     | —             | [▶ 603] |
| ⌚ | microSD property  | [Property]   | —             | [▶ 604] |
| ⌚ | microSD file name | [File name]  | —             | [▶ 603] |

### microSD contents

⌚ [microSD] ▶ [Contents]

Shows the names of the files in the "YOKOGAWA" folder on the microSD card.

|   | Value            | Description             |
|---|------------------|-------------------------|
| — | ASCII characters | The file name is shown. |

### microSD unmount

⌚ [microSD] ▶ [Unmount]

Sets unmounting of the microSD card.

|   | Value                | Description                          |
|---|----------------------|--------------------------------------|
| — | Cancel<br>[Cancel]   | microSD unmounting will be canceled. |
| — | Execute<br>[Execute] | microSD unmounting will be executed. |

### microSD format

⌚ [microSD] ▶ [Format]

Sets the formatting of the microSD card.

|   | Value                | Description                          |
|---|----------------------|--------------------------------------|
| — | Cancel<br>[Cancel]   | microSD formatting will be canceled. |
| — | Execute<br>[Execute] | microSD formatting will be executed. |

### microSD file name

⌚ [microSD] ▶ [File name]

Shows the file name of each extension.

|   | Value             | Description          |
|---|-------------------|----------------------|
| — | *.EVT<br>[* .EVT] | Event file name      |
| — | *.TRD<br>[* .TRD] | Logging file name    |
| — | *.PAR<br>[* .PAR] | Backup file name     |
| — | *.MON<br>[* .MON] | Monitoring file name |

### 5.8.1 microSD property

Menu for microSD card properties.

The following menus/settings are available:

|   | Full name               | Display name      | [Modbus] name | Page    |
|---|-------------------------|-------------------|---------------|---------|
| ① | microSD total space     | [Total space]     | —             | [▶ 604] |
| ① | microSD available space | [Available space] | —             | [▶ 604] |
| ① | microSD file system     | [File system]     | —             | [▶ 604] |

#### microSD total space

① [microSD] ▶ [Property] ▶ [Total space]

Shows the total space of the microSD card.

|   | Value          | Description                       |
|---|----------------|-----------------------------------|
| — | Numeric digits | Total space on microSD card (GB). |

#### microSD available space

① [microSD] ▶ [Property] ▶ [Available space]

Shows the available space on the microSD card.

|   | Value          | Description                           |
|---|----------------|---------------------------------------|
| — | Numeric digits | Available space on microSD card (GB). |

#### microSD file system

① [microSD] ▶ [Property] ▶ [File system]

Shows the file system of the microSD card.

|   | Value                | Description                  |
|---|----------------------|------------------------------|
| — | Unknown<br>[Unknown] | File system type is unknown. |
| — | FAT12<br>[FAT12]     | File system type is FAT12.   |
| — | FAT16<br>[FAT16]     | File system type is FAT16.   |
| — | FAT32<br>[FAT32]     | File system type is FAT32.   |
| — | exFAT<br>[exFAT]     | File system type is exFAT.   |



## 6 Troubleshooting

If the cause of a fault is unknown, the Yokogawa service should be contacted. See contact details on the back page of this manual.

For additional information about NE107 classification, see *Possible events and related settings and behavior* [▶ 64]

### System alarms

| Alarm no. | Cause                                                                                           | Remedy                                                                            |
|-----------|-------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| 101       | Frequency failure. Sensor (resonance/drive) frequency abnormality.                              | a) Check connection to sensor.                                                    |
| 102       | Signal failure. Phase difference abnormal.                                                      | a) Reduce flow.<br>b) Check connection to sensor.                                 |
| 103       | Pick off 1 short partly. Sensor 1 signal line short.                                            | a) Check connection to sensor.                                                    |
| 104       | Pick off 1 or driver circuit failure. Sensor 1 or drive current circuit abnormal.               | a) Check connection to sensor.                                                    |
| 105       | Pick off 2 short partly. Sensor 2 error.                                                        | a) Check connection to sensor.                                                    |
| 106       | Pick off 2 signal failure. Sensor 2 signal line short.                                          | a) Check connection to sensor.                                                    |
| 107       | Temperature range violation. Measured temperature error.                                        | a) Adjust temperature.<br>b) Check connection to sensor.                          |
| 108       | Temperature sensor failure.                                                                     | a) Adjust temperature.<br>b) Check connection to sensor.                          |
| 121       | Main board CPU failure.                                                                         | a) Contact Yokogawa service. See contact details on the back page of this manual. |
| 122       | Main board EEPROM failure. Non-volatile memory failure.                                         | a) Contact Yokogawa service. See contact details on the back page of this manual. |
| 123       | Parameter restore incomplete. Data restore failure.                                             | a) Retry parameter restore.                                                       |
| 124       | Sensor board hardware failure.                                                                  | a) Contact Yokogawa service. See contact details on the back page of this manual. |
| 125       | Sensor board and mainboard mismatch.                                                            | a) Contact Yokogawa service. See contact details on the back page of this manual. |
| 126       | Sensor communication error. Poor communication between sensor board and main board.             | a) Contact Yokogawa service. See contact details on the back page of this manual. |
| 127       | Option board hardware failure.                                                                  | a) Contact Yokogawa service. See contact details on the back page of this manual. |
| 128       | Option board EEPROM failure. Option board non-volatile memory failure.                          | a) Contact Yokogawa service. See contact details on the back page of this manual. |
| 129       | Option Board mismatch. Mismatch of board settings and factory settings or option board failure. | a) Return settings to factory settings.                                           |
| 130       | Indicator board hardware failure.                                                               | a) Contact Yokogawa service. See contact details on the back page of this manual. |
| 131       | Indicator board EEPROM failure. Indicator non-volatile memory failure.                          | a) Contact Yokogawa service. See contact details on the back page of this manual. |

| Alarm no. | Cause                                                                             | Remedy                                                                            |
|-----------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| 132       | LCD driver failure. Display circuit failure.                                      | a) Contact Yokogawa service. See contact details on the back page of this manual. |
| 133       | Indicator board and mainboard mismatch.                                           | a) Contact Yokogawa service. See contact details on the back page of this manual. |
| 134       | Indicator communication error. Poor communication between display and main board. | a) Check connection of display.                                                   |
| 135       | microSD card failure.                                                             | a) Change microSD card [▶ 19].                                                    |

### Process alarms

| Alarm no. | Cause                                                                          | Remedy                                                                                                                                                         |
|-----------|--------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 201       | Slug detection. Multiphase flow detection.                                     | a) Reduce gas bubbles in process.                                                                                                                              |
| 202       | Empty pipe detection.                                                          | a) Fill pipe.                                                                                                                                                  |
| 203       | Corrosion detection.                                                           | a) Replace sensor.                                                                                                                                             |
| 204       | Autozero assessment multiphase. Zero adjustment and multiphase flow detection. | a) Stop multiphase flow.<br>b) Fill pipe.<br>c) Reduce gas bubbles in process.<br>d) Perform zero adjustment again [▶ 150]                                     |
| 205       | Autozero assessment flow.                                                      | a) Check valve.<br>b) Check flow.<br>c) Check vibration.<br>d) Check density.<br>e) Check electrical connections.<br>f) Perform zero adjustment again [▶ 150]  |
| 206       | Autozero assessment temperature. Zero adjustment and unstable flow.            | a) Stabilize process temperature.<br>b) Perform zero adjustment again [▶ 150].                                                                                 |
| 207       | Batch time exceeded                                                            | a) Check the Batch process such as flow rate or valve.<br>b) Change the Max batch time 1 – 5 to appropriate batch time if no batch process problem was found.  |
| 208       | Batch overrun/underrun                                                         | a) Check and Change the Batch compensation quantity.<br>b) Change the Min batch time 1 – 5 or Max batch quantity if batch compensation quantity is no problem. |
| 209       | Max flow while batching                                                        | a) Check and Change the flow rate.<br>b) Change the Max flow time 1 – 5 to appropriate threshold if appropriate flow rate.                                     |
| 210       | Oil density calculation                                                        | a) Check temperature or pressure value.                                                                                                                        |
| 211       | Water density calculation failure                                              | a) Check temperature or salinity value.                                                                                                                        |
| 212       | NOC calculation failure                                                        | a) Check Oil density or water density.                                                                                                                         |
| 221       | Analog input failure. Analog current input has exceeded measurement level.     | a) Check analog current input cable connection.<br>b) Check connected device.<br>c) Change alarm level [▶ 336].                                                |

| Alarm no. | Cause                                                                                                 | Remedy                                                                                           |
|-----------|-------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| 222       | Mass flow HH/LL alarm. Mass flow has exceeded hi-hi or low-low limit.                                 | a) Check process.<br>b) Change HH/LL alarm setting <a href="#">▶ 160</a> ].                      |
| 223       | Density HH/LL alarm. Density has exceeded hi-hi or low-low limit.                                     | a) Check process.<br>b) Change HH/LL alarm setting <a href="#">▶ 161</a> ].                      |
| 224       | Temperature HH/LL alarm. Temperature has exceeded hi-hi or low-low limit.                             | a) Check process.<br>b) Change HH/LL alarm setting <a href="#">▶ 163</a> ].                      |
| 225       | Pressure HH/LL alarm. Pressure has exceeded hi-hi or low-low limit.                                   | a) Check process.<br>b) Change HH/LL alarm setting <a href="#">▶ 166</a> ].                      |
| 226       | Volume flow HH/LL alarm. Volume flow has exceeded hi-hi or low-low limit.                             | a) Check process.<br>b) Change HH/LL alarm setting <a href="#">▶ 165</a> ].                      |
| 227       | Corrected volume flow HH/LL alarm. Corrected volume flow has exceeded hi-hi or low-low limit.         | a) Check process.<br>b) Change HH/LL alarm setting <a href="#">▶ 171</a> ].                      |
| 228       | Concentration HH/LL alarm. Concentration has exceeded hi-hi or low-low limit.                         | a) Check process.<br>b) Change HH/LL alarm setting <a href="#">▶ 173</a> ].                      |
| 229       | Net mass flow 1 HH/LL alarm. Net mass flow 1 has exceeded hi-hi or low-low limit.                     | a) Check process.<br>b) Change HH/LL alarm setting <a href="#">▶ 175</a> ].                      |
| 230       | Net mass flow 2 HH/LL alarm. Net mass flow 2 has exceeded hi-hi or low-low limit.                     | a) Check process.<br>b) Change HH/LL alarm setting <a href="#">▶ 175</a> ].                      |
| 231       | Net volume flow 1 HH/LL alarm. Net volume flow 1 has exceeded hi-hi or low-low limit.                 | a) Check process.<br>b) Change HH/LL alarm setting <a href="#">▶ 177</a> ].                      |
| 232       | Net volume flow 2 HH/LL alarm. Net volume flow 2 has exceeded hi-hi or low-low limit.                 | a) Check process.<br>b) Change HH/LL alarm setting <a href="#">▶ 177</a> ].                      |
| 233       | Net corrected volume flow HH/LL alarm. Net corrected volume flow has exceeded hi-hi or low-low limit. | a) Check process.<br>b) Change HH/LL alarm setting <a href="#">▶ 178</a> ].                      |
| 234       | Relative density HH/LL alarm. Relative density has exceeded hi-hi or low-low limit.                   | a) Check process.<br>b) Change HH/LL alarm setting <a href="#">▶ 169</a> ].                      |
| 235       | Reference density HH/LL alarm. Reference density has exceeded hi-hi or low-low limit.                 | a) Check process.<br>b) Change HH/LL alarm setting <a href="#">▶ 168</a> ].                      |
| 236       | Viscosity HH/LL alarm. Viscosity has exceeded hi-hi or low-low limit.                                 | a) Check process.<br>b) Change HH/LL alarm setting <a href="#">▶ 181</a> ].                      |
| 241       | Totalizer 1 threshold value exceeded.                                                                 | a) Change totalizer 1 threshold.<br>b) Check or reset totalizer 1 value <a href="#">▶ 156</a> ]. |
| 242       | Totalizer 2 threshold value exceeded.                                                                 | a) Change totalizer 2 threshold.<br>b) Check or reset totalizer 2 value <a href="#">▶ 156</a> ]. |
| 243       | Totalizer 3 threshold value exceeded.                                                                 | a) Change totalizer 3 threshold.<br>b) Check or reset totalizer 3 value <a href="#">▶ 156</a> ]. |
| 244       | Totalizer 4 threshold value exceeded.                                                                 | a) Change totalizer 4 threshold.<br>b) Check or reset totalizer 4 value <a href="#">▶ 156</a> ]. |
| 245       | Totalizer 5 threshold value exceeded.                                                                 | a) Change totalizer 5 threshold.<br>b) Check or reset totalizer 5 value <a href="#">▶ 156</a> ]. |

| Alarm no. | Cause                                 | Remedy                                                                                            |
|-----------|---------------------------------------|---------------------------------------------------------------------------------------------------|
| 246       | Totalizer 6 threshold value exceeded. | a) Change totalizer 6 threshold.<br>b) Check or reset totalizer 6 value <a href="#">[▶ 156]</a> . |

### Setting alarms

| Alarm no. | Cause                                         | Remedy                                                                                                                                                                                                                                                                                                                                                                 |
|-----------|-----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 301       | Mass flow configuration error.                | a) Change mass flow parameter setting <a href="#">[▶ 381]</a> .<br>b) Check parameter setting of the following parameters: Mass flow LRV, Mass flow URV, Mass flow bi-directional mode, Mass flow low cut, Alarm hysteresis, Mass flow low alarm, Mass flow high alarm, Mass flow low low alarm, Mass flow high high alarm, Mass flow units, SI option.                |
| 302       | Density configuration error.                  | a) Change density parameter setting <a href="#">[▶ 387]</a> .<br>b) Check parameter setting of the following parameters: Density LRV, Density URV, Density low cut, Alarm hysteresis, Density low alarm, Density high alarm, Density low low alarm, Density high high alarm, Liquid gas select, Density value select, Density units, SI option.                        |
| 303       | Temperature configuration error.              | a) Change temperature parameter setting <a href="#">[▶ 392]</a> .<br>b) Check parameter setting of the following parameters: Temperature LRV, Temperature URV, Temperature upper limit, Temperature lower limit, Alarm hysteresis, Temperature low alarm, Temperature high alarm, Temperature low low alarm, Temperature high high alarm, Temperature unit, SI option. |
| 304       | Analog input temperature configuration error. | a) Change analog input temperature parameter setting <a href="#">[▶ 394]</a> .<br>b) Check parameter setting of the following parameters: Analog input temperature LRV, Analog input temperature URV, Analog input temperature unit, SI option.                                                                                                                        |
| 305       | Pressure configuration error.                 | a) Change pressure parameter setting <a href="#">[▶ 402]</a> .<br>b) Check parameter setting of the following parameters: Pressure LRV, Pressure URV, Alarm hysteresis, Pressure low alarm, Pressure high alarm, Pressure low low alarm, Pressure high high alarm, Pressure units, SI option.                                                                          |
| 306       | Analog input pressure configuration error.    | a) Change analog input pressure parameter setting <a href="#">[▶ 405]</a> .<br>b) Check parameter setting of the following parameters: Analog input pressure LRV, Analog input pressure URV, Analog input pressure units, SI option.                                                                                                                                   |

| Alarm no. | Cause                                             | Remedy                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------|---------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 307       | Volume flow configuration error.                  | a) Change volume flow parameter setting [▶ 397].<br>b) Check parameter setting of the following parameters: Volume flow LRV, Volume flow URV, Volume flow bi-directional mode, Alarm hysteresis, Volume flow low alarm, Volume flow high alarm, Volume flow low low alarm, Volume flow high high alarm Volume flow units, SI option.                                                                                                                    |
| 308       | Reference density configuration error.            | a) Change reference density parameter setting [▶ 408].<br>b) Check parameter setting of the following parameters: Reference density LRV, Reference density URV, Reference density low cut, Liquid gas select, Reference density value selection, Temperature coefficient A, Temperature coefficient B, Alarm hysteresis, Reference density low alarm, Reference density high alarm, Reference density low low alarm, Reference density high high alarm. |
| 309       | Relative density configuration error.             | a) Change relative density parameter setting [▶ 412].<br>b) Check parameter setting of the following parameters: Relative density LRV, Relative density URV, Alarm hysteresis, Relative density low alarm, Relative density high alarm, Relative density low low alarm, Relative density high high alarm, Relative density indication/equation select, Relative density reference select, Reference density value selection, Reference temperature.     |
| 310       | Corrected volume flow configuration error.        | a) Change corrected volume flow parameter setting [▶ 416].<br>b) Check parameter setting of the following parameters: Corrected volume flow LRV, Corrected volume flow URV, Corrected volume flow bi-directional mode, Alarm hysteresis, Corrected volume flow low alarm, Corrected volume flow high alarm, Corrected volume flow low low alarm, Corrected volume flow high high alarm, Corrected volume flow units, SI option.                         |
| 311       | Calorific value configuration error.              | a) Change calorific value parameter setting [▶ 421].<br>b) Check parameter setting of the following parameters: Calorific unit, SI option.                                                                                                                                                                                                                                                                                                              |
| 312       | Analog input calorific value configuration error. | a) Change analog input calorific value parameter setting [▶ 422].<br>b) Check parameter setting of the following parameters: Analog input calorific LRV, Analog input calorific URV, Analog input calorific unit, SI option.                                                                                                                                                                                                                            |

| Alarm no. | Cause                                  | Remedy                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 313       | Concentration configuration error.     | <ul style="list-style-type: none"> <li>a) Change concentration parameter setting [▶ 424].</li> <li>b) Check parameter setting of the following parameters: Concentration measurement LRV set 1 – 4, Concentration measurement URV set 1 – 4, Alarm hysteresis, Concentration measurement low alarm set 1 – 4, Concentration measurement high alarm set 1 – 4, Concentration measurement low low alarm set 1 – 4, Concentration measurement high high alarm set 1 – 4, Concentration measurement unit set 1 – 4.</li> </ul> |
| 314       | Net mass flow 1 configuration error.   | <ul style="list-style-type: none"> <li>a) Change net mass flow 1 parameter setting [▶ 450].</li> <li>b) Check parameter setting of the following parameters: Net mass flow 1 LRV, Net mass flow 1 URV, Net mass flow 1 bi-directional mode, Net mass flow 1 low cut Alarm hysteresis, Net mass flow 1 low alarm, Net mass flow 1 high alarm, Net mass flow 1 low low alarm, Net mass flow 1 high high alarm Net mass flow 1 units, SI option.</li> </ul>                                                                   |
| 315       | Net mass flow 2 configuration error.   | <ul style="list-style-type: none"> <li>a) Change net mass flow 2 parameter setting [▶ 450].</li> <li>b) Check parameter setting of the following parameters: Net mass flow 1 LRV, Net mass flow 1 URV, Net mass flow 1 bi-directional mode, Net mass flow 1 low cut Alarm hysteresis, Net mass flow 1 low alarm, Net mass flow 1 high alarm, Net mass flow 1 low low alarm, Net mass flow 1 high high alarm Net mass flow 1 units, SI option.</li> </ul>                                                                   |
| 316       | Net volume flow 1 configuration error. | <ul style="list-style-type: none"> <li>a) Change net volume flow 1 parameter setting [▶ 455].</li> <li>b) Check parameter setting of the following parameters: Net volume flow 1 LRV, Net volume flow 1 URV, Net volume flow 1 bi-directional mode, Alarm hysteresis, Net volume flow 1 low alarm, Net volume flow 1 high alarm, Net volume flow 1 low low alarm, Net volume flow 1 high high alarm Net volume flow 1 units, SI option.</li> </ul>                                                                         |
| 317       | Net volume flow 2 configuration error. | <ul style="list-style-type: none"> <li>a) Change net volume flow 2 parameter setting [▶ 455].</li> <li>b) Check parameter setting of the following parameters: Net volume flow 2 LRV, Net volume flow 2 URV, Net volume flow 2 bi-directional mode, Alarm hysteresis, Net volume flow 2 low alarm, Net volume flow 2 high alarm, Net volume flow 2 low low alarm, Net volume flow 2 high high alarm Net volume flow 2 units, SI option.</li> </ul>                                                                         |



| Alarm no. | Cause                                          | Remedy                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 318       | Net corrected volume flow configuration error. | a) Change net corrected volume flow parameter setting [▶ 461].<br>b) Check parameter setting of the following parameters: Net corrected volume flow LRV, Net corrected volume flow URV, Net corrected volume flow bi-directional mode, Alarm hysteresis, Net corrected volume flow low alarm, Net corrected volume flow high alarm, Net corrected volume flow low low alarm, Net corrected volume flow high high alarm, Net corrected volume flow units, SI option. |
| 319       | Velocity configuration error.                  | a) Change velocity parameter setting [▶ 424].<br>b) Check parameter setting of the following parameters: Velocity unit, SI option.                                                                                                                                                                                                                                                                                                                                  |
| 320       | Viscosity configuration error.                 | a) Change viscosity parameter setting [▶ 466].<br>b) Check parameter setting of the following parameters: Viscosity LRV, Viscosity URV, Alarm hysteresis, Viscosity low alarm, Viscosity high alarm, Viscosity low low alarm, Viscosity high high alarm, Viscosity units, SI option.                                                                                                                                                                                |
| 322       | Analog output configuration error.             | a) Change analog output parameter setting [▶ 470].<br>b) Check parameter setting of the following parameters: Analog out select, Analog out low limit, Analog out high limit, NAMUR NE 43 option, Analog out alarm out.                                                                                                                                                                                                                                             |
| 323       | Pulse output 1 configuration error.            | a) Change pulse output 1 parameter setting [▶ 476].<br>b) Check parameter setting of the following parameters: Pulse out 1 select, Pulse out 1 unit select, SI option, Pulse out 1 flow direction, URV/LRV parameters which are assigned for Pulse out 1 select, Pulse out 1 width.                                                                                                                                                                                 |
| 324       | Frequency output 1 configuration error.        | a) Change Frequency output 1 parameter setting [▶ 484].<br>b) Check parameter setting of the following parameters: Frequency out 1 select, Option function code, Max frequency 1, Min frequency 1.                                                                                                                                                                                                                                                                  |
| 325       | Status output 1 configuration error.           | a) Change status output 1 parameter setting [▶ 488].<br>b) Check parameter setting of the following parameters: Option function code, Status out 1 function.                                                                                                                                                                                                                                                                                                        |

| Alarm no. | Cause                                           | Remedy                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 326       | Pulse output 2 configuration error.             | <ul style="list-style-type: none"> <li>a) Change pulse output 2 parameter setting [▶ 476].</li> <li>b) Check parameter setting of the following parameters: Pulse out 2 select, Pulse out 2 unit select, SI option, Pulse/Status output 2 active pulse mode, IO type, Pulse out 2 flow direction, URV/LRV parameters which are assigned for Pulse out 2 select, Pulse out 2 width, Pulse out 2 active mode.</li> </ul> |
| 327       | Frequency output 2 configuration error.         | <ul style="list-style-type: none"> <li>a) Change Frequency output 2 parameter setting [▶ 484].</li> <li>b) Check parameter setting of the following parameters: Frequency out 2 select, Option function code, Max frequency 2, Min frequency 2.</li> </ul>                                                                                                                                                             |
| 328       | Status output 2 configuration error.            | <ul style="list-style-type: none"> <li>a) Change status output 2 parameter setting [▶ 475].</li> <li>b) Check parameter setting of the following parameters: Option function code, Status out 2 function.</li> </ul>                                                                                                                                                                                                   |
| 329       | Pulse/Status output 2 mode configuration error. | <ul style="list-style-type: none"> <li>a) Change pulse/status output 2 mode parameter setting [▶ 475].</li> <li>b) Check parameter setting of the following parameters: Pulse status out 2 active pulse mode, Pulse Status out 2 output mode, IO type.</li> </ul>                                                                                                                                                      |
| 330       | Double pulse configuration error.               | <ul style="list-style-type: none"> <li>a) Change double pulse output parameter setting [▶ 491].</li> <li>b) Check parameter setting of the following parameters: Frequency out 1 select, Option function code, Max frequency 1, Min frequency 1.</li> </ul>                                                                                                                                                            |
| 333       | Analog input configuration error.               | <ul style="list-style-type: none"> <li>a) Change analog input parameter setting [▶ 500].</li> <li>b) Check parameter setting of the following parameters: Analog input function, Option function code.</li> </ul>                                                                                                                                                                                                      |
| 335       | Totalizer 1 configuration error.                | <ul style="list-style-type: none"> <li>a) Change totalizer 1 parameter setting [▶ 503].</li> <li>b) Check parameter setting of the following parameters: Total 1 channel, Total 1 unit, SI option.</li> </ul>                                                                                                                                                                                                          |
| 336       | Totalizer 2 configuration error.                | <ul style="list-style-type: none"> <li>a) Change totalizer 2 parameter setting [▶ 503].</li> <li>b) Check parameter setting of the following parameters: Total 2 channel, Total 2 unit, SI option.</li> </ul>                                                                                                                                                                                                          |
| 337       | Totalizer 3 configuration error.                | <ul style="list-style-type: none"> <li>a) Change totalizer 3 parameter setting [▶ 503].</li> <li>b) Check parameter setting of the following parameters: Total 3 channel, Total 3 unit, SI option.</li> </ul>                                                                                                                                                                                                          |



| Alarm no. | Cause                            | Remedy                                                                                                                                                                                                                                                                                                                   |
|-----------|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 338       | Totalizer 4 configuration error. | a) Change totalizer 4 parameter setting <a href="#">[ 503]</a> .<br>b) Check parameter setting of the following parameters: Total 4 channel, Total 4 unit, SI option.                                                                                                                                                    |
| 339       | Totalizer 5 configuration error. | a) Change totalizer 5 parameter setting <a href="#">[ 503]</a> .<br>b) Check parameter setting of the following parameters: Total 5 channel, Total 5 unit, SI option.                                                                                                                                                    |
| 340       | Totalizer 6 configuration error. | a) Change totalizer 6 parameter setting <a href="#">[ 503]</a> .<br>b) Check parameter setting of the following parameters: Total 6 channel, Total 6 unit, SI option.                                                                                                                                                    |
| 341       | Batch configuration error        | a) Check the Status output/input settings.<br>b) Check the Batch 1 – 5 variable select and the unit.<br>c) Check the Batch type select 1 – 5, IO type and Batch status output 1 – 3.<br>d) Check the Primary/Secondary valve open/close and Batch quantity.<br>e) Check the leakage, quantity and time related to Batch. |
| 342       | Data logging not started         | a) Insert microSD card.                                                                                                                                                                                                                                                                                                  |
| 343       | Option function mismatch         | a) Change option setting.                                                                                                                                                                                                                                                                                                |

## Warnings

| Alarm no. | Cause                                    | Remedy                                                                                                                                                                                                     |
|-----------|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 702       | Analog output fixed.                     | a) Check test mode <a href="#">[ 146]</a> .<br>b) Check Analog output selection <a href="#">[ 471]</a> .<br>c) Check simulation <a href="#">[ 183]</a> .<br>d) Check alarm status <a href="#">[ 471]</a> . |
| 703       | Density fixed.                           | a) Set density parameter to measured value <a href="#">[ 390]</a> .                                                                                                                                        |
| 704       | Temperature fixed.                       | a) Set temperature parameter to measured value <a href="#">[ 394]</a> .                                                                                                                                    |
| 705       | Pressure fixed.                          | a) Set pressure parameter to measured value.                                                                                                                                                               |
| 706       | Reference density fixed.                 | a) Set reference density parameter to measured value <a href="#">[ 410]</a> .                                                                                                                              |
| 707       | Calorific value fixed                    | a) Set calorific value parameter to measured value.                                                                                                                                                        |
| 708       | Process variable simulation in progress. | a) Check simulation <a href="#">[ 183]</a> .                                                                                                                                                               |
| 709       | Analog output simulation in progress.    | a) Check simulation <a href="#">[ 183]</a> .                                                                                                                                                               |
| 710       | Pulse output simulation in progress.     | a) Check simulation <a href="#">[ 183]</a> .                                                                                                                                                               |
| 711       | Status output simulation in progress.    | a) Check simulation <a href="#">[ 183]</a> .                                                                                                                                                               |

| Alarm no. | Cause                                                                                       | Remedy                                                                                                                           |
|-----------|---------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| 715       | Process variable trimming.                                                                  | a) Check gain/offset of the corresponding process variable [▶ 380].                                                              |
| 717       | Analog output saturated.                                                                    | a) Check setting and process value output to analog output [▶ 470].                                                              |
| 718       | Pulse output 1 saturated.                                                                   | a) Check setting and process value output to pulse output 1 [▶ 476].                                                             |
| 719       | Pulse output 2 saturated.                                                                   | a) Check setting and process value output to pulse output 2 [▶ 476].                                                             |
| 720       | Double pulse output saturated.                                                              | a) Check setting and process value output to double pulse output [▶ 491].                                                        |
| 721       | Autozero running. Zero adjustment in progress.                                              | a) Wait until zero adjustment has completed.                                                                                     |
| 722       | Tube health check diagnostics execution error.                                              | a) Check diagnostic setting and operating procedure [▶ 241].<br>b) Retry diagnosis.                                              |
| 723       | Date and time not set.                                                                      | a) Set date and time [▶ 547].                                                                                                    |
| 724       | Display over warning. The number of digits that can be displayed has been exceeded.         | a) Check display format parameter [▶ 514].                                                                                       |
| 725       | microSD card size warning. Remaining space on memory card has exceeded the threshold value. | a) Free up microSD card memory [▶ 19].                                                                                           |
| 726       | microSD card mismatch. Unexpected microSD card type is in use.                              | a) Change microSD card [▶ 19].                                                                                                   |
| 728       | microSD card removal procedure error.                                                       | a) Remove microSD card properly [▶ 19].                                                                                          |
| 729       | Parameter backup incomplete.                                                                | a) Retry parameter backup [▶ 265].<br>b) Change microSD card [▶ 19].                                                             |
| 730       | Parameter restore in progress.                                                              | a) Wait until parameter restore has completed.                                                                                   |
| 732       | Batch progress indication                                                                   | a) Confirm whether Batching is finished or not. Change the Progress Indication 1 – 5 value to appropriate threshold if continue. |
| 733       | Viscosity not calculated                                                                    | a) Check the delta pressure value which is received from external device via Analog input.<br>b) Check process.                  |
| 734       | Viscosity not reliable                                                                      | a) Check the delta pressure value which is received from external device via Analog input.<br>b) Check process.                  |
| 735       | Autozero warning.                                                                           | a) Check the environment and retry Autozero.                                                                                     |
| 901       | Device configuration locked.                                                                |                                                                                                                                  |
| 902       | Device configuration not locked.                                                            |                                                                                                                                  |
| 903       | Parameter backup running.                                                                   |                                                                                                                                  |
| 904       | Data logging running.                                                                       |                                                                                                                                  |
| 905       | Tube Health Check running.                                                                  |                                                                                                                                  |
| 906       | Batch running                                                                               |                                                                                                                                  |
| 907       | Batch hold                                                                                  |                                                                                                                                  |
| 909       | Maintenance in progress.                                                                    |                                                                                                                                  |

## 7 Appendix

### 7.1 Firmware change log

| Hardware Revision | Main Software Revision | Sensor Software Revision | Indicator Software Revision | Changes                                                                                  |
|-------------------|------------------------|--------------------------|-----------------------------|------------------------------------------------------------------------------------------|
| S1.01             | R1.01.01               | R1.01.03                 | R1.01.01                    | Initial release                                                                          |
| S1.01             | R1.01.01               | R1.01.04                 | R1.01.01                    | Improvement of start-up behavior                                                         |
| S1.01             | R2.01.01               | R1.01.04                 | R2.01.01                    | Addition of Batch/Viscosity/Compensation, etc.<br>Improvement of some existing functions |
| S2.01             | R2.01.01               | R1.01.04                 | R2.01.01                    | Change of an electronic part                                                             |
| S2.01             | R2.01.02               | R1.01.04                 | R2.01.01                    | Improvement of some existing functions                                                   |

### 7.2 Modbus parameter list (input register)

| Register Type  | Read FC | Write FC | PDU adrs | Parameter Name (for communication) | Access Type | Data Type | R/W Attr | Enumerator (for communication) | Units              |
|----------------|---------|----------|----------|------------------------------------|-------------|-----------|----------|--------------------------------|--------------------|
| Input Register | 0x04    | -        | 0        | Mass flow                          | Float       | Value     | R        |                                | [Mass flow unit]   |
| Input Register | 0x04    | -        | 2        | Volume flow                        | Float       | Value     | R        |                                | [Volume flow unit] |
| Input Register | 0x04    | -        | 4        | Density                            | Float       | Value     | R        |                                | [Density unit]     |
| Input Register | 0x04    | -        | 6        | Temperature                        | Float       | Value     | R        |                                | [Temperature unit] |
| Input Register | 0x04    | -        | 8        | Totalizer 1                        | Float       | Value     | R        |                                | [Total 1 unit]     |
| Input Register | 0x04    | -        | 10       | Totalizer 2                        | Float       | Value     | R        |                                | [Total 2 unit]     |
| Input Register | 0x04    | -        | 12       | Totalizer 3                        | Float       | Value     | R        |                                | [Total 3 unit]     |
| Input Register | 0x04    | -        | 14       | Totalizer 4                        | Float       | Value     | R        |                                | [Total 4 unit]     |
| Input Register | 0x04    | -        | 16       | Totalizer 5                        | Float       | Value     | R        |                                | [Total 5 unit]     |
| Input Register | 0x04    | -        | 18       | Totalizer 6                        | Float       | Value     | R        |                                | [Total 6 unit]     |
| Input Register | 0x04    | -        | 20       | Reference density                  | Float       | Value     | R        |                                | [Density unit]     |
| Input Register | 0x04    | -        | 22       | Relative density                   | Float       | Value     | R        |                                |                    |

|                            |      |   |    |                           |           |       |         |                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                |
|----------------------------|------|---|----|---------------------------|-----------|-------|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input Register             | 0x04 | - | 24 | Net mass flow 2           | Float     | Value | R       |                                                                                                                                                                                                                                                                    | [Net mass flow 2 unit]                                                                                                                                                                                                                                         |
| Input Register             | 0x04 | - | 26 | Net volume flow 1         | Float     | Value | R       |                                                                                                                                                                                                                                                                    | [Net volume flow 1 unit]                                                                                                                                                                                                                                       |
| Input Register             | 0x04 | - | 28 | Net volume flow 2         | Float     | Value | R       |                                                                                                                                                                                                                                                                    | [Net volume flow 2 unit]                                                                                                                                                                                                                                       |
| Input Register             | 0x04 | - | 30 | Net corrected volume flow | Float     | Value | R       |                                                                                                                                                                                                                                                                    | [Net corrected volume flow unit]                                                                                                                                                                                                                               |
| Input Register             | 0x04 | - | 32 | Concentration             | Float     | Value | R       |                                                                                                                                                                                                                                                                    | When Selected concentration set is 0:Set1<br>[Concentration measurement unit set 1]<br>When 1:Set2<br>[Concentration measurement unit set 2]<br>When 2:Set3<br>[Concentration measurement unit set 3]<br>When 3:Set4<br>[Concentration measurement unit set 4] |
| Input Register             | 0x04 | - | 34 | Net mass flow 1           | Float     | Value | R       |                                                                                                                                                                                                                                                                    | [Net mass flow 1 unit]                                                                                                                                                                                                                                         |
| Input Register             | 0x04 | - | 36 | Pressure                  | Float     | Value | R       |                                                                                                                                                                                                                                                                    | [Pressure unit]                                                                                                                                                                                                                                                |
| Input Register             | 0x04 | - | 38 | Velocity                  | Float     | Value | R       |                                                                                                                                                                                                                                                                    | [Velocity unit]                                                                                                                                                                                                                                                |
| Input Register             | 0x04 | - | 40 | Corrected volume flow     | Float     | Value | R       |                                                                                                                                                                                                                                                                    | [Corrected volume flow unit]                                                                                                                                                                                                                                   |
| Input Register             | 0x04 | - | 42 | Calorific value           | Float     | Value | R       |                                                                                                                                                                                                                                                                    | [Calorific unit]                                                                                                                                                                                                                                               |
| Input Register (duplicate) | 0x04 | - | 45 | Mass flow unit            | Unsigned8 | Enum  | R/W(C1) | 0:g/s<br>1:g/min<br>2:g/h<br>3:kg/s<br>4:kg/min<br>5:kg/h<br>6:kg/d<br>7:t/min<br>8:t/h<br>9:t/d<br>15:ton(US)/min<br>16:ton(US)/h<br>17:ton(US)/d<br>18:ton(UK)/min<br>19:ton(UK)/h<br>20:ton(UK)/d<br>10:lb/s<br>11:lb/min<br>12:lb/h<br>13:lb/d<br>14:User unit |                                                                                                                                                                                                                                                                |

|                            |      |   |    |                  |            |      |         |                                                                                                                                                                                                                                                                                                                                                      |  |
|----------------------------|------|---|----|------------------|------------|------|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Input Register (duplicate) | 0x04 | - | 46 | Volume flow unit | Un-signed8 | Enum | R/W(C1) | 0:cm3/s<br>1:cm3/min<br>2:cm3/h<br>3:L/s<br>4:L/min<br>5:L/h<br>6:L/d<br>7:m3/s<br>8:m3/min<br>9:m3/h<br>10:m3/d<br>11:gal/s<br>12:gal/min<br>13:gal/h<br>14:gal/d<br>15:ft3/s<br>16:ft3/min<br>17:ft3/h<br>18:ft3/d<br>19:bbl/s<br>20:bbl/min<br>21:bbl/h<br>22:bbl/d<br>23:Impgal/s<br>24:Impgal/min<br>25:Impgal/h<br>26:Impgal/d<br>27:User unit |  |
| Input Register (duplicate) | 0x04 | - | 47 | Density unit     | Un-signed8 | Enum | R/W(C1) | 0:g/mL<br>1:kg/L<br>8:kg/cm3<br>9:kg/dm3<br>2:kg/m3<br>3:lb/gal<br>4:lb/ft3<br>5:g/cm3<br>10:g/cc<br>6:g/L<br>7:User unit                                                                                                                                                                                                                            |  |
| Input Register (duplicate) | 0x04 | - | 48 | Temperature unit | Un-signed8 | Enum | R/W(C1) | 0:degC<br>1:degF<br>2:degR<br>3:K                                                                                                                                                                                                                                                                                                                    |  |
| Input Register (duplicate) | 0x04 | - | 49 | Velocity unit    | Un-signed8 | Enum | R/W(C2) | 0:m/s<br>1:ft/s                                                                                                                                                                                                                                                                                                                                      |  |

|                            |      |   |    |              |            |      |                                                                                                                                                                                                                                                            |  |
|----------------------------|------|---|----|--------------|------------|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Input Register (duplicate) | 0x04 | - | 50 | Total 1 unit | Un-signed8 | Enum | R/W(C1)<br>0:g<br>1:kg<br>2:t<br>22:ton(US)<br>23:ton(UK)<br>3:lb<br>4:cm3<br>5:L<br>6:m3<br>7:gal<br>8:kgal<br>9:ft3<br>10:bbl<br>11:Impgal<br>12:kImpgal<br>13:NL<br>14:Nm3<br>15:SL<br>16:Sft3<br>17:MSft3<br>18:Sm3<br>19:MJ<br>20:Btu<br>21:User unit |  |
| Input Register (duplicate) | 0x04 | - | 51 | Total 2 unit | Un-signed8 | Enum | R/W(C1)<br>0:g<br>1:kg<br>2:t<br>22:ton(US)<br>23:ton(UK)<br>3:lb<br>4:cm3<br>5:L<br>6:m3<br>7:gal<br>8:kgal<br>9:ft3<br>10:bbl<br>11:Impgal<br>12:kImpgal<br>13:NL<br>14:Nm3<br>15:SL<br>16:Sft3<br>17:MSft3<br>18:Sm3<br>19:MJ<br>20:Btu<br>21:User unit |  |

|                            |      |   |    |              |            |      |                 |                                                                                                                                                                                                                                                 |  |
|----------------------------|------|---|----|--------------|------------|------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Input Register (duplicate) | 0x04 | - | 52 | Total 3 unit | Un-signed8 | Enum | R/<br>W(C<br>1) | 0:g<br>1:kg<br>2:t<br>22:ton(US)<br>23:ton(UK)<br>3:lb<br>4:cm3<br>5:L<br>6:m3<br>7:gal<br>8:kgal<br>9:ft3<br>10:bbl<br>11:Impgal<br>12:kImpgal<br>13:NL<br>14:Nm3<br>15:SL<br>16:Sft3<br>17:MSft3<br>18:Sm3<br>19:MJ<br>20:Btu<br>21:User unit |  |
| Input Register (duplicate) | 0x04 | - | 53 | Total 4 unit | Un-signed8 | Enum | R/<br>W(C<br>2) | 0:g<br>1:kg<br>2:t<br>22:ton(US)<br>23:ton(UK)<br>3:lb<br>4:cm3<br>5:L<br>6:m3<br>7:gal<br>8:kgal<br>9:ft3<br>10:bbl<br>11:Impgal<br>12:kImpgal<br>13:NL<br>14:Nm3<br>15:SL<br>16:Sft3<br>17:MSft3<br>18:Sm3<br>19:MJ<br>20:Btu<br>21:User unit |  |

|                            |      |   |    |                                      |            |      |         |                                                                                                                                                                                                                                                                    |  |
|----------------------------|------|---|----|--------------------------------------|------------|------|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Input Register (duplicate) | 0x04 | - | 54 | Total 5 unit                         | Un-signed8 | Enum | R/W(C2) | 0:g<br>1:kg<br>2:t<br>22:ton(US)<br>23:ton(UK)<br>3:lb<br>4:cm3<br>5:L<br>6:m3<br>7:gal<br>8:kgal<br>9:ft3<br>10:bbl<br>11:Impgal<br>12:kImpgal<br>13:NL<br>14:Nm3<br>15:SL<br>16:Sft3<br>17:MSft3<br>18:Sm3<br>19:MJ<br>20:Btu<br>21:User unit                    |  |
| Input Register (duplicate) | 0x04 | - | 55 | Concentration measurement unit set 1 | Un-signed8 | Enum | R/W(C2) | 0:degBrix<br>1:Wt% sol<br>2:Vol% sol<br>3:Wt %<br>4:Vol %<br>5:Wt % User unit<br>6:Vol % User unit                                                                                                                                                                 |  |
| Input Register (duplicate) | 0x04 | - | 56 | Net mass flow 1 unit                 | Un-signed8 | Enum | R/W(C2) | 0:g/s<br>1:g/min<br>2:g/h<br>3:kg/s<br>4:kg/min<br>5:kg/h<br>6:kg/d<br>7:t/min<br>8:t/h<br>9:t/d<br>15:ton(US)/min<br>16:ton(US)/h<br>17:ton(US)/d<br>18:ton(UK)/min<br>19:ton(UK)/h<br>20:ton(UK)/d<br>10:lb/s<br>11:lb/min<br>12:lb/h<br>13:lb/d<br>14:User unit |  |



|                            |      |   |    |                        |           |      |                                                                                                                                                                                                                                                                                                                                                                     |  |
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| Input Register (duplicate) | 0x04 | - | 57 | Net mass flow 2 unit   | Unsigned8 | Enum | R/<br>W(C2)<br>0:g/s<br>1:g/min<br>2:g/h<br>3:kg/s<br>4:kg/min<br>5:kg/h<br>6:kg/d<br>7:t/min<br>8:t/h<br>9:t/d<br>15:ton(US)/min<br>16:ton(US)/h<br>17:ton(US)/d<br>18:ton(UK)/min<br>19:ton(UK)/h<br>20:ton(UK)/d<br>10:lb/s<br>11:lb/min<br>12:lb/h<br>13:lb/d<br>14:User unit                                                                                   |  |
| Input Register (duplicate) | 0x04 | - | 58 | Net volume flow 1 unit | Unsigned8 | Enum | R/<br>W(C2)<br>0:cm3/s<br>1:cm3/min<br>2:cm3/h<br>3:L/s<br>4:L/min<br>5:L/h<br>6:L/d<br>7:m3/s<br>8:m3/min<br>9:m3/h<br>10:m3/d<br>11:gal/s<br>12:gal/min<br>13:gal/h<br>14:gal/d<br>15:ft3/s<br>16:ft3/min<br>17:ft3/h<br>18:ft3/d<br>19:bbl/s<br>20:bbl/min<br>21:bbl/h<br>22:bbl/d<br>23:Impgal/s<br>24:Impgal/min<br>25:Impgal/h<br>26:Impgal/d<br>27:User unit |  |

|                            |      |   |    |                                |            |      |         |                                                                                                                                                                                                                                                                                                                                                      |
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| Input Register (duplicate) | 0x04 | - | 59 | Net volume flow 2 unit         | Un-signed8 | Enum | R/W(C2) | 0:cm3/s<br>1:cm3/min<br>2:cm3/h<br>3:L/s<br>4:L/min<br>5:L/h<br>6:L/d<br>7:m3/s<br>8:m3/min<br>9:m3/h<br>10:m3/d<br>11:gal/s<br>12:gal/min<br>13:gal/h<br>14:gal/d<br>15:ft3/s<br>16:ft3/min<br>17:ft3/h<br>18:ft3/d<br>19:bb1/s<br>20:bb1/min<br>21:bb1/h<br>22:bb1/d<br>23:Impgal/s<br>24:Impgal/min<br>25:Impgal/h<br>26:Impgal/d<br>27:User unit |
| Input Register (duplicate) | 0x04 | - | 60 | Net corrected volume flow unit | Un-signed8 | Enum | R/W(C2) | 8:SL/s<br>9:SL/min<br>10:SL/h<br>11:SL/d<br>12:Sft3/s<br>13:Sft3/min<br>14:Sft3/h<br>15:Sft3/d<br>16:Sm3/s<br>17:Sm3/min<br>18:Sm3/h<br>19:Sm3/d<br>21:MMSft3/h<br>22:MMSft3/d<br>20:User unit                                                                                                                                                       |

|                            |      |   |    |                                      |            |      |                 |                                                                                                                                                                                                                                                                                        |  |
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| Input Register (duplicate) | 0x04 | - | 61 | Total 6 unit                         | Un-signed8 | Enum | R/<br>W(C<br>2) | 0:g<br>1:kg<br>2:t<br>22:ton(US)<br>23:ton(UK)<br>3:lb<br>4:cm3<br>5:L<br>6:m3<br>7:gal<br>8:kgal<br>9:ft3<br>10:bbl<br>11:Impgal<br>12:kImpgal<br>13:NL<br>14:Nm3<br>15:SL<br>16:Sft3<br>17:MSft3<br>18:Sm3<br>19:MJ<br>20:Btu<br>21:User unit                                        |  |
| Input Register (duplicate) | 0x04 | - | 62 | Concentration measurement unit set 2 | Un-signed8 | Enum | R/<br>W(C<br>2) | 0:degBrix<br>1:Wt% sol<br>2:Vol% sol<br>3:Wt %<br>4:Vol %<br>5:Wt % User unit<br>6:Vol % User unit                                                                                                                                                                                     |  |
| Input Register (duplicate) | 0x04 | - | 63 | Concentration measurement unit set 3 | Un-signed8 | Enum | R/<br>W(C<br>2) | 0:degBrix<br>1:Wt% sol<br>2:Vol% sol<br>3:Wt %<br>4:Vol %<br>5:Wt % User unit<br>6:Vol % User unit                                                                                                                                                                                     |  |
| Input Register (duplicate) | 0x04 | - | 64 | Corrected volume flow unit           | Un-signed8 | Enum | R/<br>W(C<br>2) | 0:NL/s<br>1:NL/min<br>2:NL/h<br>3:NL/d<br>4:Nm3/s<br>5:Nm3/min<br>6:Nm3/h<br>7:Nm3/d<br>8:SL/s<br>9:SL/min<br>10:SL/h<br>11:SL/d<br>12:Sft3/s<br>13:Sft3/min<br>14:Sft3/h<br>15:Sft3/d<br>16:Sm3/s<br>17:Sm3/min<br>18:Sm3/h<br>19:Sm3/d<br>21:MMSft3/h<br>22:MMSft3/d<br>20:User unit |  |

|                            |      |   |    |                                      |            |      |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
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| Input Register (duplicate) | 0x04 | - | 65 | Concentration measurement unit set 4 | Un-signed8 | Enum | R/W(C 2) | 0:degBrix<br>1:Wt% sol<br>2:Vol% sol<br>3:Wt %<br>4:Vol %<br>5:Wt % User unit<br>6:Vol % User unit                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
| Input Register (duplicate) | 0x04 | - | 66 | Pulse output 1 unit select           | Un-signed8 | Enum | R/W(C 1) | 0:g/P<br>1:kg/P<br>2:t/P<br>40:ton(US)/P<br>41:ton(UK)/P<br>3:lb/P<br>4:P/g<br>5:P/kg<br>6:P/t<br>42:P/ton(US)<br>43:P/ton(UK)<br>7:P/lb<br>8:cm3/P<br>9:L/P<br>10:m3/P<br>11:gal/P<br>12:kgal/P<br>13:ft3/P<br>14:bbl/P<br>15:Impgal/P<br>16:klmpgal/P<br>17:P/cm3<br>18:P/L<br>19:P/m3<br>20:P/gal<br>21:P/kgal<br>22:P/ft3<br>23:P/bbl<br>24:P/Impgal<br>25:P/klmpgal<br>26:NL/P<br>27:Nm3/P<br>28:SL/P<br>29:Sft3/P<br>30:Sm3/P<br>31:P/NL<br>32:P/Nm3<br>33:P/SL<br>34:P/Sft3<br>35:P/Sm3<br>36:MJ/P<br>37:Btu/P<br>38:P/MJ<br>39:P/Btu |  |

|                            |      |   |    |                            |            |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |
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| Input Register (duplicate) | 0x04 | - | 67 | Pulse output 2 unit select | Un-signed8 | Enum | R/<br>W(C1)<br>0:g/P<br>1:kg/P<br>2:t/P<br>40:ton(US)/P<br>41:ton(UK)/P<br>3:lb/P<br>4:P/g<br>5:P/kg<br>6:P/t<br>42:P/ton(US)<br>43:P/ton(UK)<br>7:P/lb<br>8:cm3/P<br>9:L/P<br>10:m3/P<br>11:gal/P<br>12:kgal/P<br>13:ft3/P<br>14:bbl/P<br>15:Impgal/P<br>16:kImpgal/P<br>17:P/cm3<br>18:P/L<br>19:P/m3<br>20:P/gal<br>21:P/kgal<br>22:P/ft3<br>23:P/bbl<br>24:P/Impgal<br>25:P/kImpgal<br>26:NL/P<br>27:Nm3/P<br>28:SL/P<br>29:Sft3/P<br>30:Sm3/P<br>31:P/NL<br>32:P/Nm3<br>33:P/SL<br>34:P/Sft3<br>35:P/Sm3<br>36:MJ/P<br>37:Btu/P<br>38:P/MJ<br>39:P/Btu |  |
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| Input Register (duplicate) | 0x04 | - | 68 | Pressure unit                 | Un-signed8 | Enum | R/W(C2) | 0:inH2O(68degF)<br>1:inHg<br>2:ftH2O(68degF)<br>3:mmH2O(68degF)<br>4:mmHg<br>5:psi<br>6:bar<br>7:mbar<br>8:g/cm2<br>9:kg/cm2<br>10:Pa<br>11:kPa<br>12:torr<br>13:atm<br>14:MPa<br>15:inH2O<br>16:mmH2O<br>17:ftH2O<br>18:hPa |  |
| Input Register (duplicate) | 0x04 | - | 69 | Calorific unit                | Un-signed8 | Enum | R/W(C2) | 0:MJ/kg<br>1:Btu/lb<br>2:MJ/m3<br>3:Btu/gal<br>4:MJ/Nm3<br>5:Btu/Sft3                                                                                                                                                        |  |
| Input Register (duplicate) | 0x04 | - | 70 | Analog input temperature unit | Un-signed8 | Enum | R/W(C2) | 0:degC<br>1:degF<br>2:degR<br>3:K                                                                                                                                                                                            |  |
| Input Register (duplicate) | 0x04 | - | 71 | Analog input pressure unit    | Un-signed8 | Enum | R/W(C2) | 0:inH2O(68degF)<br>1:inHg<br>2:ftH2O(68degF)<br>3:mmH2O(68degF)<br>4:mmHg<br>5:psi<br>6:bar<br>7:mbar<br>8:g/cm2<br>9:kg/cm2<br>10:Pa<br>11:kPa<br>12:torr<br>13:atm<br>14:MPa<br>15:inH2O<br>16:mmH2O<br>17:ftH2O<br>18:hPa |  |
| Input Register (duplicate) | 0x04 | - | 72 | Analog input calorific unit   | Un-signed8 | Enum | R/W(C2) | 0:MJ/kg<br>1:Btu/lb<br>2:MJ/m3<br>3:Btu/gal<br>4:MJ/Nm3<br>5:Btu/Sft3                                                                                                                                                        |  |

|                                |      |   |     |                        |             |       |         |                                                                                                                                                                  |      |
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| Input Register (duplicate)     | 0x04 | - | 73  | Viscosity unit         | Un-signed8  | Enum  | R/W(C2) | 0:mPas<br>1:Pas<br>2:cP<br>3:Ns/m2<br>4:kg/ms<br>5:User unit (dynamic)<br>8:cSt<br>6:St<br>9:mm2/s<br>7:cm2/s<br>10:dm2/s<br>11:m2/s<br>12:User unit (kinematic) |      |
| Input Register                 | 0x04 | - | 81  | Drive gain             | Float       | Value | R       |                                                                                                                                                                  | A/V  |
| Input Register                 | 0x04 | - | 83  | Resonance frequency    | Float       | Value | R       |                                                                                                                                                                  | Hz   |
| Input Register                 | 0x04 | - | 85  | Phase difference       | Float       | Value | R       |                                                                                                                                                                  | mrad |
| Input Register                 | 0x04 | - | 87  | Drive current          | Float       | Value | R       |                                                                                                                                                                  | mApp |
| Input Register                 | 0x04 | - | 90  | Analog input percent   | Float       | Value | R       |                                                                                                                                                                  | %    |
| Input Register                 | 0x04 | - | 92  | Analog input current   | Float       | Value | R       |                                                                                                                                                                  | mA   |
| Input Register                 | 0x04 | - | 94  | Analog output percent  | Float       | Value | R       |                                                                                                                                                                  | %    |
| Input Register                 | 0x04 | - | 96  | Analog output current  | Float       | Value | R       |                                                                                                                                                                  | mA   |
| Input Register (Flexible area) | 0x04 | - | 98  | Flex input register 01 | Un-signed16 | Value | R       |                                                                                                                                                                  |      |
| Input Register (Flexible area) | 0x04 | - | 99  | Flex input register 02 | Un-signed16 | Value | R       |                                                                                                                                                                  |      |
| Input Register (Flexible area) | 0x04 | - | 100 | Flex input register 03 | Un-signed16 | Value | R       |                                                                                                                                                                  |      |
| Input Register (Flexible area) | 0x04 | - | 101 | Flex input register 04 | Un-signed16 | Value | R       |                                                                                                                                                                  |      |
| Input Register (Flexible area) | 0x04 | - | 102 | Flex input register 05 | Un-signed16 | Value | R       |                                                                                                                                                                  |      |
| Input Register (Flexible area) | 0x04 | - | 103 | Flex input register 06 | Un-signed16 | Value | R       |                                                                                                                                                                  |      |

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| Input Register (Flexible area) | 0x04 | - | 104 | Flex input register 07 | Un-signed16 | Value | R |  |  |
| Input Register (Flexible area) | 0x04 | - | 105 | Flex input register 08 | Un-signed16 | Value | R |  |  |
| Input Register (Flexible area) | 0x04 | - | 106 | Flex input register 09 | Un-signed16 | Value | R |  |  |
| Input Register (Flexible area) | 0x04 | - | 107 | Flex input register 10 | Un-signed16 | Value | R |  |  |
| Input Register (Flexible area) | 0x04 | - | 108 | Flex input register 11 | Un-signed16 | Value | R |  |  |
| Input Register (Flexible area) | 0x04 | - | 109 | Flex input register 12 | Un-signed16 | Value | R |  |  |
| Input Register (Flexible area) | 0x04 | - | 110 | Flex input register 13 | Un-signed16 | Value | R |  |  |
| Input Register (Flexible area) | 0x04 | - | 111 | Flex input register 14 | Un-signed16 | Value | R |  |  |
| Input Register (Flexible area) | 0x04 | - | 112 | Flex input register 15 | Un-signed16 | Value | R |  |  |
| Input Register (Flexible area) | 0x04 | - | 113 | Flex input register 16 | Un-signed16 | Value | R |  |  |
| Input Register (Flexible area) | 0x04 | - | 114 | Flex input register 17 | Un-signed16 | Value | R |  |  |
| Input Register (Flexible area) | 0x04 | - | 115 | Flex input register 18 | Un-signed16 | Value | R |  |  |
| Input Register (Flexible area) | 0x04 | - | 116 | Flex input register 19 | Un-signed16 | Value | R |  |  |
| Input Register (Flexible area) | 0x04 | - | 117 | Flex input register 20 | Un-signed16 | Value | R |  |  |



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| Input Register (Flexible area) | 0x04 | - | 118 | Flex input register 21 | Un-signed16 | Value | R |  |  |
| Input Register (Flexible area) | 0x04 | - | 119 | Flex input register 22 | Un-signed16 | Value | R |  |  |
| Input Register (Flexible area) | 0x04 | - | 120 | Flex input register 23 | Un-signed16 | Value | R |  |  |
| Input Register (Flexible area) | 0x04 | - | 121 | Flex input register 24 | Un-signed16 | Value | R |  |  |
| Input Register (Flexible area) | 0x04 | - | 122 | Flex input register 25 | Un-signed16 | Value | R |  |  |
| Input Register (Flexible area) | 0x04 | - | 123 | Flex input register 26 | Un-signed16 | Value | R |  |  |
| Input Register (Flexible area) | 0x04 | - | 124 | Flex input register 27 | Un-signed16 | Value | R |  |  |
| Input Register (Flexible area) | 0x04 | - | 125 | Flex input register 28 | Un-signed16 | Value | R |  |  |
| Input Register (Flexible area) | 0x04 | - | 126 | Flex input register 29 | Un-signed16 | Value | R |  |  |
| Input Register (Flexible area) | 0x04 | - | 127 | Flex input register 30 | Un-signed16 | Value | R |  |  |
| Input Register (Flexible area) | 0x04 | - | 128 | Flex input register 31 | Un-signed16 | Value | R |  |  |
| Input Register (Flexible area) | 0x04 | - | 129 | Flex input register 32 | Un-signed16 | Value | R |  |  |
| Input Register (Flexible area) | 0x04 | - | 130 | Flex input register 33 | Un-signed16 | Value | R |  |  |
| Input Register (Flexible area) | 0x04 | - | 131 | Flex input register 34 | Un-signed16 | Value | R |  |  |

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| Input Register (Flexible area) | 0x04 | - | 132 | Flex input register 35 | Unsigned16 | Value | R           |                                                                                                                                                                                                                               |  |
| Input Register (Flexible area) | 0x04 | - | 133 | Flex input register 36 | Unsigned16 | Value | R           |                                                                                                                                                                                                                               |  |
| Input Register (Flexible area) | 0x04 | - | 134 | Flex input register 37 | Unsigned16 | Value | R           |                                                                                                                                                                                                                               |  |
| Input Register (Flexible area) | 0x04 | - | 135 | Flex input register 38 | Unsigned16 | Value | R           |                                                                                                                                                                                                                               |  |
| Input Register (Flexible area) | 0x04 | - | 136 | Flex input register 39 | Unsigned16 | Value | R           |                                                                                                                                                                                                                               |  |
| Input Register (Flexible area) | 0x04 | - | 137 | Flex input register 40 | Unsigned16 | Value | R           |                                                                                                                                                                                                                               |  |
| Input Register (duplicate)     | 0x04 | - | 140 | Batch unit 1           | Unsigned8  | Enum  | R/<br>W(C1) | 0:g<br>1:kg<br>2:t<br>20:ton(US)<br>21:ton(UK)<br>3:lb<br>4:cm3<br>5:L<br>6:m3<br>7:gal<br>8:kgal<br>9:ft3<br>10:bbl<br>11:Impgal<br>12:klmpgal<br>13:NL<br>14:Nm3<br>15:SL<br>16:Sft3<br>17:MMSft3<br>18:Sm3<br>19:User unit |  |

|                            |      |   |     |              |            |      |             |                                                                                                                                                                                                                               |  |
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| Input Register (duplicate) | 0x04 | - | 141 | Batch unit 2 | Un-signed8 | Enum | R/<br>W(C1) | 0:g<br>1:kg<br>2:t<br>20:ton(US)<br>21:ton(UK)<br>3:lb<br>4:cm3<br>5:L<br>6:m3<br>7:gal<br>8:kgal<br>9:ft3<br>10:bbl<br>11:Impgal<br>12:kImpgal<br>13:NL<br>14:Nm3<br>15:SL<br>16:Sft3<br>17:MMSft3<br>18:Sm3<br>19:User unit |  |
| Input Register (duplicate) | 0x04 | - | 142 | Batch unit 3 | Un-signed8 | Enum | R/<br>W(C1) | 0:g<br>1:kg<br>2:t<br>20:ton(US)<br>21:ton(UK)<br>3:lb<br>4:cm3<br>5:L<br>6:m3<br>7:gal<br>8:kgal<br>9:ft3<br>10:bbl<br>11:Impgal<br>12:kImpgal<br>13:NL<br>14:Nm3<br>15:SL<br>16:Sft3<br>17:MMSft3<br>18:Sm3<br>19:User unit |  |

|                            |      |   |     |                |            |          |         |                                                                                                                                                                                                                               |                  |
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| Input Register (duplicate) | 0x04 | - | 143 | Batch unit 4   | Un-signed8 | Enum     | R/W(C1) | 0:g<br>1:kg<br>2:t<br>20:ton(US)<br>21:ton(UK)<br>3:lb<br>4:cm3<br>5:L<br>6:m3<br>7:gal<br>8:kgal<br>9:ft3<br>10:bbl<br>11:Impgal<br>12:kImpgal<br>13:NL<br>14:Nm3<br>15:SL<br>16:Sft3<br>17:MMSft3<br>18:Sm3<br>19:User unit |                  |
| Input Register (duplicate) | 0x04 | - | 144 | Batch unit 5   | Un-signed8 | Enum     | R/W(C1) | 0:g<br>1:kg<br>2:t<br>20:ton(US)<br>21:ton(UK)<br>3:lb<br>4:cm3<br>5:L<br>6:m3<br>7:gal<br>8:kgal<br>9:ft3<br>10:bbl<br>11:Impgal<br>12:kImpgal<br>13:NL<br>14:Nm3<br>15:SL<br>16:Sft3<br>17:MMSft3<br>18:Sm3<br>19:User unit |                  |
| Input Register (duplicate) | 0x04 | - | 145 | Viscosity      | Float      | Value    | R       |                                                                                                                                                                                                                               | [Viscosity unit] |
| Input Register             | 0x04 | - | 200 | Status group 0 | Un-signed8 | Bit-Enum | R       | bit0:101:Resonance frequency failure<br>bit1:102:Signal failure<br>bit2:103,4:Pick off 1 failure<br>bit3:105,6:Pick off 2 failure<br>bit4:107,8:Temperature failure<br>bit5:Reserved<br>bit6:Reserved<br>bit7:Reserved        |                  |

|                |      |   |     |                |            |          |   |                                                                                                                                                                                                                                                                                                        |
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| Input Register | 0x04 | - | 201 | Status group 1 | Un-signed8 | Bit-Enum | R | bit0:109:Tube leakage detection<br>bit1:Reserved<br>bit2:Reserved<br>bit3:Reserved<br>bit4:Reserved<br>bit5:Reserved<br>bit6:Reserved<br>bit7:121,22:Main board failure                                                                                                                                |
| Input Register | 0x04 | - | 202 | Status group 2 | Un-signed8 | Bit-Enum | R | bit0:123:Parameter restore incomplete<br>bit1:124,25:Sensor board failure<br>bit2:126:Sensor communication error<br>bit3:127-29:Option board failure<br>bit4:130-32:Indicator board failure<br>bit5:133:Indicator board mismatch<br>bit6:134:Indicator communication error<br>bit7:135:microSD failure |
| Input Register | 0x04 | - | 203 | Status group 3 | Un-signed8 | Bit-Enum | R | bit0:201:Slug detection<br>bit1:202:Empty pipe detection<br>bit2:203:Corrosion detection<br>bit3:204-06:Autzero failure<br>bit4:207-09:Batch failure<br>bit5:210-12:NOC failure<br>bit6:Reserved<br>bit7:Reserved                                                                                      |

|                |      |   |     |                |            |          |   |                                                                                                                                                                                                                                                                                                                                                                                                                                         |
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| Input Register | 0x04 | - | 204 | Status group 4 | Un-signed8 | Bit-Enum | R | bit0:221:Analog input failure<br>bit1:222:Mass flow high high low low alarm<br>bit2:223:Density high high low low alarm<br>bit3:224:Temperature high high low low alarm<br>bit4:225:Pressure high high low low alarm<br>bit5:226:Volume flow high high low low alarm<br>bit6:227:Corrected volume flow high high low low alarm<br>bit7:228:Concentration high high low low alarm                                                        |
| Input Register | 0x04 | - | 205 | Status group 5 | Un-signed8 | Bit-Enum | R | bit0:229:Net mass flow 1 high high low low alarm<br>bit1:230:Net mass flow 2 high high low low alarm<br>bit2:231:Net volume flow 1 high high low low alarm<br>bit3:232:Net volume flow 2 high high low low alarm<br>bit4:233:Net corrected volume flow high high low low alarm<br>bit5:234:Relative density high high low low alarm<br>bit6:235:Reference density high high low low alarm<br>bit7:236:Viscosity high high low low alarm |

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| Input Register | 0x04 | - | 206 | Status group 14 | Un-signed8 | Bit-Enum | R | bit0:Reserved<br>bit1:Reserved<br>bit2:241:Totalizer 1 threshold exceeded<br>bit3:242:Totalizer 2 threshold exceeded<br>bit4:243:Totalizer 3 threshold exceeded<br>bit5:244:Totalizer 4 threshold exceeded<br>bit6:245:Totalizer 5 threshold exceeded<br>bit7:246:Totalizer 6 threshold exceeded                           |
| Input Register | 0x04 | - | 207 | Status group 15 | Un-signed8 | Bit-Enum | R | bit0:301-20:Process variables configuration error<br>bit1:Reserved<br>bit2:322:Analog output configuration error<br>bit3:323-25:Pulse /Status output 1 configuration error<br>bit4:326-29:Pulse /Status output 2 configuration error<br>bit5:330:Double pulse output configuration error<br>bit6:Reserved<br>bit7:Reserved |
| Input Register | 0x04 | - | 208 | Status group 16 | Un-signed8 | Bit-Enum | R | bit0:333:Analog input configuration error<br>bit1:Reserved<br>bit2:335-40:Totalizer configuration error<br>bit3:341:Batch configuration error<br>bit4:342:Data logging not started<br>bit5:343:Option function mismatch<br>bit6:Reserved<br>bit7:Reserved                                                                  |

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| Input Register | 0x04 | - | 209 | Status group 17 | Un-signed8 | Bit-Enum | R | bit0:Reserved<br>bit1:702:Analog output fixed<br>bit2:703:Density fixed<br>bit3:704:Temperature fixed<br>bit4:705:Pressure fixed<br>bit5:706:Reference density fixed<br>bit6:707:Calorific value fixed<br>bit7:708:Process variable simulation                                                 |  |
| Input Register | 0x04 | - | 210 | Status group 18 | Un-signed8 | Bit-Enum | R | bit0:709:Analog output simulation<br>bit1:710:Pulse output simulation<br>bit2:711:Status output simulation<br>bit3:Reserved<br>bit4:Reserved<br>bit5:Reserved<br>bit6:715:Process variable trimming<br>bit7:Reserved                                                                           |  |
| Input Register | 0x04 | - | 211 | Status group 19 | Un-signed8 | Bit-Enum | R | bit0:717:Analog output saturated<br>bit1:718:Pulse output 1 saturated<br>bit2:719:Pulse output 2 saturated<br>bit3:720:Double pulse output saturated<br>bit4:721:Autozero running<br>bit5:722:Tube Health Check execution error<br>bit6:723:Date/Time not set<br>bit7:724:Display over warning |  |



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| Input Register | 0x04 | - | 212 | Status group 20 | Un-signed8 | Bit-Enum | R | bit0:725:microSD card size warning<br>bit1:726:microSD card mismatch<br>bit2:Reserved<br>bit3:728:microSD card removal procedure error<br>bit4:729:Parameter backup incomplete<br>bit5:730:Parameter restore running<br>bit6:Reserved<br>bit7:732:Batch progress indication |
| Input Register | 0x04 | - | 213 | Status group 21 | Un-signed8 | Bit-Enum | R | bit0:733,34:Viscosity warning<br>bit1:735:Autozero warning<br>bit2:736:Device restart during Custody Transfer<br>bit3:Reserved<br>bit4:Reserved<br>bit5:Reserved<br>bit6:Reserved<br>bit7:Reserved                                                                          |
| Input Register | 0x04 | - | 214 | Status group 22 | Un-signed8 | Bit-Enum | R | bit0:901:Device configuration locked<br>bit1:902:Device configuration not locked<br>bit2:903:Parameter backup running<br>bit3:904:Data logging running<br>bit4:905:Tube Health Check running<br>bit5:906:Batch running<br>bit6:907:Batch hold<br>bit7:908:Reserved          |
| Input Register | 0x04 | - | 215 | Status group 23 | Un-signed8 | Bit-Enum | R | bit0:909:Maintenance mode running<br>bit1:Reserved<br>bit2:Reserved<br>bit3:Reserved<br>bit4:Reserved<br>bit5:Reserved<br>bit6:Reserved<br>bit7:Reserved                                                                                                                    |

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| Input Register | 0x04 | - | 216 | Status group 24       | Un-signed8 | Bit-Enum | R | bit0:Reserved<br>bit1:Reserved<br>bit2:Reserved<br>bit3:Reserved<br>bit4:Reserved<br>bit5:Reserved<br>bit6:Reserved<br>bit7:Reserved                                                                                                                                                              |  |
| Input Register | 0x04 | - | 300 | System alarm status 0 | Un-signed8 | Bit-Enum | R | bit0:101:Resonance frequency failure<br>bit1:102:Signal failure<br>bit2:103:Pick off 1 failure<br>bit3:104:Pick off 1 failure<br>bit4:106:Pick off 2 failure<br>bit5:105:Pick off 2 failure<br>bit6:107:Temperature range failure<br>bit7:108:Temperature sensor failure                          |  |
| Input Register | 0x04 | - | 301 | System alarm status 1 | Un-signed8 | Bit-Enum | R | bit0:109:Tube leakage detection<br>bit1:Reserved<br>bit2:Reserved<br>bit3:Reserved<br>bit4:Reserved<br>bit5:Reserved<br>bit6:Reserved<br>bit7:Reserved                                                                                                                                            |  |
| Input Register | 0x04 | - | 302 | System alarm status 2 | Un-signed8 | Bit-Enum | R | bit0:121:Main board CPU failure<br>bit1:122:Main board EEPROM failure<br>bit2:123:Parameter restore incomplete<br>bit3:124:Sensor board failure<br>bit4:125:Sensor board mismatch<br>bit5:126:Sensor communication error<br>bit6:127:Option board failure<br>bit7:128:Option board EEPROM failure |  |

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| Input Register | 0x04 | - | 303 | System alarm status 3  | Un-signed8 | Bit-Enum | R | bit0:129:Option board mismatch<br>bit1:130:Indicator board failure<br>bit2:131:Indicator board EEPROM failure<br>bit3:132:LCD driver failure<br>bit4:133:Indicator board mismatch<br>bit5:134:Indicator communication error<br>bit6:135:microSD failure<br>bit7:Reserved |  |
| Input Register | 0x04 | - | 304 | System alarm status 4  | Un-signed8 | Bit-Enum | R | bit0: Reserved<br>bit1: Reserved<br>bit2: Reserved<br>bit3: Reserved<br>bit4: Reserved<br>bit5: Reserved<br>bit6: Reserved<br>bit7: Reserved                                                                                                                             |  |
| Input Register | 0x04 | - | 305 | Process alarm status 0 | Un-signed8 | Bit-Enum | R | bit0:201:Slug detection<br>bit1:202:Empty pipe detection<br>bit2:203:Corrosion detection<br>bit3:204:Autozero judgment multi-phase<br>bit4:205:Autozero judgment flow<br>bit5:206:Autozero judgment temperature<br>bit6:Reserved<br>bit7:Reserved                        |  |
| Input Register | 0x04 | - | 306 | Process alarm status 1 | Un-signed8 | Bit-Enum | R | bit0:207:Batch time exceeded<br>bit1:208:Batch overrun/underrun<br>bit2:209:Max flow while batching<br>bit3:210:Oil density calculation failure<br>bit4:211:Water density calculation failure<br>bit5:212:NOC calculation failure<br>bit6:Reserved<br>bit7:Reserved      |  |

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| Input Register | 0x04 | - | 307 | Process alarm status 2 | Un-signed8 | Bit-Enum | R | bit0:221:Analog input failure<br>bit1:222:Mass flow high high low low alarm<br>bit2:223:Density high high low low alarm<br>bit3:224:Temperature high high low low alarm<br>bit4:225:Pressure high high low low alarm<br>bit5:226:Volume flow high high low low alarm<br>bit6:227:Corrected volume flow high high low low alarm<br>bit7:228:Concentration high high low low alarm                                                        |
| Input Register | 0x04 | - | 308 | Process alarm status 3 | Un-signed8 | Bit-Enum | R | bit0:229:Net mass flow 1 high high low low alarm<br>bit1:230:Net mass flow 2 high high low low alarm<br>bit2:231:Net volume flow 1 high high low low alarm<br>bit3:232:Net volume flow 2 high high low low alarm<br>bit4:233:Net corrected volume flow high high low low alarm<br>bit5:234:Relative density high high low low alarm<br>bit6:235:Reference density high high low low alarm<br>bit7:236:Viscosity high high low low alarm |

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| Input Register | 0x04 | - | 309 | Process alarm status 4 | Un-signed8 | Bit-Enum | R | bit0:241:Totalizer 1 threshold exceeded<br>bit1:242:Totalizer 2 threshold exceeded<br>bit2:243:Totalizer 3 threshold exceeded<br>bit3:244:Totalizer 4 threshold exceeded<br>bit4:245:Totalizer 5 threshold exceeded<br>bit5:246:Totalizer 6 threshold exceeded<br>bit6:Reserved<br>bit7:Reserved                                                                                 |
| Input Register | 0x04 | - | 310 | Process alarm status 5 | Un-signed8 | Bit-Enum | R | bit0: Reserved<br>bit1: Reserved<br>bit2: Reserved<br>bit3: Reserved<br>bit4: Reserved<br>bit5: Reserved<br>bit6: Reserved<br>bit7: Reserved                                                                                                                                                                                                                                     |
| Input Register | 0x04 | - | 311 | Setting alarm status 0 | Un-signed8 | Bit-Enum | R | bit0:301:Mass flow configuration error<br>bit1:302:Density configuration error<br>bit2:303:Temperature configuration error<br>bit3:304:Analog input temperature configuration error<br>bit4:305:Pressure configuration error<br>bit5:306:Analog input pressure configuration error<br>bit6:307:Volume flow configuration error<br>bit7:308:Reference density configuration error |

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| Input Register | 0x04 | - | 312 | Setting alarm status 1 | Un-signed8 | Bit-Enum | R | bit0:309:Relative density configuration error<br>bit1:310:Corrected volume flow configuration error<br>bit2:311:Calorific value configuration error<br>bit3:312:Analog input calorific value configuration error<br>bit4:313:Concentration configuration error<br>bit5:314:Net mass flow 1 configuration error<br>bit6:315:Net mass flow 2 configuration error<br>bit7:316:Net volume flow 1 configuration error |  |
| Input Register | 0x04 | - | 313 | Setting alarm status 2 | Un-signed8 | Bit-Enum | R | bit0:317:Net volume flow 2 configuration error<br>bit1:318:Net corrected volume flow configuration error<br>bit2:319:Velocity configuration error<br>bit3:320:Viscosity configuration error<br>bit4:Reserved<br>bit5:Reserved<br>bit6:Reserved<br>bit7:Reserved                                                                                                                                                  |  |

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| Input Register | 0x04 | - | 314 | Setting alarm status 3 | Un-signed8 | Bit-Enum | R | bit0:Reserved<br>bit1:322:Analog output configuration error<br>bit2:323:Pulse output 1 configuration error<br>bit3:324:Frequency output 1 configuration error<br>bit4:325:Status output 1 configuration error<br>bit5:326:Pulse output 2 configuration error<br>bit6:327:Frequency output 2 configuration error<br>bit7:328:Status output 2 configuration error |
| Input Register | 0x04 | - | 315 | Setting alarm status 4 | Un-signed8 | Bit-Enum | R | bit0:329:Pulse/Status output 2 mode configuration error<br>bit1:330:Double pulse output configuration error<br>bit2:Reserved<br>bit3:Reserved<br>bit4:333:Analog input configuration error<br>bit5:Reserved<br>bit6:Reserved<br>bit7:Reserved                                                                                                                   |
| Input Register | 0x04 | - | 316 | Setting alarm status 5 | Un-signed8 | Bit-Enum | R | bit0:335:Totalizer 1 configuration error<br>bit1:336:Totalizer 2 configuration error<br>bit2:337:Totalizer 3 configuration error<br>bit3:338:Totalizer 4 configuration error<br>bit4:339:Totalizer 5 configuration error<br>bit5:340:Totalizer 6 configuration error<br>bit6:341:Batch configuration error<br>bit7:342:Data logging not started                 |

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| Input Register | 0x04 | - | 317 | Setting alarm status 6 | Un-signed8 | Bit-Enum | R | bit0: 343:Option function mis-match<br>bit1: Reserved<br>bit2: Reserved<br>bit3: Reserved<br>bit4: Reserved<br>bit5: Reserved<br>bit6: Reserved<br>bit7: Reserved                                                                              |  |
| Input Register | 0x04 | - | 318 | Setting alarm status 7 | Un-signed8 | Bit-Enum | R | bit0: Reserved<br>bit1: Reserved<br>bit2: Reserved<br>bit3: Reserved<br>bit4: Reserved<br>bit5: Reserved<br>bit6: Reserved<br>bit7: Reserved                                                                                                   |  |
| Input Register | 0x04 | - | 319 | Warning status 0       | Un-signed8 | Bit-Enum | R | bit0:Reserved<br>bit1:702:Analog output fixed<br>bit2:703:Density fixed<br>bit3:704:Temperature fixed<br>bit4:705:Pressure fixed<br>bit5:706:Reference density fixed<br>bit6:707:Calorific value fixed<br>bit7:708:Process variable simulation |  |
| Input Register | 0x04 | - | 320 | Warning status 1       | Un-signed8 | Bit-Enum | R | bit0:709:Analog output simulation<br>bit1:710:Pulse output simulation<br>bit2:711:Status output simulation<br>bit3:Reserved<br>bit4:Reserved<br>bit5:Reserved<br>bit6:715:Process variable trimming<br>bit7:Reserved                           |  |



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| Input Register | 0x04 | - | 321 | Warning status 2 | Un-signed8 | Bit-Enum | R | bit0:717:Analog output saturated<br>bit1:718:Pulse output 1 saturated<br>bit2:719:Pulse output 2 saturated<br>bit3:720:Double pulse output saturated<br>bit4:721:Autozero running<br>bit5:722:Tube Health Check execution error<br>bit6:723:Date/Time not set<br>bit7:724:Display over warning |
| Input Register | 0x04 | - | 322 | Warning status 3 | Un-signed8 | Bit-Enum | R | bit0:725:microSD card size warning<br>bit1:726:microSD card mismatch<br>bit2:Reserved<br>bit3:728:microSD card removal procedure error<br>bit4:729:Parameter backup incomplete<br>bit5:730:Parameter restore running<br>bit6:Reserved<br>bit7:732:Batch progress indication                    |
| Input Register | 0x04 | - | 323 | Warning status 4 | Un-signed8 | Bit-Enum | R | bit0: 733:Viscosity not calculated<br>bit1: 734:Viscosity not reliable<br>bit2: 735:Autozero warning<br>bit3: 736:Device restart during Custody Transfer<br>bit4: Reserved<br>bit5: Reserved<br>bit6: Reserved<br>bit7: Reserved                                                               |
| Input Register | 0x04 | - | 324 | Warning status 5 | Un-signed8 | Bit-Enum | R | bit0: Reserved<br>bit1: Reserved<br>bit2: Reserved<br>bit3: Reserved<br>bit4: Reserved<br>bit5: Reserved<br>bit6: Reserved<br>bit7: Reserved                                                                                                                                                   |

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| Input Register | 0x04 | - | 325 | Information status 0     | Unsigned8 | Bit-Enum | R | bit0:901:Device configuration locked<br>bit1:902:Device configuration not locked<br>bit2:903:Parameter backup running<br>bit3:904:Data logging running<br>bit4:905:Tube Health Check running<br>bit5:906:Batch running<br>bit6:907: Batch hold<br>bit7:Reserved |  |
| Input Register | 0x04 | - | 326 | Information status 1     | Unsigned8 | Bit-Enum | R | bit0:909:Maintenance mode running<br>bit1:Reserved<br>bit2:Reserved<br>bit3:Reserved<br>bit4:Reserved<br>bit5:Reserved<br>bit6:Reserved<br>bit7:Reserved                                                                                                        |  |
| Input Register | 0x04 | - | 327 | Information status 2     | Unsigned8 | Bit-Enum | R | bit0: Reserved<br>bit1: Reserved<br>bit2: Reserved<br>bit3: Reserved<br>bit4: Reserved<br>bit5: Reserved<br>bit6: Reserved<br>bit7: Reserved                                                                                                                    |  |
| Input Register | 0x04 | - | 400 | Mass flow data quality   | Unsigned8 | Enum     | R | 0:Bad<br>64:Poor accuracy<br>128:Manual / Fixed<br>255:Good                                                                                                                                                                                                     |  |
| Input Register | 0x04 | - | 401 | Mass flow limit status   | Unsigned8 | Enum     | R | 0:Not limited<br>16:Low limited<br>32:High limited<br>48:Constant                                                                                                                                                                                               |  |
| Input Register | 0x04 | - | 402 | Density data quality     | Unsigned8 | Enum     | R | 0:Bad<br>64:Poor accuracy<br>128:Manual / Fixed<br>255:Good                                                                                                                                                                                                     |  |
| Input Register | 0x04 | - | 403 | Density limit status     | Unsigned8 | Enum     | R | 0:Not limited<br>16:Low limited<br>32:High limited<br>48:Constant                                                                                                                                                                                               |  |
| Input Register | 0x04 | - | 404 | Temperature data quality | Unsigned8 | Enum     | R | 0:Bad<br>64:Poor accuracy<br>128:Manual / Fixed<br>255:Good                                                                                                                                                                                                     |  |

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| Input Register | 0x04 | - | 405 | Temperature limit status           | Un-signed8 | Enum | R | 0:Not limited<br>16:Low limited<br>32:High limited<br>48:Constant |  |
| Input Register | 0x04 | - | 406 | Pressure data quality              | Un-signed8 | Enum | R | 0:Bad<br>64:Poor accuracy<br>128:Manual / Fixed<br>255:Good       |  |
| Input Register | 0x04 | - | 407 | Pressure limit status              | Un-signed8 | Enum | R | 0:Not limited<br>16:Low limited<br>32:High limited<br>48:Constant |  |
| Input Register | 0x04 | - | 408 | Calorific data quality             | Un-signed8 | Enum | R | 0:Bad<br>64:Poor accuracy<br>128:Manual / Fixed<br>255:Good       |  |
| Input Register | 0x04 | - | 409 | Calorific limit status             | Un-signed8 | Enum | R | 0:Not limited<br>16:Low limited<br>32:High limited<br>48:Constant |  |
| Input Register | 0x04 | - | 410 | Volume flow data quality           | Un-signed8 | Enum | R | 0:Bad<br>64:Poor accuracy<br>128:Manual / Fixed<br>255:Good       |  |
| Input Register | 0x04 | - | 411 | Volume flow limit status           | Un-signed8 | Enum | R | 0:Not limited<br>16:Low limited<br>32:High limited<br>48:Constant |  |
| Input Register | 0x04 | - | 412 | Reference density data quality     | Un-signed8 | Enum | R | 0:Bad<br>64:Poor accuracy<br>128:Manual / Fixed<br>255:Good       |  |
| Input Register | 0x04 | - | 413 | Reference density limit status     | Un-signed8 | Enum | R | 0:Not limited<br>16:Low limited<br>32:High limited<br>48:Constant |  |
| Input Register | 0x04 | - | 414 | Relative density data quality      | Un-signed8 | Enum | R | 0:Bad<br>64:Poor accuracy<br>128:Manual / Fixed<br>255:Good       |  |
| Input Register | 0x04 | - | 415 | Relative density limit status      | Un-signed8 | Enum | R | 0:Not limited<br>16:Low limited<br>32:High limited<br>48:Constant |  |
| Input Register | 0x04 | - | 416 | Corrected volume flow data quality | Un-signed8 | Enum | R | 0:Bad<br>64:Poor accuracy<br>128:Manual / Fixed<br>255:Good       |  |
| Input Register | 0x04 | - | 417 | Corrected volume flow limit status | Un-signed8 | Enum | R | 0:Not limited<br>16:Low limited<br>32:High limited<br>48:Constant |  |

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| Input Register | 0x04 | - | 430 | Totalizer 1 data quality   | Un-signed8 | Enum | R | 0:Bad<br>64:Poor accuracy<br>128:Manual / Fixed<br>255:Good       |  |
| Input Register | 0x04 | - | 431 | Totalizer 1 limit status   | Un-signed8 | Enum | R | 0:Not limited<br>16:Low limited<br>32:High limited<br>48:Constant |  |
| Input Register | 0x04 | - | 432 | Totalizer 2 data quality   | Un-signed8 | Enum | R | 0:Bad<br>64:Poor accuracy<br>128:Manual / Fixed<br>255:Good       |  |
| Input Register | 0x04 | - | 433 | Totalizer 2 limit status   | Un-signed8 | Enum | R | 0:Not limited<br>16:Low limited<br>32:High limited<br>48:Constant |  |
| Input Register | 0x04 | - | 434 | Totalizer 3 data quality   | Un-signed8 | Enum | R | 0:Bad<br>64:Poor accuracy<br>128:Manual / Fixed<br>255:Good       |  |
| Input Register | 0x04 | - | 435 | Totalizer 3 limit status   | Un-signed8 | Enum | R | 0:Not limited<br>16:Low limited<br>32:High limited<br>48:Constant |  |
| Input Register | 0x04 | - | 436 | Totalizer 4 data quality   | Un-signed8 | Enum | R | 0:Bad<br>64:Poor accuracy<br>128:Manual / Fixed<br>255:Good       |  |
| Input Register | 0x04 | - | 437 | Totalizer 4 limit status   | Un-signed8 | Enum | R | 0:Not limited<br>16:Low limited<br>32:High limited<br>48:Constant |  |
| Input Register | 0x04 | - | 438 | Totalizer 5 data quality   | Un-signed8 | Enum | R | 0:Bad<br>64:Poor accuracy<br>128:Manual / Fixed<br>255:Good       |  |
| Input Register | 0x04 | - | 439 | Totalizer 5 limit status   | Un-signed8 | Enum | R | 0:Not limited<br>16:Low limited<br>32:High limited<br>48:Constant |  |
| Input Register | 0x04 | - | 440 | Totalizer 6 data quality   | Un-signed8 | Enum | R | 0:Bad<br>64:Poor accuracy<br>128:Manual / Fixed<br>255:Good       |  |
| Input Register | 0x04 | - | 441 | Totalizer 6 limit status   | Un-signed8 | Enum | R | 0:Not limited<br>16:Low limited<br>32:High limited<br>48:Constant |  |
| Input Register | 0x04 | - | 460 | Concentration data quality | Un-signed8 | Enum | R | 0:Bad<br>64:Poor accuracy<br>128:Manual / Fixed<br>255:Good       |  |

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| Input Register | 0x04 | - | 461 | Concentration limit status             | Un-signed8 | Enum  | R | 0:Not limited<br>16:Low limited<br>32:High limited<br>48:Constant |                |
| Input Register | 0x04 | - | 462 | Net mass flow 1 data quality           | Un-signed8 | Enum  | R | 0:Bad<br>64:Poor accuracy<br>128:Manual / Fixed<br>255:Good       |                |
| Input Register | 0x04 | - | 463 | Net mass flow 1 limit status           | Un-signed8 | Enum  | R | 0:Not limited<br>16:Low limited<br>32:High limited<br>48:Constant |                |
| Input Register | 0x04 | - | 464 | Net mass flow 2 data quality           | Un-signed8 | Enum  | R | 0:Bad<br>64:Poor accuracy<br>128:Manual / Fixed<br>255:Good       |                |
| Input Register | 0x04 | - | 465 | Net mass flow 2 limit status           | Un-signed8 | Enum  | R | 0:Not limited<br>16:Low limited<br>32:High limited<br>48:Constant |                |
| Input Register | 0x04 | - | 466 | Net volume flow 1 data quality         | Un-signed8 | Enum  | R | 0:Bad<br>64:Poor accuracy<br>128:Manual / Fixed<br>255:Good       |                |
| Input Register | 0x04 | - | 467 | Net volume flow 1 limit status         | Un-signed8 | Enum  | R | 0:Not limited<br>16:Low limited<br>32:High limited<br>48:Constant |                |
| Input Register | 0x04 | - | 468 | Net volume flow 2 data quality         | Un-signed8 | Enum  | R | 0:Bad<br>64:Poor accuracy<br>128:Manual / Fixed<br>255:Good       |                |
| Input Register | 0x04 | - | 469 | Net volume flow 2 limit status         | Un-signed8 | Enum  | R | 0:Not limited<br>16:Low limited<br>32:High limited<br>48:Constant |                |
| Input Register | 0x04 | - | 470 | Net corrected volume flow data quality | Un-signed8 | Enum  | R | 0:Bad<br>64:Poor accuracy<br>128:Manual / Fixed<br>255:Good       |                |
| Input Register | 0x04 | - | 471 | Net corrected volume flow limit status | Un-signed8 | Enum  | R | 0:Not limited<br>16:Low limited<br>32:High limited<br>48:Constant |                |
| Input Register | 0x04 | - | 500 | Oil density                            | Float      | Value | R |                                                                   | [Density unit] |
| Input Register | 0x04 | - | 502 | Water density                          | Float      | Value | R |                                                                   | [Density unit] |
| Input Register | 0x04 | - | 504 | Water cut value                        | Float      | Value | R |                                                                   | %              |
| Input Register | 0x04 | - | 506 | Volume concentration value             | Float      | Value | R |                                                                   | %              |

|                            |      |   |     |                                  |                |       |   |                                          |                    |
|----------------------------|------|---|-----|----------------------------------|----------------|-------|---|------------------------------------------|--------------------|
| Input Register             | 0x04 | - | 508 | Mass concentration value         | Float          | Value | R |                                          | %                  |
| Input Register             | 0x04 | - | 510 | Gas void fraction                | Float          | Value | R |                                          | %                  |
| Input Register             | 0x04 | - | 512 | Current thermal expansion factor | Float          | Value | R |                                          |                    |
| Input Register             | 0x04 | - | 514 | Current K0 coefficient           | Float          | Value | R |                                          |                    |
| Input Register             | 0x04 | - | 516 | Current K1 coefficient           | Float          | Value | R |                                          |                    |
| Input Register             | 0x04 | - | 518 | Current K2 coefficient           | Float          | Value | R |                                          |                    |
| Input Register             | 0x04 | - | 520 | Selected concentration set       | Un-signed8     | Enum  | R | 0:Set 1<br>1:Set 2<br>2:Set 3<br>3:Set 4 |                    |
| Input Register (duplicate) | 0x04 | - | 550 | Device ID                        | Un-signed32    | Value | R |                                          |                    |
| Input Register (duplicate) | 0x04 | - | 552 | Max permissible temperature      | Float          | Value | R |                                          | degC               |
| Input Register (duplicate) | 0x04 | - | 554 | Max permissible pressure         | Float          | Value | R |                                          | bar                |
| Input Register (duplicate) | 0x04 | - | 556 | Factory backup name              | Un-signed8[16] | ASCII | R |                                          |                    |
| Input Register (duplicate) | 0x04 | - | 564 | Factory backup date              | Un-signed32    | Date  | R |                                          |                    |
| Input Register (duplicate) | 0x04 | - | 566 | Temperature lower limit          | Float          | Value | R |                                          | [Temperature unit] |
| Input Register (duplicate) | 0x04 | - | 568 | Temperature upper limit          | Float          | Value | R |                                          | [Temperature unit] |
| Input Register (duplicate) | 0x04 | - | 570 | SI option                        | Un-signed8     | Enum  | R | 0:Off<br>1:On                            |                    |
| Input Register (duplicate) | 0x04 | - | 571 | Release date                     | Un-signed32    | Date  | R |                                          |                    |
| Input Register (duplicate) | 0x04 | - | 573 | Extra number 2                   | Un-signed8[16] | ASCII | R |                                          |                    |

|                |      |   |     |                              |             |          |   |                                                                                                                                                                                                                                                                                                                                                                                                    |                    |
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| Input Register | 0x04 | - | 600 | Autozero value               | Float       | Evalue   | R |                                                                                                                                                                                                                                                                                                                                                                                                    | [Mass flow unit]   |
| Input Register | 0x04 | - | 602 | Autozero standard deviation  | Float       | Evalue   | R |                                                                                                                                                                                                                                                                                                                                                                                                    | [Mass flow unit]   |
| Input Register | 0x04 | - | 604 | Transmitter temperature      | Float       | Value    | R |                                                                                                                                                                                                                                                                                                                                                                                                    | [Temperature unit] |
| Input Register | 0x04 | - | 606 | Sensor max temperature       | Float       | Value    | R |                                                                                                                                                                                                                                                                                                                                                                                                    | [Temperature unit] |
| Input Register | 0x04 | - | 608 | Max transmitter temperature  | Float       | Value    | R |                                                                                                                                                                                                                                                                                                                                                                                                    | [Temperature unit] |
| Input Register | 0x04 | - | 620 | Write protect                | Un-signed8  | Enum     | R | 0:No<br>1:Yes                                                                                                                                                                                                                                                                                                                                                                                      |                    |
| Input Register | 0x04 | - | 621 | Software seal                | Un-signed8  | Enum     | R | 0:Break<br>1:Keep                                                                                                                                                                                                                                                                                                                                                                                  |                    |
| Input Register | 0x04 | - | 622 | Burn out                     | Un-signed8  | Enum     | R | 0:High<br>1:Low                                                                                                                                                                                                                                                                                                                                                                                    |                    |
| Input Register | 0x04 | - | 623 | Device address               | Un-signed8  | Value    | R |                                                                                                                                                                                                                                                                                                                                                                                                    |                    |
| Input Register | 0x04 | - | 624 | Write access status          | Un-signed8  | Enum     | R | 0:All locked<br>1:Display only<br>2:Autozero only<br>3:Display + Autozero<br>4:Not locked                                                                                                                                                                                                                                                                                                          |                    |
| Input Register | 0x04 | - | 625 | Function option status       | Un-signed16 | Bit-Enum | R | bit0:Tube Health Check<br>bit1:Batch function<br>bit2:Tube leakage detection<br>bit3:Analog input calorific value<br>bit4:Viscosity<br>bit5:Concentration standard<br>bit6:Concentration advanced<br>bit7:Net oil computing API<br>bit8:Net oil computing API and GVF<br>bit9:Reserved<br>bit10:Reserved<br>bit11:Reserved<br>bit12:Reserved<br>bit13:Reserved<br>bit14:Reserved<br>bit15:Reserved |                    |
| Input Register | 0x04 | - | 626 | Configuration change counter | Un-signed16 | Value    | R |                                                                                                                                                                                                                                                                                                                                                                                                    |                    |

|                |      |   |     |                     |            |      |   |                                                                                                                                                                                                                                                              |  |
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| Input Register | 0x04 | - | 627 | Terminal state 1    | Un-signed8 | Enum | R | 0:Analog output (Active)<br>1:Pulse/Status output (Passive)<br>2:Pulse/Status output (Active, No pull-up R)<br>3:Pulse/Status output (Active, Inner pull-up R)<br>4:Analog input (Active)<br>5:Analog input (Passive)<br>6:NM(Passive)<br>7:None<br>8:Modbus |  |
| Input Register | 0x04 | - | 628 | Terminal state 2    | Un-signed8 | Enum | R | 0:Pulse/Status output (Passive)<br>1:NM (Passive)<br>2:None                                                                                                                                                                                                  |  |
| Input Register | 0x04 | - | 629 | Terminal state 3    | Un-signed8 | Enum | R | 0:Pulse/Status output (Passive)<br>1:Status input (Voltage-free)<br>2:Status output (Passive)<br>3:Analog output (Passive)<br>4:None<br>5:Modbus(GND, (-)only)                                                                                               |  |
| Input Register | 0x04 | - | 630 | Terminal state 4    | Un-signed8 | Enum | R | 0:Analog output (Active)<br>1:Pulse/Status output (Passive)<br>2:Pulse/Status output (Active, No pull-up R)<br>3:Pulse/Status output (Active, Inner pull-up R)<br>4:Analog input (Active)<br>5:Analog input (Passive)<br>6:NM(Passive)<br>7:None<br>8:Modbus |  |
| Input Register | 0x04 | - | 631 | Language package    | Un-signed8 | Enum | R | 0: Package 1<br>1: Package 2<br>2: Package 3                                                                                                                                                                                                                 |  |
| Input Register | 0x04 | - | 632 | Total health result | Un-signed8 | Enum | R | 0:Good (with TuHC and No critical failure)<br>1:Good (No critical failure)<br>2:Warning<br>3:Bad<br>4:Start-up                                                                                                                                               |  |



|                            |      |   |     |                                  |                |       |   |                                                                                                                                                                                                                                         |   |
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| Input Register             | 0x04 | - | 640 | Operation time                   | Un-signed8[16] | ASCII | R |                                                                                                                                                                                                                                         |   |
| Input Register             | 0x04 | - | 648 | Current date                     | Un-signed32    | Date  | R |                                                                                                                                                                                                                                         |   |
| Input Register             | 0x04 | - | 650 | Current time                     | Un-signed32    | Time  | R |                                                                                                                                                                                                                                         |   |
| Input Register             | 0x04 | - | 652 | Logging start time               | Un-signed32    | Time  | R |                                                                                                                                                                                                                                         | s |
| Input Register             | 0x04 | - | 670 | Main software revision           | Un-signed8[16] | ASCII | R |                                                                                                                                                                                                                                         |   |
| Input Register             | 0x04 | - | 678 | Sensor software revision         | Un-signed8[16] | ASCII | R |                                                                                                                                                                                                                                         |   |
| Input Register             | 0x04 | - | 686 | Indicator software revision      | Un-signed8[16] | ASCII | R |                                                                                                                                                                                                                                         |   |
| Input Register (duplicate) | 0x04 | - | 740 | Transmitter type                 | Un-signed8     | Enum  | R | 0:Essential<br>1:Ultimate                                                                                                                                                                                                               |   |
| Input Register (duplicate) | 0x04 | - | 741 | IO type                          | Un-signed8     | Enum  | R | 0:None<br>1:JA<br>2:JB<br>3:JC<br>4:JD<br>5:JE<br>6:JF<br>7:JG<br>8:JH<br>9:JJ<br>10:JK<br>11:JL<br>12:JM<br>13:JN<br>14:JP<br>15:JQ<br>16:JR<br>17:JS<br>18:JT<br>19:JU<br>20:M0<br>21:M2<br>22:M3<br>23:M4<br>24:M5<br>25:M6<br>26:M7 |   |
| Input Register (duplicate) | 0x04 | - | 742 | Concentration measurement select | Un-signed8     | Enum  | R | 0:Inhibit<br>1:Standard<br>2:Advanced<br>3:Net oil computing API<br>4:Net oil computing API and GVF                                                                                                                                     |   |

|                            |      |   |     |                                            |                |          |   |                                                                                                                                                                                                                                                                                                                                      |                |
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| Input Register (duplicate) | 0x04 | - | 743 | Function option code                       | Un-signed16    | Bit-Enum | R | bit0:Tube Health Check<br>bit1:Batch function<br>bit2:Tube leakage detection<br>bit3:Analog input calorific value<br>bit4:Viscosity<br>bit5:Reserved<br>bit6:Reserved<br>bit7:Reserved<br>bit8:Reserved<br>bit9:Reserved<br>bit10:Reserved<br>bit11:Reserved<br>bit12:Reserved<br>bit13:Reserved<br>bit14:Reserved<br>bit15:Reserved |                |
| Input Register (duplicate) | 0x04 | - | 744 | Complete device serial number              | Un-signed8[16] | ASCII    | R |                                                                                                                                                                                                                                                                                                                                      |                |
| Input Register (duplicate) | 0x04 | - | 752 | Transmitter spare serial number            | Un-signed8[16] | ASCII    | R |                                                                                                                                                                                                                                                                                                                                      |                |
| Input Register (duplicate) | 0x04 | - | 770 | Sensor spare serial number                 | Un-signed8[16] | ASCII    | R |                                                                                                                                                                                                                                                                                                                                      |                |
| Input Register (duplicate) | 0x04 | - | 778 | Extra number 1                             | Un-signed8[16] | ASCII    | R |                                                                                                                                                                                                                                                                                                                                      |                |
| Input Register (duplicate) | 0x04 | - | 786 | Hardware revision                          | Un-signed8[16] | ASCII    | R |                                                                                                                                                                                                                                                                                                                                      |                |
| Input Register             | 0x04 | - | 800 | Total 1 24hours value                      | Float          | Value    | R |                                                                                                                                                                                                                                                                                                                                      | [Total 1 unit] |
| Input Register             | 0x04 | - | 802 | Total 1 24hours last update date           | Un-signed32    | Date     | R |                                                                                                                                                                                                                                                                                                                                      |                |
| Input Register             | 0x04 | - | 804 | Total 1 24hours last update time           | Un-signed32    | Time     | R |                                                                                                                                                                                                                                                                                                                                      |                |
| Input Register             | 0x04 | - | 806 | Total 1 24hours last update operation time | Un-signed8[16] | ASCII    | R |                                                                                                                                                                                                                                                                                                                                      |                |
| Input Register             | 0x04 | - | 814 | Total 1 24hours start date                 | Un-signed32    | Date     | R |                                                                                                                                                                                                                                                                                                                                      |                |
| Input Register             | 0x04 | - | 816 | Total 1 24hours start time                 | Un-signed32    | Time     | R |                                                                                                                                                                                                                                                                                                                                      |                |
| Input Register             | 0x04 | - | 818 | Total 1 24hours start operation time       | Un-signed8[16] | ASCII    | R |                                                                                                                                                                                                                                                                                                                                      |                |

|                |      |   |      |                                            |                |          |   |                                                                                                                                                                                                                                                      |                |
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| Input Register | 0x04 | - | 840  | Total 2 24hours value                      | Float          | Value    | R |                                                                                                                                                                                                                                                      | [Total 2 unit] |
| Input Register | 0x04 | - | 842  | Total 2 24hours last update date           | Un-signed32    | Date     | R |                                                                                                                                                                                                                                                      |                |
| Input Register | 0x04 | - | 844  | Total 2 24hours last update time           | Un-signed32    | Time     | R |                                                                                                                                                                                                                                                      |                |
| Input Register | 0x04 | - | 846  | Total 2 24hours last update operation time | Un-signed8[16] | ASCII    | R |                                                                                                                                                                                                                                                      |                |
| Input Register | 0x04 | - | 854  | Total 2 24hours start date                 | Un-signed32    | Date     | R |                                                                                                                                                                                                                                                      |                |
| Input Register | 0x04 | - | 856  | Total 2 24hours start time                 | Un-signed32    | Time     | R |                                                                                                                                                                                                                                                      |                |
| Input Register | 0x04 | - | 858  | Total 2 24hours start operation time       | Un-signed8[16] | ASCII    | R |                                                                                                                                                                                                                                                      |                |
| Input Register | 0x04 | - | 880  | Total 3 24hours value                      | Float          | Value    | R |                                                                                                                                                                                                                                                      | [Total 3 unit] |
| Input Register | 0x04 | - | 882  | Total 3 24hours last update date           | Un-signed32    | Date     | R |                                                                                                                                                                                                                                                      |                |
| Input Register | 0x04 | - | 884  | Total 3 24hours last update time           | Un-signed32    | Time     | R |                                                                                                                                                                                                                                                      |                |
| Input Register | 0x04 | - | 886  | Total 3 24hours last update operation time | Un-signed8[16] | ASCII    | R |                                                                                                                                                                                                                                                      |                |
| Input Register | 0x04 | - | 894  | Total 3 24hours start date                 | Un-signed32    | Date     | R |                                                                                                                                                                                                                                                      |                |
| Input Register | 0x04 | - | 896  | Total 3 24hours start time                 | Un-signed32    | Time     | R |                                                                                                                                                                                                                                                      |                |
| Input Register | 0x04 | - | 898  | Total 3 24hours start operation time       | Un-signed8[16] | ASCII    | R |                                                                                                                                                                                                                                                      |                |
| Input Register | 0x04 | - | 1000 | TuHC result flag                           | Un-signed8     | Bit-Enum | R | bit0:Change of inlet stiffness is over threshold<br>bit1:Change of outlet stiffness is over threshold<br>bit2:Suspicious test (continue test)<br>bit3:Skip test (continue test)<br>bit4:Stop test<br>bit5:Reserved<br>bit6:Reserved<br>bit7:Reserved |                |
| Input Register | 0x04 | - | 1001 | TuHC change ratio of inlet stiffness       | Float          | Value    | R |                                                                                                                                                                                                                                                      | %              |
| Input Register | 0x04 | - | 1003 | TuHC change ratio of outlet stiffness      | Float          | Value    | R |                                                                                                                                                                                                                                                      | %              |

|                |      |   |      |                              |             |       |   |                                                                                                                                                                                                                                                                                                                                                                              |     |
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| Input Register | 0x04 | - | 1005 | TuHC time at start           | Un-signed32 | Time  | R |                                                                                                                                                                                                                                                                                                                                                                              |     |
| Input Register | 0x04 | - | 1007 | TuHC operation time at start | Un-signed32 | Value | R |                                                                                                                                                                                                                                                                                                                                                                              | min |
| Input Register | 0x04 | - | 1009 | TuHC date at start           | Un-signed32 | Date  | R |                                                                                                                                                                                                                                                                                                                                                                              |     |
| Input Register | 0x04 | - | 1011 | TuHC progress percentage     | Un-signed8  | Value | R |                                                                                                                                                                                                                                                                                                                                                                              | %   |
| Input Register | 0x04 | - | 1012 | TuHC test counter            | Un-signed32 | Value | R |                                                                                                                                                                                                                                                                                                                                                                              |     |
| Input Register | 0x04 | - | 1014 | TuHC alarm                   | Un-signed8  | Enum  | R | 0:No error<br>1:S1 amplitude is zero at AGC<br>2:S2 amplitude is zero at AGC<br>3:Drive current is zero at AGC<br>4:Drive gain is zero at AGC<br>5:Amplitude is zero at fixed drive gain<br>6:No reference data<br>7:Different sensor parameters to reference<br>8:Unable to copy bad result to reference<br>9:Next test was started to copy reference<br>10:Parameter error |     |

|                            |      |   |      |                                    |             |          |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |
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| Input Register             | 0x04 | - | 1015 | TuHC warning                       | Un-signed16 | Bit-Enum | R | bit0:Suspicious test<br>bit1:Unstable condition at AGC1 & AGC2<br>bit2:Unstable condition at test & reference<br>bit3:Fluctuation of condition at AGC1<br>bit4:Change threshold level<br>bit5:Temperature or Pressure is out of range<br>bit6:Fluctuation of condition at scan<br>bit7:No cross thresholds<br>bit8:Deviation of slope<br>bit9:Unstable condition at AGC1 & scan<br>bit10:Skip test<br>bit11:Slope control error<br>bit12:Amplitude is out of limit<br>bit13:Data trans error<br>bit14:Calculation error<br>bit15:Reserved |      |
| Input Register             | 0x04 | - | 1016 | TuHC health result                 | Un-signed8  | Enum     | R | 0: Not execute<br>1: Warning<br>2: Error<br>3: OK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |
| Input Register (duplicate) | 0x04 | - | 1030 | TuHC date at reference 1           | Un-signed32 | Date     | R |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |
| Input Register (duplicate) | 0x04 | - | 1032 | TuHC time at reference 1           | Un-signed32 | Time     | R |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |
| Input Register (duplicate) | 0x04 | - | 1034 | TuHC operation time at reference 1 | Un-signed32 | Value    | R |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | min  |
| Input Register (duplicate) | 0x04 | - | 1036 | TuHC temperature at reference 1    | Float       | Value    | R |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | degC |
| Input Register (duplicate) | 0x04 | - | 1038 | TuHC mass flow at reference 1      | Float       | Value    | R |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | kg/h |

|                            |      |   |      |                                                                       |                |       |   |                                                  |      |
|----------------------------|------|---|------|-----------------------------------------------------------------------|----------------|-------|---|--------------------------------------------------|------|
| Input Register (duplicate) | 0x04 | - | 1040 | TuHC density at reference 1                                           | Float          | Value | R |                                                  | kg/L |
| Input Register             | 0x04 | - | 1042 | TuHC inlet stiffness selected result calculation method at reference  | Un-signed8     | Enum  | R |                                                  |      |
| Input Register             | 0x04 | - | 1043 | TuHC outlet stiffness selected result calculation method at reference | Un-signed8     | Enum  | R |                                                  |      |
| Input Register             | 0x04 | - | 1100 | Event no 1                                                            | Un-signed16    | Value | R |                                                  |      |
| Input Register             | 0x04 | - | 1101 | Event contents 1                                                      | Un-signed8     | Enum  | R | 0: Event clear<br>1: Event set<br>2: Acknowledge |      |
| Input Register             | 0x04 | - | 1102 | Event 1 operation time                                                | Un-signed8[16] | ASCII | R |                                                  |      |
| Input Register             | 0x04 | - | 1110 | Event 1 date                                                          | Un-signed32    | Date  | R |                                                  |      |
| Input Register             | 0x04 | - | 1112 | Event 1 time                                                          | Un-signed32    | Time  | R |                                                  |      |
| Input Register             | 0x04 | - | 1120 | Event no 2                                                            | Un-signed16    | Value | R |                                                  |      |
| Input Register             | 0x04 | - | 1121 | Event contents 2                                                      | Un-signed8     | Enum  | R | 0: Event clear<br>1: Event set<br>2: Acknowledge |      |
| Input Register             | 0x04 | - | 1122 | Event 2 operation time                                                | Un-signed8[16] | ASCII | R |                                                  |      |
| Input Register             | 0x04 | - | 1130 | Event 2 date                                                          | Un-signed32    | Date  | R |                                                  |      |
| Input Register             | 0x04 | - | 1132 | Event 2 time                                                          | Un-signed32    | Time  | R |                                                  |      |
| Input Register             | 0x04 | - | 1140 | Event no 3                                                            | Un-signed16    | Value | R |                                                  |      |
| Input Register             | 0x04 | - | 1141 | Event contents 3                                                      | Un-signed8     | Enum  | R | 0: Event clear<br>1: Event set<br>2: Acknowledge |      |
| Input Register             | 0x04 | - | 1142 | Event 3 operation time                                                | Un-signed8[16] | ASCII | R |                                                  |      |
| Input Register             | 0x04 | - | 1150 | Event 3 date                                                          | Un-signed32    | Date  | R |                                                  |      |
| Input Register             | 0x04 | - | 1152 | Event 3 time                                                          | Un-signed32    | Time  | R |                                                  |      |
| Input Register             | 0x04 | - | 1160 | Event no 4                                                            | Un-signed16    | Value | R |                                                  |      |
| Input Register             | 0x04 | - | 1161 | Event contents 4                                                      | Un-signed8     | Enum  | R | 0: Event clear<br>1: Event set<br>2: Acknowledge |      |

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| Input Register | 0x04 | - | 1162 | Event 4 operation time | Unsigned8[16] | ASCII | R |                                                  |  |
| Input Register | 0x04 | - | 1170 | Event 4 date           | Unsigned32    | Date  | R |                                                  |  |
| Input Register | 0x04 | - | 1172 | Event 4 time           | Unsigned32    | Time  | R |                                                  |  |
| Input Register | 0x04 | - | 1180 | Event no 5             | Unsigned16    | Value | R |                                                  |  |
| Input Register | 0x04 | - | 1181 | Event contents 5       | Unsigned8     | Enum  | R | 0: Event clear<br>1: Event set<br>2: Acknowledge |  |
| Input Register | 0x04 | - | 1182 | Event 5 operation time | Unsigned8[16] | ASCII | R |                                                  |  |
| Input Register | 0x04 | - | 1190 | Event 5 date           | Unsigned32    | Date  | R |                                                  |  |
| Input Register | 0x04 | - | 1192 | Event 5 time           | Unsigned32    | Time  | R |                                                  |  |
| Input Register | 0x04 | - | 1200 | Event no 6             | Unsigned16    | Value | R |                                                  |  |
| Input Register | 0x04 | - | 1201 | Event contents 6       | Unsigned8     | Enum  | R | 0: Event clear<br>1: Event set<br>2: Acknowledge |  |
| Input Register | 0x04 | - | 1202 | Event 6 operation time | Unsigned8[16] | ASCII | R |                                                  |  |
| Input Register | 0x04 | - | 1210 | Event 6 date           | Unsigned32    | Date  | R |                                                  |  |
| Input Register | 0x04 | - | 1212 | Event 6 time           | Unsigned32    | Time  | R |                                                  |  |
| Input Register | 0x04 | - | 1220 | Event no 7             | Unsigned16    | Value | R |                                                  |  |
| Input Register | 0x04 | - | 1221 | Event contents 7       | Unsigned8     | Enum  | R | 0: Event clear<br>1: Event set<br>2: Acknowledge |  |
| Input Register | 0x04 | - | 1222 | Event 7 operation time | Unsigned8[16] | ASCII | R |                                                  |  |
| Input Register | 0x04 | - | 1230 | Event 7 date           | Unsigned32    | Date  | R |                                                  |  |
| Input Register | 0x04 | - | 1232 | Event 7 time           | Unsigned32    | Time  | R |                                                  |  |
| Input Register | 0x04 | - | 1240 | Event no 8             | Unsigned16    | Value | R |                                                  |  |
| Input Register | 0x04 | - | 1241 | Event contents 8       | Unsigned8     | Enum  | R | 0: Event clear<br>1: Event set<br>2: Acknowledge |  |
| Input Register | 0x04 | - | 1242 | Event 8 operation time | Unsigned8[16] | ASCII | R |                                                  |  |
| Input Register | 0x04 | - | 1250 | Event 8 date           | Unsigned32    | Date  | R |                                                  |  |
| Input Register | 0x04 | - | 1252 | Event 8 time           | Unsigned32    | Time  | R |                                                  |  |

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| Input Register | 0x04 | - | 1260 | Event no 9                  | Un-signed16    | Value | R |                                                  |                    |
| Input Register | 0x04 | - | 1261 | Event contents 9            | Un-signed8     | Enum  | R | 0: Event clear<br>1: Event set<br>2: Acknowledge |                    |
| Input Register | 0x04 | - | 1262 | Event 9 operation time      | Un-signed8[16] | ASCII | R |                                                  |                    |
| Input Register | 0x04 | - | 1270 | Event 9 date                | Un-signed32    | Date  | R |                                                  |                    |
| Input Register | 0x04 | - | 1272 | Event 9 time                | Un-signed32    | Time  | R |                                                  |                    |
| Input Register | 0x04 | - | 1280 | Event no 10                 | Un-signed16    | Value | R |                                                  |                    |
| Input Register | 0x04 | - | 1281 | Event contents 10           | Un-signed8     | Enum  | R | 0: Event clear<br>1: Event set<br>2: Acknowledge |                    |
| Input Register | 0x04 | - | 1282 | Event 10 operation time     | Un-signed8[16] | ASCII | R |                                                  |                    |
| Input Register | 0x04 | - | 1290 | Event 10 date               | Un-signed32    | Date  | R |                                                  |                    |
| Input Register | 0x04 | - | 1292 | Event 10 time               | Un-signed32    | Time  | R |                                                  |                    |
| Input Register | 0x04 | - | 1400 | Event 1 mass flow last 1    | Float          | Value | R |                                                  | [Mass flow unit]   |
| Input Register | 0x04 | - | 1402 | Event 1 mass flow last 2    | Float          | Value | R |                                                  | [Mass flow unit]   |
| Input Register | 0x04 | - | 1404 | Event 1 mass flow last 3    | Float          | Value | R |                                                  | [Mass flow unit]   |
| Input Register | 0x04 | - | 1406 | Event 1 mass flow after 1   | Float          | Value | R |                                                  | [Mass flow unit]   |
| Input Register | 0x04 | - | 1408 | Event 1 mass flow after 2   | Float          | Value | R |                                                  | [Mass flow unit]   |
| Input Register | 0x04 | - | 1410 | Event 1 mass flow after 3   | Float          | Value | R |                                                  | [Mass flow unit]   |
| Input Register | 0x04 | - | 1412 | Event 1 density last 1      | Float          | Value | R |                                                  | [Density unit]     |
| Input Register | 0x04 | - | 1414 | Event 1 density last 2      | Float          | Value | R |                                                  | [Density unit]     |
| Input Register | 0x04 | - | 1416 | Event 1 density last 3      | Float          | Value | R |                                                  | [Density unit]     |
| Input Register | 0x04 | - | 1418 | Event 1 density after 1     | Float          | Value | R |                                                  | [Density unit]     |
| Input Register | 0x04 | - | 1420 | Event 1 density after 2     | Float          | Value | R |                                                  | [Density unit]     |
| Input Register | 0x04 | - | 1422 | Event 1 density after 3     | Float          | Value | R |                                                  | [Density unit]     |
| Input Register | 0x04 | - | 1430 | Event 1 temperature last 1  | Float          | Value | R |                                                  | [Temperature unit] |
| Input Register | 0x04 | - | 1432 | Event 1 temperature last 2  | Float          | Value | R |                                                  | [Temperature unit] |
| Input Register | 0x04 | - | 1434 | Event 1 temperature last 3  | Float          | Value | R |                                                  | [Temperature unit] |
| Input Register | 0x04 | - | 1436 | Event 1 temperature after 1 | Float          | Value | R |                                                  | [Temperature unit] |



|                |      |   |      |                                   |       |       |   |  |                          |
|----------------|------|---|------|-----------------------------------|-------|-------|---|--|--------------------------|
| Input Register | 0x04 | - | 1438 | Event 1 temperature after 2       | Float | Value | R |  | [Temperature unit]       |
| Input Register | 0x04 | - | 1440 | Event 1 temperature after 3       | Float | Value | R |  | [Temperature unit]       |
| Input Register | 0x04 | - | 1442 | Event 1 pressure last 1           | Float | Value | R |  | [Pressure unit]          |
| Input Register | 0x04 | - | 1444 | Event 1 pressure last 2           | Float | Value | R |  | [Pressure unit]          |
| Input Register | 0x04 | - | 1446 | Event 1 pressure last 3           | Float | Value | R |  | [Pressure unit]          |
| Input Register | 0x04 | - | 1448 | Event 1 pressure after 1          | Float | Value | R |  | [Pressure unit]          |
| Input Register | 0x04 | - | 1450 | Event 1 pressure after 2          | Float | Value | R |  | [Pressure unit]          |
| Input Register | 0x04 | - | 1452 | Event 1 pressure after 3          | Float | Value | R |  | [Pressure unit]          |
| Input Register | 0x04 | - | 1460 | Event 1 net mass flow 1 last 1    | Float | Value | R |  | [Net mass flow 1 unit]   |
| Input Register | 0x04 | - | 1462 | Event 1 net mass flow 1 last 2    | Float | Value | R |  | [Net mass flow 1 unit]   |
| Input Register | 0x04 | - | 1464 | Event 1 net mass flow 1 last 3    | Float | Value | R |  | [Net mass flow 1 unit]   |
| Input Register | 0x04 | - | 1466 | Event 1 net mass flow 1 after 1   | Float | Value | R |  | [Net mass flow 1 unit]   |
| Input Register | 0x04 | - | 1468 | Event 1 net mass flow 1 after 2   | Float | Value | R |  | [Net mass flow 1 unit]   |
| Input Register | 0x04 | - | 1470 | Event 1 net mass flow 1 after 3   | Float | Value | R |  | [Net mass flow 1 unit]   |
| Input Register | 0x04 | - | 1472 | Event 1 net volume flow 1 last 1  | Float | Value | R |  | [Net volume flow 1 unit] |
| Input Register | 0x04 | - | 1474 | Event 1 net volume flow 1 last 2  | Float | Value | R |  | [Net volume flow 1 unit] |
| Input Register | 0x04 | - | 1476 | Event 1 net volume flow 1 last 3  | Float | Value | R |  | [Net volume flow 1 unit] |
| Input Register | 0x04 | - | 1478 | Event 1 net volume flow 1 after 1 | Float | Value | R |  | [Net volume flow 1 unit] |
| Input Register | 0x04 | - | 1480 | Event 1 net volume flow 1 after 2 | Float | Value | R |  | [Net volume flow 1 unit] |
| Input Register | 0x04 | - | 1482 | Event 1 net volume flow 1 after 3 | Float | Value | R |  | [Net volume flow 1 unit] |

|                |      |   |      |                              |       |       |   |                                                                                                                                                                                                                                                                  |
|----------------|------|---|------|------------------------------|-------|-------|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input Register | 0x04 | - | 1490 | Event 1 concentration last 1 | Float | Value | R | When Selected concentration set is 0:Set1<br>[Concentration measurement unit set 1]<br>When 1:Set2<br>[Concentration measurement unit set 2]<br>When 2:Set3 ,<br>[Concentration measurement unit set 3]<br>When 3:Set4<br>[Concentration measurement unit set 4] |
| Input Register | 0x04 | - | 1492 | Event 1 concentration last 2 | Float | Value | R | When Selected concentration set is 0:Set1<br>[Concentration measurement unit set 1]<br>When 1:Set2<br>[Concentration measurement unit set 2]<br>When 2:Set3 ,<br>[Concentration measurement unit set 3]<br>When 3:Set4<br>[Concentration measurement unit set 4] |
| Input Register | 0x04 | - | 1494 | Event 1 concentration last 3 | Float | Value | R | When Selected concentration set is 0:Set1<br>[Concentration measurement unit set 1]<br>When 1:Set2<br>[Concentration measurement unit set 2]<br>When 2:Set3 ,<br>[Concentration measurement unit set 3]<br>When 3:Set4<br>[Concentration measurement unit set 4] |

|                |      |   |      |                                        |       |       |   |  |                                                                                                                                                                                                                                                                  |
|----------------|------|---|------|----------------------------------------|-------|-------|---|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input Register | 0x04 | - | 1496 | Event 1 concentration after 1          | Float | Value | R |  | When Selected concentration set is 0:Set1<br>[Concentration measurement unit set 1]<br>When 1:Set2<br>[Concentration measurement unit set 2]<br>When 2:Set3 ,<br>[Concentration measurement unit set 3]<br>When 3:Set4<br>[Concentration measurement unit set 4] |
| Input Register | 0x04 | - | 1498 | Event 1 concentration after 2          | Float | Value | R |  | When Selected concentration set is 0:Set1<br>[Concentration measurement unit set 1]<br>When 1:Set2<br>[Concentration measurement unit set 2]<br>When 2:Set3 ,<br>[Concentration measurement unit set 3]<br>When 3:Set4<br>[Concentration measurement unit set 4] |
| Input Register | 0x04 | - | 1500 | Event 1 concentration after 3          | Float | Value | R |  | When Selected concentration set is 0:Set1<br>[Concentration measurement unit set 1]<br>When 1:Set2<br>[Concentration measurement unit set 2]<br>When 2:Set3 ,<br>[Concentration measurement unit set 3]<br>When 3:Set4<br>[Concentration measurement unit set 4] |
| Input Register | 0x04 | - | 1502 | Event 1 transmitter temperature last 1 | Float | Value | R |  | [Temperature unit]                                                                                                                                                                                                                                               |
| Input Register | 0x04 | - | 1504 | Event 1 transmitter temperature last 2 | Float | Value | R |  | [Temperature unit]                                                                                                                                                                                                                                               |

|                |      |   |      |                                         |       |       |   |  |                    |
|----------------|------|---|------|-----------------------------------------|-------|-------|---|--|--------------------|
| Input Register | 0x04 | - | 1506 | Event 1 transmitter temperature last 3  | Float | Value | R |  | [Temperature unit] |
| Input Register | 0x04 | - | 1508 | Event 1 transmitter temperature after 1 | Float | Value | R |  | [Temperature unit] |
| Input Register | 0x04 | - | 1510 | Event 1 transmitter temperature after 2 | Float | Value | R |  | [Temperature unit] |
| Input Register | 0x04 | - | 1512 | Event 1 transmitter temperature after 3 | Float | Value | R |  | [Temperature unit] |
| Input Register | 0x04 | - | 1520 | Event 1 resonance frequency last 1      | Float | Value | R |  | Hz                 |
| Input Register | 0x04 | - | 1522 | Event 1 resonance frequency last 2      | Float | Value | R |  | Hz                 |
| Input Register | 0x04 | - | 1524 | Event 1 resonance frequency last 3      | Float | Value | R |  | Hz                 |
| Input Register | 0x04 | - | 1526 | Event 1 resonance frequency after 1     | Float | Value | R |  | Hz                 |
| Input Register | 0x04 | - | 1528 | Event 1 resonance frequency after 2     | Float | Value | R |  | Hz                 |
| Input Register | 0x04 | - | 1530 | Event 1 resonance frequency after 3     | Float | Value | R |  | Hz                 |
| Input Register | 0x04 | - | 1532 | Event 1 phase difference last 1         | Float | Value | R |  | mrad               |
| Input Register | 0x04 | - | 1534 | Event 1 phase difference last 2         | Float | Value | R |  | mrad               |
| Input Register | 0x04 | - | 1536 | Event 1 phase difference last 3         | Float | Value | R |  | mrad               |
| Input Register | 0x04 | - | 1538 | Event 1 phase difference after 1        | Float | Value | R |  | mrad               |
| Input Register | 0x04 | - | 1540 | Event 1 phase difference after 2        | Float | Value | R |  | mrad               |
| Input Register | 0x04 | - | 1542 | Event 1 phase difference after 3        | Float | Value | R |  | mrad               |
| Input Register | 0x04 | - | 1550 | Event 1 drive gain last 1               | Float | Value | R |  | A/V                |
| Input Register | 0x04 | - | 1552 | Event 1 drive gain last 2               | Float | Value | R |  | A/V                |
| Input Register | 0x04 | - | 1554 | Event 1 drive gain last 3               | Float | Value | R |  | A/V                |
| Input Register | 0x04 | - | 1556 | Event 1 drive gain after 1              | Float | Value | R |  | A/V                |

|                |      |   |      |                                |       |       |   |  |                    |
|----------------|------|---|------|--------------------------------|-------|-------|---|--|--------------------|
| Input Register | 0x04 | - | 1558 | Event 1 drive gain after 2     | Float | Value | R |  | A/V                |
| Input Register | 0x04 | - | 1560 | Event 1 drive gain after 3     | Float | Value | R |  | A/V                |
| Input Register | 0x04 | - | 1562 | Event 1 drive current last 1   | Float | Value | R |  | mApp               |
| Input Register | 0x04 | - | 1564 | Event 1 drive current last 2   | Float | Value | R |  | mApp               |
| Input Register | 0x04 | - | 1566 | Event 1 drive current last 3   | Float | Value | R |  | mApp               |
| Input Register | 0x04 | - | 1568 | Event 1 drive current after 1  | Float | Value | R |  | mApp               |
| Input Register | 0x04 | - | 1570 | Event 1 drive current after 2  | Float | Value | R |  | mApp               |
| Input Register | 0x04 | - | 1572 | Event 1 drive current after 3  | Float | Value | R |  | mApp               |
| Input Register | 0x04 | - | 1580 | Autozero value 1               | Float | Value | R |  | [Mass flow unit]   |
| Input Register | 0x04 | - | 1582 | Autozero standard deviation 1  | Float | Value | R |  | [Mass flow unit]   |
| Input Register | 0x04 | - | 1584 | Autozero density 1             | Float | Value | R |  | [Density unit]     |
| Input Register | 0x04 | - | 1586 | Autozero temperature 1         | Float | Value | R |  | [Temperature unit] |
| Input Register | 0x04 | - | 1588 | Autozero drive current 1       | Float | Value | R |  | mApp               |
| Input Register | 0x04 | - | 1590 | Autozero resonance frequency 1 | Float | Value | R |  | Hz                 |
| Input Register | 0x04 | - | 1592 | Autozero pressure 1            | Float | Value | R |  | [Pressure unit]    |
| Input Register | 0x04 | - | 1594 | Sensor max temperature 1       | Float | Value | R |  | [Temperature unit] |
| Input Register | 0x04 | - | 1700 | Event 2 mass flow last 1       | Float | Value | R |  | [Mass flow unit]   |
| Input Register | 0x04 | - | 1702 | Event 2 mass flow last 2       | Float | Value | R |  | [Mass flow unit]   |
| Input Register | 0x04 | - | 1704 | Event 2 mass flow last 3       | Float | Value | R |  | [Mass flow unit]   |
| Input Register | 0x04 | - | 1706 | Event 2 mass flow after 1      | Float | Value | R |  | [Mass flow unit]   |
| Input Register | 0x04 | - | 1708 | Event 2 mass flow after 2      | Float | Value | R |  | [Mass flow unit]   |
| Input Register | 0x04 | - | 1710 | Event 2 mass flow after 3      | Float | Value | R |  | [Mass flow unit]   |
| Input Register | 0x04 | - | 1712 | Event 2 density last 1         | Float | Value | R |  | [Density unit]     |
| Input Register | 0x04 | - | 1714 | Event 2 density last 2         | Float | Value | R |  | [Density unit]     |
| Input Register | 0x04 | - | 1716 | Event 2 density last 3         | Float | Value | R |  | [Density unit]     |
| Input Register | 0x04 | - | 1718 | Event 2 density after 1        | Float | Value | R |  | [Density unit]     |

|                |      |   |      |                                  |       |       |   |  |                          |
|----------------|------|---|------|----------------------------------|-------|-------|---|--|--------------------------|
| Input Register | 0x04 | - | 1720 | Event 2 density after 2          | Float | Value | R |  | [Density unit]           |
| Input Register | 0x04 | - | 1722 | Event 2 density after 3          | Float | Value | R |  | [Density unit]           |
| Input Register | 0x04 | - | 1730 | Event 2 temperature last 1       | Float | Value | R |  | [Temperature unit]       |
| Input Register | 0x04 | - | 1732 | Event 2 temperature last 2       | Float | Value | R |  | [Temperature unit]       |
| Input Register | 0x04 | - | 1734 | Event 2 temperature last 3       | Float | Value | R |  | [Temperature unit]       |
| Input Register | 0x04 | - | 1736 | Event 2 temperature after 1      | Float | Value | R |  | [Temperature unit]       |
| Input Register | 0x04 | - | 1738 | Event 2 temperature after 2      | Float | Value | R |  | [Temperature unit]       |
| Input Register | 0x04 | - | 1740 | Event 2 temperature after 3      | Float | Value | R |  | [Temperature unit]       |
| Input Register | 0x04 | - | 1742 | Event 2 pressure last 1          | Float | Value | R |  | [Pressure unit]          |
| Input Register | 0x04 | - | 1744 | Event 2 pressure last 2          | Float | Value | R |  | [Pressure unit]          |
| Input Register | 0x04 | - | 1746 | Event 2 pressure last 3          | Float | Value | R |  | [Pressure unit]          |
| Input Register | 0x04 | - | 1748 | Event 2 pressure after 1         | Float | Value | R |  | [Pressure unit]          |
| Input Register | 0x04 | - | 1750 | Event 2 pressure after 2         | Float | Value | R |  | [Pressure unit]          |
| Input Register | 0x04 | - | 1752 | Event 2 pressure after 3         | Float | Value | R |  | [Pressure unit]          |
| Input Register | 0x04 | - | 1760 | Event 2 net mass flow 1 last 1   | Float | Value | R |  | [Net mass flow 1 unit]   |
| Input Register | 0x04 | - | 1762 | Event 2 net mass flow 1 last 2   | Float | Value | R |  | [Net mass flow 1 unit]   |
| Input Register | 0x04 | - | 1764 | Event 2 net mass flow 1 last 3   | Float | Value | R |  | [Net mass flow 1 unit]   |
| Input Register | 0x04 | - | 1766 | Event 2 net mass flow 1 after 1  | Float | Value | R |  | [Net mass flow 1 unit]   |
| Input Register | 0x04 | - | 1768 | Event 2 net mass flow 1 after 2  | Float | Value | R |  | [Net mass flow 1 unit]   |
| Input Register | 0x04 | - | 1770 | Event 2 net mass flow 1 after 3  | Float | Value | R |  | [Net mass flow 1 unit]   |
| Input Register | 0x04 | - | 1772 | Event 2 net volume flow 1 last 1 | Float | Value | R |  | [Net volume flow 1 unit] |
| Input Register | 0x04 | - | 1774 | Event 2 net volume flow 1 last 2 | Float | Value | R |  | [Net volume flow 1 unit] |
| Input Register | 0x04 | - | 1776 | Event 2 net volume flow 1 last 3 | Float | Value | R |  | [Net volume flow 1 unit] |

|                |      |   |      |                                   |       |       |   |  |                                                                                                                                                                                                                                                                  |
|----------------|------|---|------|-----------------------------------|-------|-------|---|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input Register | 0x04 | - | 1778 | Event 2 net volume flow 1 after 1 | Float | Value | R |  | [Net volume flow 1 unit]                                                                                                                                                                                                                                         |
| Input Register | 0x04 | - | 1780 | Event 2 net volume flow 1 after 2 | Float | Value | R |  | [Net volume flow 1 unit]                                                                                                                                                                                                                                         |
| Input Register | 0x04 | - | 1782 | Event 2 net volume flow 1 after 3 | Float | Value | R |  | [Net volume flow 1 unit]                                                                                                                                                                                                                                         |
| Input Register | 0x04 | - | 1790 | Event 2 concentration last 1      | Float | Value | R |  | When Selected concentration set is 0:Set1<br>[Concentration measurement unit set 1]<br>When 1:Set2<br>[Concentration measurement unit set 2]<br>When 2:Set3 ,<br>[Concentration measurement unit set 3]<br>When 3:Set4<br>[Concentration measurement unit set 4] |
| Input Register | 0x04 | - | 1792 | Event 2 concentration last 2      | Float | Value | R |  | When Selected concentration set is 0:Set1<br>[Concentration measurement unit set 1]<br>When 1:Set2<br>[Concentration measurement unit set 2]<br>When 2:Set3 ,<br>[Concentration measurement unit set 3]<br>When 3:Set4<br>[Concentration measurement unit set 4] |

|                |      |   |      |                               |       |       |   |                                                                                                                                                                                                                                                                  |
|----------------|------|---|------|-------------------------------|-------|-------|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input Register | 0x04 | - | 1794 | Event 2 concentration last 3  | Float | Value | R | When Selected concentration set is 0:Set1<br>[Concentration measurement unit set 1]<br>When 1:Set2<br>[Concentration measurement unit set 2]<br>When 2:Set3 ,<br>[Concentration measurement unit set 3]<br>When 3:Set4<br>[Concentration measurement unit set 4] |
| Input Register | 0x04 | - | 1796 | Event 2 concentration after 1 | Float | Value | R | When Selected concentration set is 0:Set1<br>[Concentration measurement unit set 1]<br>When 1:Set2<br>[Concentration measurement unit set 2]<br>When 2:Set3 ,<br>[Concentration measurement unit set 3]<br>When 3:Set4<br>[Concentration measurement unit set 4] |
| Input Register | 0x04 | - | 1798 | Event 2 concentration after 2 | Float | Value | R | When Selected concentration set is 0:Set1<br>[Concentration measurement unit set 1]<br>When 1:Set2<br>[Concentration measurement unit set 2]<br>When 2:Set3 ,<br>[Concentration measurement unit set 3]<br>When 3:Set4<br>[Concentration measurement unit set 4] |



|                |      |   |      |                                         |       |       |   |                                                                                                                                                                                                                                                                  |
|----------------|------|---|------|-----------------------------------------|-------|-------|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input Register | 0x04 | - | 1800 | Event 2 concentration after 3           | Float | Value | R | When Selected concentration set is 0:Set1<br>[Concentration measurement unit set 1]<br>When 1:Set2<br>[Concentration measurement unit set 2]<br>When 2:Set3 ,<br>[Concentration measurement unit set 3]<br>When 3:Set4<br>[Concentration measurement unit set 4] |
| Input Register | 0x04 | - | 1802 | Event 2 transmitter temperature last 1  | Float | Value | R | [Temperature unit]                                                                                                                                                                                                                                               |
| Input Register | 0x04 | - | 1804 | Event 2 transmitter temperature last 2  | Float | Value | R | [Temperature unit]                                                                                                                                                                                                                                               |
| Input Register | 0x04 | - | 1806 | Event 2 transmitter temperature last 3  | Float | Value | R | [Temperature unit]                                                                                                                                                                                                                                               |
| Input Register | 0x04 | - | 1808 | Event 2 transmitter temperature after 1 | Float | Value | R | [Temperature unit]                                                                                                                                                                                                                                               |
| Input Register | 0x04 | - | 1810 | Event 2 transmitter temperature after 2 | Float | Value | R | [Temperature unit]                                                                                                                                                                                                                                               |
| Input Register | 0x04 | - | 1812 | Event 2 transmitter temperature after 3 | Float | Value | R | [Temperature unit]                                                                                                                                                                                                                                               |
| Input Register | 0x04 | - | 1820 | Event 2 resonance frequency last 1      | Float | Value | R | Hz                                                                                                                                                                                                                                                               |
| Input Register | 0x04 | - | 1822 | Event 2 resonance frequency last 2      | Float | Value | R | Hz                                                                                                                                                                                                                                                               |
| Input Register | 0x04 | - | 1824 | Event 2 resonance frequency last 3      | Float | Value | R | Hz                                                                                                                                                                                                                                                               |
| Input Register | 0x04 | - | 1826 | Event 2 resonance frequency after 1     | Float | Value | R | Hz                                                                                                                                                                                                                                                               |
| Input Register | 0x04 | - | 1828 | Event 2 resonance frequency after 2     | Float | Value | R | Hz                                                                                                                                                                                                                                                               |
| Input Register | 0x04 | - | 1830 | Event 2 resonance frequency after 3     | Float | Value | R | Hz                                                                                                                                                                                                                                                               |
| Input Register | 0x04 | - | 1832 | Event 2 phase difference last 1         | Float | Value | R | mrad                                                                                                                                                                                                                                                             |

|                |      |   |      |                                  |       |       |   |  |                    |
|----------------|------|---|------|----------------------------------|-------|-------|---|--|--------------------|
| Input Register | 0x04 | - | 1834 | Event 2 phase difference last 2  | Float | Value | R |  | mrاد               |
| Input Register | 0x04 | - | 1836 | Event 2 phase difference last 3  | Float | Value | R |  | mrاد               |
| Input Register | 0x04 | - | 1838 | Event 2 phase difference after 1 | Float | Value | R |  | mrاد               |
| Input Register | 0x04 | - | 1840 | Event 2 phase difference after 2 | Float | Value | R |  | mrاد               |
| Input Register | 0x04 | - | 1842 | Event 2 phase difference after 3 | Float | Value | R |  | mrاد               |
| Input Register | 0x04 | - | 1850 | Event 2 drive gain last 1        | Float | Value | R |  | A/V                |
| Input Register | 0x04 | - | 1852 | Event 2 drive gain last 2        | Float | Value | R |  | A/V                |
| Input Register | 0x04 | - | 1854 | Event 2 drive gain last 3        | Float | Value | R |  | A/V                |
| Input Register | 0x04 | - | 1856 | Event 2 drive gain after 1       | Float | Value | R |  | A/V                |
| Input Register | 0x04 | - | 1858 | Event 2 drive gain after 2       | Float | Value | R |  | A/V                |
| Input Register | 0x04 | - | 1860 | Event 2 drive gain after 3       | Float | Value | R |  | A/V                |
| Input Register | 0x04 | - | 1862 | Event 2 drive current last 1     | Float | Value | R |  | mApp               |
| Input Register | 0x04 | - | 1864 | Event 2 drive current last 2     | Float | Value | R |  | mApp               |
| Input Register | 0x04 | - | 1866 | Event 2 drive current last 3     | Float | Value | R |  | mApp               |
| Input Register | 0x04 | - | 1868 | Event 2 drive current after 1    | Float | Value | R |  | mApp               |
| Input Register | 0x04 | - | 1870 | Event 2 drive current after 2    | Float | Value | R |  | mApp               |
| Input Register | 0x04 | - | 1872 | Event 2 drive current after 3    | Float | Value | R |  | mApp               |
| Input Register | 0x04 | - | 1880 | Autozero value 2                 | Float | Value | R |  | [Mass flow unit]   |
| Input Register | 0x04 | - | 1882 | Autozero standard deviation 2    | Float | Value | R |  | [Mass flow unit]   |
| Input Register | 0x04 | - | 1884 | Autozero density 2               | Float | Value | R |  | [Density unit]     |
| Input Register | 0x04 | - | 1886 | Autozero temperature 2           | Float | Value | R |  | [Temperature unit] |
| Input Register | 0x04 | - | 1888 | Autozero drive current 2         | Float | Value | R |  | mApp               |
| Input Register | 0x04 | - | 1890 | Autozero resonance frequency 2   | Float | Value | R |  | Hz                 |
| Input Register | 0x04 | - | 1892 | Autozero pressure 2              | Float | Value | R |  | [Pressure unit]    |

|                |      |   |      |                                |       |       |   |  |                        |
|----------------|------|---|------|--------------------------------|-------|-------|---|--|------------------------|
| Input Register | 0x04 | - | 1894 | Sensor max temperature 2       | Float | Value | R |  | [Temperature unit]     |
| Input Register | 0x04 | - | 2000 | Event 3 mass flow last 1       | Float | Value | R |  | [Mass flow unit]       |
| Input Register | 0x04 | - | 2002 | Event 3 mass flow last 2       | Float | Value | R |  | [Mass flow unit]       |
| Input Register | 0x04 | - | 2004 | Event 3 mass flow last 3       | Float | Value | R |  | [Mass flow unit]       |
| Input Register | 0x04 | - | 2006 | Event 3 mass flow after 1      | Float | Value | R |  | [Mass flow unit]       |
| Input Register | 0x04 | - | 2008 | Event 3 mass flow after 2      | Float | Value | R |  | [Mass flow unit]       |
| Input Register | 0x04 | - | 2010 | Event 3 mass flow after 3      | Float | Value | R |  | [Mass flow unit]       |
| Input Register | 0x04 | - | 2012 | Event 3 density last 1         | Float | Value | R |  | [Density unit]         |
| Input Register | 0x04 | - | 2014 | Event 3 density last 2         | Float | Value | R |  | [Density unit]         |
| Input Register | 0x04 | - | 2016 | Event 3 density last 3         | Float | Value | R |  | [Density unit]         |
| Input Register | 0x04 | - | 2018 | Event 3 density after 1        | Float | Value | R |  | [Density unit]         |
| Input Register | 0x04 | - | 2020 | Event 3 density after 2        | Float | Value | R |  | [Density unit]         |
| Input Register | 0x04 | - | 2022 | Event 3 density after 3        | Float | Value | R |  | [Density unit]         |
| Input Register | 0x04 | - | 2030 | Event 3 temperature last 1     | Float | Value | R |  | [Temperature unit]     |
| Input Register | 0x04 | - | 2032 | Event 3 temperature last 2     | Float | Value | R |  | [Temperature unit]     |
| Input Register | 0x04 | - | 2034 | Event 3 temperature last 3     | Float | Value | R |  | [Temperature unit]     |
| Input Register | 0x04 | - | 2036 | Event 3 temperature after 1    | Float | Value | R |  | [Temperature unit]     |
| Input Register | 0x04 | - | 2038 | Event 3 temperature after 2    | Float | Value | R |  | [Temperature unit]     |
| Input Register | 0x04 | - | 2040 | Event 3 temperature after 3    | Float | Value | R |  | [Temperature unit]     |
| Input Register | 0x04 | - | 2042 | Event 3 pressure last 1        | Float | Value | R |  | [Pressure unit]        |
| Input Register | 0x04 | - | 2044 | Event 3 pressure last 2        | Float | Value | R |  | [Pressure unit]        |
| Input Register | 0x04 | - | 2046 | Event 3 pressure last 3        | Float | Value | R |  | [Pressure unit]        |
| Input Register | 0x04 | - | 2048 | Event 3 pressure after 1       | Float | Value | R |  | [Pressure unit]        |
| Input Register | 0x04 | - | 2050 | Event 3 pressure after 2       | Float | Value | R |  | [Pressure unit]        |
| Input Register | 0x04 | - | 2052 | Event 3 pressure after 3       | Float | Value | R |  | [Pressure unit]        |
| Input Register | 0x04 | - | 2060 | Event 3 net mass flow 1 last 1 | Float | Value | R |  | [Net mass flow 1 unit] |

|                |      |   |      |                                   |       |       |   |  |                                                                                                                                                                                                                                                                  |
|----------------|------|---|------|-----------------------------------|-------|-------|---|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input Register | 0x04 | - | 2062 | Event 3 net mass flow 1 last 2    | Float | Value | R |  | [Net mass flow 1 unit]                                                                                                                                                                                                                                           |
| Input Register | 0x04 | - | 2064 | Event 3 net mass flow 1 last 3    | Float | Value | R |  | [Net mass flow 1 unit]                                                                                                                                                                                                                                           |
| Input Register | 0x04 | - | 2066 | Event 3 net mass flow 1 after 1   | Float | Value | R |  | [Net mass flow 1 unit]                                                                                                                                                                                                                                           |
| Input Register | 0x04 | - | 2068 | Event 3 net mass flow 1 after 2   | Float | Value | R |  | [Net mass flow 1 unit]                                                                                                                                                                                                                                           |
| Input Register | 0x04 | - | 2070 | Event 3 net mass flow 1 after 3   | Float | Value | R |  | [Net mass flow 1 unit]                                                                                                                                                                                                                                           |
| Input Register | 0x04 | - | 2072 | Event 3 net volume flow 1 last 1  | Float | Value | R |  | [Net volume flow 1 unit]                                                                                                                                                                                                                                         |
| Input Register | 0x04 | - | 2074 | Event 3 net volume flow 1 last 2  | Float | Value | R |  | [Net volume flow 1 unit]                                                                                                                                                                                                                                         |
| Input Register | 0x04 | - | 2076 | Event 3 net volume flow 1 last 3  | Float | Value | R |  | [Net volume flow 1 unit]                                                                                                                                                                                                                                         |
| Input Register | 0x04 | - | 2078 | Event 3 net volume flow 1 after 1 | Float | Value | R |  | [Net volume flow 1 unit]                                                                                                                                                                                                                                         |
| Input Register | 0x04 | - | 2080 | Event 3 net volume flow 1 after 2 | Float | Value | R |  | [Net volume flow 1 unit]                                                                                                                                                                                                                                         |
| Input Register | 0x04 | - | 2082 | Event 3 net volume flow 1 after 3 | Float | Value | R |  | [Net volume flow 1 unit]                                                                                                                                                                                                                                         |
| Input Register | 0x04 | - | 2090 | Event 3 concentration last 1      | Float | Value | R |  | When Selected concentration set is 0:Set1<br>[Concentration measurement unit set 1]<br>When 1:Set2<br>[Concentration measurement unit set 2]<br>When 2:Set3 ,<br>[Concentration measurement unit set 3]<br>When 3:Set4<br>[Concentration measurement unit set 4] |

|                |      |   |      |                               |       |       |   |                                                                                                                                                                                                                                                                  |
|----------------|------|---|------|-------------------------------|-------|-------|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input Register | 0x04 | - | 2092 | Event 3 concentration last 2  | Float | Value | R | When Selected concentration set is 0:Set1<br>[Concentration measurement unit set 1]<br>When 1:Set2<br>[Concentration measurement unit set 2]<br>When 2:Set3 ,<br>[Concentration measurement unit set 3]<br>When 3:Set4<br>[Concentration measurement unit set 4] |
| Input Register | 0x04 | - | 2094 | Event 3 concentration last 3  | Float | Value | R | When Selected concentration set is 0:Set1<br>[Concentration measurement unit set 1]<br>When 1:Set2<br>[Concentration measurement unit set 2]<br>When 2:Set3 ,<br>[Concentration measurement unit set 3]<br>When 3:Set4<br>[Concentration measurement unit set 4] |
| Input Register | 0x04 | - | 2096 | Event 3 concentration after 1 | Float | Value | R | When Selected concentration set is 0:Set1<br>[Concentration measurement unit set 1]<br>When 1:Set2<br>[Concentration measurement unit set 2]<br>When 2:Set3 ,<br>[Concentration measurement unit set 3]<br>When 3:Set4<br>[Concentration measurement unit set 4] |

|                |      |   |      |                                         |       |       |   |  |                                                                                                                                                                                                                                                                  |
|----------------|------|---|------|-----------------------------------------|-------|-------|---|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input Register | 0x04 | - | 2098 | Event 3 concentration after 2           | Float | Value | R |  | When Selected concentration set is 0:Set1<br>[Concentration measurement unit set 1]<br>When 1:Set2<br>[Concentration measurement unit set 2]<br>When 2:Set3 ,<br>[Concentration measurement unit set 3]<br>When 3:Set4<br>[Concentration measurement unit set 4] |
| Input Register | 0x04 | - | 2100 | Event 3 concentration after 3           | Float | Value | R |  | When Selected concentration set is 0:Set1<br>[Concentration measurement unit set 1]<br>When 1:Set2<br>[Concentration measurement unit set 2]<br>When 2:Set3 ,<br>[Concentration measurement unit set 3]<br>When 3:Set4<br>[Concentration measurement unit set 4] |
| Input Register | 0x04 | - | 2102 | Event 3 transmitter temperature last 1  | Float | Value | R |  | [Temperature unit]                                                                                                                                                                                                                                               |
| Input Register | 0x04 | - | 2104 | Event 3 transmitter temperature last 2  | Float | Value | R |  | [Temperature unit]                                                                                                                                                                                                                                               |
| Input Register | 0x04 | - | 2106 | Event 3 transmitter temperature last 3  | Float | Value | R |  | [Temperature unit]                                                                                                                                                                                                                                               |
| Input Register | 0x04 | - | 2108 | Event 3 transmitter temperature after 1 | Float | Value | R |  | [Temperature unit]                                                                                                                                                                                                                                               |
| Input Register | 0x04 | - | 2110 | Event 3 transmitter temperature after 2 | Float | Value | R |  | [Temperature unit]                                                                                                                                                                                                                                               |
| Input Register | 0x04 | - | 2112 | Event 3 transmitter temperature after 3 | Float | Value | R |  | [Temperature unit]                                                                                                                                                                                                                                               |
| Input Register | 0x04 | - | 2120 | Event 3 resonance frequency last 1      | Float | Value | R |  | Hz                                                                                                                                                                                                                                                               |
| Input Register | 0x04 | - | 2122 | Event 3 resonance frequency last 2      | Float | Value | R |  | Hz                                                                                                                                                                                                                                                               |

|                |      |   |      |                                     |       |       |   |  |                  |
|----------------|------|---|------|-------------------------------------|-------|-------|---|--|------------------|
| Input Register | 0x04 | - | 2124 | Event 3 resonance frequency last 3  | Float | Value | R |  | Hz               |
| Input Register | 0x04 | - | 2126 | Event 3 resonance frequency after 1 | Float | Value | R |  | Hz               |
| Input Register | 0x04 | - | 2128 | Event 3 resonance frequency after 2 | Float | Value | R |  | Hz               |
| Input Register | 0x04 | - | 2130 | Event 3 resonance frequency after 3 | Float | Value | R |  | Hz               |
| Input Register | 0x04 | - | 2132 | Event 3 phase difference last 1     | Float | Value | R |  | mrad             |
| Input Register | 0x04 | - | 2134 | Event 3 phase difference last 2     | Float | Value | R |  | mrad             |
| Input Register | 0x04 | - | 2136 | Event 3 phase difference last 3     | Float | Value | R |  | mrad             |
| Input Register | 0x04 | - | 2138 | Event 3 phase difference after 1    | Float | Value | R |  | mrad             |
| Input Register | 0x04 | - | 2140 | Event 3 phase difference after 2    | Float | Value | R |  | mrad             |
| Input Register | 0x04 | - | 2142 | Event 3 phase difference after 3    | Float | Value | R |  | mrad             |
| Input Register | 0x04 | - | 2150 | Event 3 drive gain last 1           | Float | Value | R |  | A/V              |
| Input Register | 0x04 | - | 2152 | Event 3 drive gain last 2           | Float | Value | R |  | A/V              |
| Input Register | 0x04 | - | 2154 | Event 3 drive gain last 3           | Float | Value | R |  | A/V              |
| Input Register | 0x04 | - | 2156 | Event 3 drive gain after 1          | Float | Value | R |  | A/V              |
| Input Register | 0x04 | - | 2158 | Event 3 drive gain after 2          | Float | Value | R |  | A/V              |
| Input Register | 0x04 | - | 2160 | Event 3 drive gain after 3          | Float | Value | R |  | A/V              |
| Input Register | 0x04 | - | 2162 | Event 3 drive current last 1        | Float | Value | R |  | mApp             |
| Input Register | 0x04 | - | 2164 | Event 3 drive current last 2        | Float | Value | R |  | mApp             |
| Input Register | 0x04 | - | 2166 | Event 3 drive current last 3        | Float | Value | R |  | mApp             |
| Input Register | 0x04 | - | 2168 | Event 3 drive current after 1       | Float | Value | R |  | mApp             |
| Input Register | 0x04 | - | 2170 | Event 3 drive current after 2       | Float | Value | R |  | mApp             |
| Input Register | 0x04 | - | 2172 | Event 3 drive current after 3       | Float | Value | R |  | mApp             |
| Input Register | 0x04 | - | 2180 | Autozero value 3                    | Float | Value | R |  | [Mass flow unit] |

|                |      |   |      |                                |       |       |   |  |                    |
|----------------|------|---|------|--------------------------------|-------|-------|---|--|--------------------|
| Input Register | 0x04 | - | 2182 | Autozero standard deviation 3  | Float | Value | R |  | [Mass flow unit]   |
| Input Register | 0x04 | - | 2184 | Autozero density 3             | Float | Value | R |  | [Density unit]     |
| Input Register | 0x04 | - | 2186 | Autozero temperature 3         | Float | Value | R |  | [Temperature unit] |
| Input Register | 0x04 | - | 2188 | Autozero drive current 3       | Float | Value | R |  | mApp               |
| Input Register | 0x04 | - | 2190 | Autozero resonance frequency 3 | Float | Value | R |  | Hz                 |
| Input Register | 0x04 | - | 2192 | Autozero pressure 3            | Float | Value | R |  | [Pressure unit]    |
| Input Register | 0x04 | - | 2194 | Sensor max temperature 3       | Float | Value | R |  | [Temperature unit] |
| Input Register | 0x04 | - | 2300 | Event 4 mass flow last 1       | Float | Value | R |  | [Mass flow unit]   |
| Input Register | 0x04 | - | 2302 | Event 4 mass flow last 2       | Float | Value | R |  | [Mass flow unit]   |
| Input Register | 0x04 | - | 2304 | Event 4 mass flow last 3       | Float | Value | R |  | [Mass flow unit]   |
| Input Register | 0x04 | - | 2306 | Event 4 mass flow after 1      | Float | Value | R |  | [Mass flow unit]   |
| Input Register | 0x04 | - | 2308 | Event 4 mass flow after 2      | Float | Value | R |  | [Mass flow unit]   |
| Input Register | 0x04 | - | 2310 | Event 4 mass flow after 3      | Float | Value | R |  | [Mass flow unit]   |
| Input Register | 0x04 | - | 2312 | Event 4 density last 1         | Float | Value | R |  | [Density unit]     |
| Input Register | 0x04 | - | 2314 | Event 4 density last 2         | Float | Value | R |  | [Density unit]     |
| Input Register | 0x04 | - | 2316 | Event 4 density last 3         | Float | Value | R |  | [Density unit]     |
| Input Register | 0x04 | - | 2318 | Event 4 density after 1        | Float | Value | R |  | [Density unit]     |
| Input Register | 0x04 | - | 2320 | Event 4 density after 2        | Float | Value | R |  | [Density unit]     |
| Input Register | 0x04 | - | 2322 | Event 4 density after 3        | Float | Value | R |  | [Density unit]     |
| Input Register | 0x04 | - | 2330 | Event 4 temperature last 1     | Float | Value | R |  | [Temperature unit] |
| Input Register | 0x04 | - | 2332 | Event 4 temperature last 2     | Float | Value | R |  | [Temperature unit] |
| Input Register | 0x04 | - | 2334 | Event 4 temperature last 3     | Float | Value | R |  | [Temperature unit] |
| Input Register | 0x04 | - | 2336 | Event 4 temperature after 1    | Float | Value | R |  | [Temperature unit] |
| Input Register | 0x04 | - | 2338 | Event 4 temperature after 2    | Float | Value | R |  | [Temperature unit] |
| Input Register | 0x04 | - | 2340 | Event 4 temperature after 3    | Float | Value | R |  | [Temperature unit] |
| Input Register | 0x04 | - | 2342 | Event 4 pressure last 1        | Float | Value | R |  | [Pressure unit]    |



|                |      |   |      |                                   |       |       |   |  |                          |
|----------------|------|---|------|-----------------------------------|-------|-------|---|--|--------------------------|
| Input Register | 0x04 | - | 2344 | Event 4 pressure last 2           | Float | Value | R |  | [Pressure unit]          |
| Input Register | 0x04 | - | 2346 | Event 4 pressure last 3           | Float | Value | R |  | [Pressure unit]          |
| Input Register | 0x04 | - | 2348 | Event 4 pressure after 1          | Float | Value | R |  | [Pressure unit]          |
| Input Register | 0x04 | - | 2350 | Event 4 pressure after 2          | Float | Value | R |  | [Pressure unit]          |
| Input Register | 0x04 | - | 2352 | Event 4 pressure after 3          | Float | Value | R |  | [Pressure unit]          |
| Input Register | 0x04 | - | 2360 | Event 4 net mass flow 1 last 1    | Float | Value | R |  | [Net mass flow 1 unit]   |
| Input Register | 0x04 | - | 2362 | Event 4 net mass flow 1 last 2    | Float | Value | R |  | [Net mass flow 1 unit]   |
| Input Register | 0x04 | - | 2364 | Event 4 net mass flow 1 last 3    | Float | Value | R |  | [Net mass flow 1 unit]   |
| Input Register | 0x04 | - | 2366 | Event 4 net mass flow 1 after 1   | Float | Value | R |  | [Net mass flow 1 unit]   |
| Input Register | 0x04 | - | 2368 | Event 4 net mass flow 1 after 2   | Float | Value | R |  | [Net mass flow 1 unit]   |
| Input Register | 0x04 | - | 2370 | Event 4 net mass flow 1 after 3   | Float | Value | R |  | [Net mass flow 1 unit]   |
| Input Register | 0x04 | - | 2372 | Event 4 net volume flow 1 last 1  | Float | Value | R |  | [Net volume flow 1 unit] |
| Input Register | 0x04 | - | 2374 | Event 4 net volume flow 1 last 2  | Float | Value | R |  | [Net volume flow 1 unit] |
| Input Register | 0x04 | - | 2376 | Event 4 net volume flow 1 last 3  | Float | Value | R |  | [Net volume flow 1 unit] |
| Input Register | 0x04 | - | 2378 | Event 4 net volume flow 1 after 1 | Float | Value | R |  | [Net volume flow 1 unit] |
| Input Register | 0x04 | - | 2380 | Event 4 net volume flow 1 after 2 | Float | Value | R |  | [Net volume flow 1 unit] |
| Input Register | 0x04 | - | 2382 | Event 4 net volume flow 1 after 3 | Float | Value | R |  | [Net volume flow 1 unit] |

|                |      |   |      |                              |       |       |   |                                                                                                                                                                                                                                                                  |
|----------------|------|---|------|------------------------------|-------|-------|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input Register | 0x04 | - | 2390 | Event 4 concentration last 1 | Float | Value | R | When Selected concentration set is 0:Set1<br>[Concentration measurement unit set 1]<br>When 1:Set2<br>[Concentration measurement unit set 2]<br>When 2:Set3 ,<br>[Concentration measurement unit set 3]<br>When 3:Set4<br>[Concentration measurement unit set 4] |
| Input Register | 0x04 | - | 2392 | Event 4 concentration last 2 | Float | Value | R | When Selected concentration set is 0:Set1<br>[Concentration measurement unit set 1]<br>When 1:Set2<br>[Concentration measurement unit set 2]<br>When 2:Set3 ,<br>[Concentration measurement unit set 3]<br>When 3:Set4<br>[Concentration measurement unit set 4] |
| Input Register | 0x04 | - | 2394 | Event 4 concentration last 3 | Float | Value | R | When Selected concentration set is 0:Set1<br>[Concentration measurement unit set 1]<br>When 1:Set2<br>[Concentration measurement unit set 2]<br>When 2:Set3 ,<br>[Concentration measurement unit set 3]<br>When 3:Set4<br>[Concentration measurement unit set 4] |

|                |      |   |      |                                        |       |       |   |                                                                                                                                                                                                                                                                  |
|----------------|------|---|------|----------------------------------------|-------|-------|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input Register | 0x04 | - | 2396 | Event 4 concentration after 1          | Float | Value | R | When Selected concentration set is 0:Set1<br>[Concentration measurement unit set 1]<br>When 1:Set2<br>[Concentration measurement unit set 2]<br>When 2:Set3 ,<br>[Concentration measurement unit set 3]<br>When 3:Set4<br>[Concentration measurement unit set 4] |
| Input Register | 0x04 | - | 2398 | Event 4 concentration after 2          | Float | Value | R | When Selected concentration set is 0:Set1<br>[Concentration measurement unit set 1]<br>When 1:Set2<br>[Concentration measurement unit set 2]<br>When 2:Set3 ,<br>[Concentration measurement unit set 3]<br>When 3:Set4<br>[Concentration measurement unit set 4] |
| Input Register | 0x04 | - | 2400 | Event 4 concentration after 3          | Float | Value | R | When Selected concentration set is 0:Set1<br>[Concentration measurement unit set 1]<br>When 1:Set2<br>[Concentration measurement unit set 2]<br>When 2:Set3 ,<br>[Concentration measurement unit set 3]<br>When 3:Set4<br>[Concentration measurement unit set 4] |
| Input Register | 0x04 | - | 2402 | Event 4 transmitter temperature last 1 | Float | Value | R | [Temperature unit]                                                                                                                                                                                                                                               |
| Input Register | 0x04 | - | 2404 | Event 4 transmitter temperature last 2 | Float | Value | R | [Temperature unit]                                                                                                                                                                                                                                               |

|                |      |   |      |                                         |       |       |   |  |                    |
|----------------|------|---|------|-----------------------------------------|-------|-------|---|--|--------------------|
| Input Register | 0x04 | - | 2406 | Event 4 transmitter temperature last 3  | Float | Value | R |  | [Temperature unit] |
| Input Register | 0x04 | - | 2408 | Event 4 transmitter temperature after 1 | Float | Value | R |  | [Temperature unit] |
| Input Register | 0x04 | - | 2410 | Event 4 transmitter temperature after 2 | Float | Value | R |  | [Temperature unit] |
| Input Register | 0x04 | - | 2412 | Event 4 transmitter temperature after 3 | Float | Value | R |  | [Temperature unit] |
| Input Register | 0x04 | - | 2420 | Event 4 resonance frequency last 1      | Float | Value | R |  | Hz                 |
| Input Register | 0x04 | - | 2422 | Event 4 resonance frequency last 2      | Float | Value | R |  | Hz                 |
| Input Register | 0x04 | - | 2424 | Event 4 resonance frequency last 3      | Float | Value | R |  | Hz                 |
| Input Register | 0x04 | - | 2426 | Event 4 resonance frequency after 1     | Float | Value | R |  | Hz                 |
| Input Register | 0x04 | - | 2428 | Event 4 resonance frequency after 2     | Float | Value | R |  | Hz                 |
| Input Register | 0x04 | - | 2430 | Event 4 resonance frequency after 3     | Float | Value | R |  | Hz                 |
| Input Register | 0x04 | - | 2432 | Event 4 phase difference last 1         | Float | Value | R |  | mrad               |
| Input Register | 0x04 | - | 2434 | Event 4 phase difference last 2         | Float | Value | R |  | mrad               |
| Input Register | 0x04 | - | 2436 | Event 4 phase difference last 3         | Float | Value | R |  | mrad               |
| Input Register | 0x04 | - | 2438 | Event 4 phase difference after 1        | Float | Value | R |  | mrad               |
| Input Register | 0x04 | - | 2440 | Event 4 phase difference after 2        | Float | Value | R |  | mrad               |
| Input Register | 0x04 | - | 2442 | Event 4 phase difference after 3        | Float | Value | R |  | mrad               |
| Input Register | 0x04 | - | 2450 | Event 4 drive gain last 1               | Float | Value | R |  | A/V                |
| Input Register | 0x04 | - | 2452 | Event 4 drive gain last 2               | Float | Value | R |  | A/V                |
| Input Register | 0x04 | - | 2454 | Event 4 drive gain last 3               | Float | Value | R |  | A/V                |
| Input Register | 0x04 | - | 2456 | Event 4 drive gain after 1              | Float | Value | R |  | A/V                |

|                            |      |   |      |                                |       |       |   |  |                                                                                                                                                                                                                                                                                 |
|----------------------------|------|---|------|--------------------------------|-------|-------|---|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input Register             | 0x04 | - | 2458 | Event 4 drive gain after 2     | Float | Value | R |  | A/V                                                                                                                                                                                                                                                                             |
| Input Register             | 0x04 | - | 2460 | Event 4 drive gain after 3     | Float | Value | R |  | A/V                                                                                                                                                                                                                                                                             |
| Input Register             | 0x04 | - | 2462 | Event 4 drive current last 1   | Float | Value | R |  | mApp                                                                                                                                                                                                                                                                            |
| Input Register             | 0x04 | - | 2464 | Event 4 drive current last 2   | Float | Value | R |  | mApp                                                                                                                                                                                                                                                                            |
| Input Register             | 0x04 | - | 2466 | Event 4 drive current last 3   | Float | Value | R |  | mApp                                                                                                                                                                                                                                                                            |
| Input Register             | 0x04 | - | 2468 | Event 4 drive current after 1  | Float | Value | R |  | mApp                                                                                                                                                                                                                                                                            |
| Input Register             | 0x04 | - | 2470 | Event 4 drive current after 2  | Float | Value | R |  | mApp                                                                                                                                                                                                                                                                            |
| Input Register             | 0x04 | - | 2472 | Event 4 drive current after 3  | Float | Value | R |  | mApp                                                                                                                                                                                                                                                                            |
| Input Register             | 0x04 | - | 2480 | Autozero value 4               | Float | Value | R |  | [Mass flow unit]                                                                                                                                                                                                                                                                |
| Input Register             | 0x04 | - | 2482 | Autozero standard deviation 4  | Float | Value | R |  | [Mass flow unit]                                                                                                                                                                                                                                                                |
| Input Register             | 0x04 | - | 2484 | Autozero density 4             | Float | Value | R |  | [Density unit]                                                                                                                                                                                                                                                                  |
| Input Register             | 0x04 | - | 2486 | Autozero temperature 4         | Float | Value | R |  | [Temperature unit]                                                                                                                                                                                                                                                              |
| Input Register             | 0x04 | - | 2488 | Autozero drive current 4       | Float | Value | R |  | mApp                                                                                                                                                                                                                                                                            |
| Input Register             | 0x04 | - | 2490 | Autozero resonance frequency 4 | Float | Value | R |  | Hz                                                                                                                                                                                                                                                                              |
| Input Register             | 0x04 | - | 2492 | Autozero pressure 4            | Float | Value | R |  | [Pressure unit]                                                                                                                                                                                                                                                                 |
| Input Register             | 0x04 | - | 2494 | Sensor max temperature 4       | Float | Value | R |  | [Temperature unit]                                                                                                                                                                                                                                                              |
| Input Register (duplicate) | 0x04 | - | 2600 | Qmax                           | Float | Value | R |  | [Mass flow unit]                                                                                                                                                                                                                                                                |
| Input Register (duplicate) | 0x04 | - | 2602 | Qnom                           | Float | Value | R |  | [Mass flow unit]                                                                                                                                                                                                                                                                |
| Input Register             | 0x04 | - | 2800 | Batch                          | Float | Value | R |  | If Batch select is "0 Batch 1" then [Batch unit 1].<br>If Batch select is "1 Batch 2" then [Batch unit 2].<br>If Batch select is "2 Batch 3" then [Batch unit 3].<br>If Batch select is "3 Batch 4" then [Batch unit 4].<br>If Batch select is "4 Batch 5" then [Batch unit 5]. |

|                |      |   |      |                            |            |       |   |                                                                   |                                                                                                                                                                                                                                                                                 |
|----------------|------|---|------|----------------------------|------------|-------|---|-------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input Register | 0x04 | - | 2802 | Batch data quality         | Un-signed8 | Enum  | R | 0:Bad<br>64:Poor accuracy<br>128:Manual / Fixed<br>255:Good       |                                                                                                                                                                                                                                                                                 |
| Input Register | 0x04 | - | 2803 | Batch limit status         | Un-signed8 | Enum  | R | 0:Not limited<br>16:Low limited<br>32:High limited<br>48:Constant |                                                                                                                                                                                                                                                                                 |
| Input Register | 0x04 | - | 2804 | Batch time                 | Float      | Value | R |                                                                   |                                                                                                                                                                                                                                                                                 |
| Input Register | 0x04 | - | 2806 | Batch mode 1 leakage value | Float      | Value | R |                                                                   | If Batch select is "0 Batch 1" then [Batch unit 1].<br>If Batch select is "1 Batch 2" then [Batch unit 2].<br>If Batch select is "2 Batch 3" then [Batch unit 3].<br>If Batch select is "3 Batch 4" then [Batch unit 4].<br>If Batch select is "4 Batch 5" then [Batch unit 5]. |
| Input Register | 0x04 | - | 2808 | Batch mode 2 leakage value | Float      | Value | R |                                                                   | If Batch select is "0 Batch 1" then [Batch unit 1].<br>If Batch select is "1 Batch 2" then [Batch unit 2].<br>If Batch select is "2 Batch 3" then [Batch unit 3].<br>If Batch select is "3 Batch 4" then [Batch unit 4].<br>If Batch select is "4 Batch 5" then [Batch unit 5]. |
| Input Register | 0x04 | - | 2810 | Batch mode 3 leakage value | Float      | Value | R |                                                                   | If Batch select is "0 Batch 1" then [Batch unit 1].<br>If Batch select is "1 Batch 2" then [Batch unit 2].<br>If Batch select is "2 Batch 3" then [Batch unit 3].<br>If Batch select is "3 Batch 4" then [Batch unit 4].<br>If Batch select is "4 Batch 5" then [Batch unit 5]. |

|                |      |   |      |                       |       |       |   |  |                                                                                                                                                                                                                                                                                 |
|----------------|------|---|------|-----------------------|-------|-------|---|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input Register | 0x04 | - | 2812 | Batch total quantity  | Float | Value | R |  | If Batch select is "0 Batch 1" then [Batch unit 1].<br>If Batch select is "1 Batch 2" then [Batch unit 2].<br>If Batch select is "2 Batch 3" then [Batch unit 3].<br>If Batch select is "3 Batch 4" then [Batch unit 4].<br>If Batch select is "4 Batch 5" then [Batch unit 5]. |
| Input Register | 0x04 | - | 2814 | Batch upwards value   | Float | Value | R |  | If Batch select is "0 Batch 1" then [Batch unit 1].<br>If Batch select is "1 Batch 2" then [Batch unit 2].<br>If Batch select is "2 Batch 3" then [Batch unit 3].<br>If Batch select is "3 Batch 4" then [Batch unit 4].<br>If Batch select is "4 Batch 5" then [Batch unit 5]. |
| Input Register | 0x04 | - | 2816 | Batch downwards value | Float | Value | R |  | If Batch select is "0 Batch 1" then [Batch unit 1].<br>If Batch select is "1 Batch 2" then [Batch unit 2].<br>If Batch select is "2 Batch 3" then [Batch unit 3].<br>If Batch select is "3 Batch 4" then [Batch unit 4].<br>If Batch select is "4 Batch 5" then [Batch unit 5]. |

|                |      |   |      |                                 |            |       |   |                                                                   |                                                                                                                                                                                                                                                                                 |
|----------------|------|---|------|---------------------------------|------------|-------|---|-------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input Register | 0x04 | - | 2818 | Batch compensation value        | Float      | Value | R |                                                                   | If Batch select is "0 Batch 1" then [Batch unit 1].<br>If Batch select is "1 Batch 2" then [Batch unit 2].<br>If Batch select is "2 Batch 3" then [Batch unit 3].<br>If Batch select is "3 Batch 4" then [Batch unit 4].<br>If Batch select is "4 Batch 5" then [Batch unit 5]. |
| Input Register | 0x04 | - | 2820 | Batch counter value             | Un-signed8 | Value | R |                                                                   |                                                                                                                                                                                                                                                                                 |
| Input Register | 0x04 | - | 2830 | Batch primary valve close 1     | Float      | Value | R |                                                                   | [Batch unit 1]                                                                                                                                                                                                                                                                  |
| Input Register | 0x04 | - | 2832 | Batch primary valve close 2     | Float      | Value | R |                                                                   | [Batch unit 2]                                                                                                                                                                                                                                                                  |
| Input Register | 0x04 | - | 2834 | Batch primary valve close 3     | Float      | Value | R |                                                                   | [Batch unit 3]                                                                                                                                                                                                                                                                  |
| Input Register | 0x04 | - | 2836 | Batch primary valve close 4     | Float      | Value | R |                                                                   | [Batch unit 4]                                                                                                                                                                                                                                                                  |
| Input Register | 0x04 | - | 2838 | Batch primary valve close 5     | Float      | Value | R |                                                                   | [Batch unit 5]                                                                                                                                                                                                                                                                  |
| Input Register | 0x04 | - | 2900 | Viscosity                       | Float      | Value | R |                                                                   | [Viscosity unit]                                                                                                                                                                                                                                                                |
| Input Register | 0x04 | - | 2902 | Viscosity data quality          | Un-signed8 | Enum  | R | 0:Bad<br>64:Poor accuracy<br>128:Manual / Fixed<br>255:Good       |                                                                                                                                                                                                                                                                                 |
| Input Register | 0x04 | - | 2903 | Viscosity limit status          | Un-signed8 | Enum  | R | 0:Not limited<br>16:Low limited<br>32:High limited<br>48:Constant |                                                                                                                                                                                                                                                                                 |
| Input Register | 0x04 | - | 2906 | Re compensation viscosity value | Float      | Value | R |                                                                   | [H:Re compensation viscosity unit]                                                                                                                                                                                                                                              |



## 7.3 Modbus parameter list (holding register)

| Register Type                    | Read FC | Write FC | PDU adrs | Parameter Name (for communication) | Access Type | Data Type | R/W Attr     | Enumerator (for communication)       | Units |
|----------------------------------|---------|----------|----------|------------------------------------|-------------|-----------|--------------|--------------------------------------|-------|
| Holding Register (duplicate)     | 0x03    | 0x06     | 0        | Total 1 reset/preset               | Un-signed8  | Enum      | R/W(C1)      | 0:Not execute<br>1:Reset<br>2:Preset |       |
| Holding Register (duplicate)     | 0x03    | 0x06     | 1        | Autozero execute                   | Un-signed8  | Enum      | R/W(C0)<br>a | 0:Not execute<br>1:Execute           |       |
| Holding Register (duplicate)     | 0x03    | 0x06     | 2        | Modbus init                        | Un-signed8  | Enum      | R/W(C1)      | 0:Not execute<br>1:Execute           |       |
| Holding Register (duplicate)     | 0x03    | 0x06     | 3        | Device reset                       | Un-signed8  | Enum      | R/W(C0)      | 0:Not execute<br>1:Execute           |       |
| Holding Register (Flexible area) | 0x03    | 0x06     | 4        | Flex holding register 01           | Un-signed16 | Value     | R/W(C0)      |                                      |       |
| Holding Register (Flexible area) | 0x03    | 0x06     | 5        | Flex holding register 02           | Un-signed16 | Value     | R/W(C0)      |                                      |       |
| Holding Register (Flexible area) | 0x03    | 0x06     | 6        | Flex holding register 03           | Un-signed16 | Value     | R/W(C0)      |                                      |       |
| Holding Register (Flexible area) | 0x03    | 0x06     | 7        | Flex holding register 04           | Un-signed16 | Value     | R/W(C0)      |                                      |       |
| Holding Register (Flexible area) | 0x03    | 0x06     | 8        | Flex holding register 05           | Un-signed16 | Value     | R/W(C0)      |                                      |       |
| Holding Register (Flexible area) | 0x03    | 0x06     | 9        | Flex holding register 06           | Un-signed16 | Value     | R/W(C0)      |                                      |       |
| Holding Register (Flexible area) | 0x03    | 0x06     | 10       | Flex holding register 07           | Un-signed16 | Value     | R/W(C0)      |                                      |       |
| Holding Register (Flexible area) | 0x03    | 0x06     | 11       | Flex holding register 08           | Un-signed16 | Value     | R/W(C0)      |                                      |       |
| Holding Register (Flexible area) | 0x03    | 0x06     | 12       | Flex holding register 09           | Un-signed16 | Value     | R/W(C0)      |                                      |       |

|                                  |      |      |    |                          |             |       |         |  |  |
|----------------------------------|------|------|----|--------------------------|-------------|-------|---------|--|--|
| Holding Register (Flexible area) | 0x03 | 0x06 | 13 | Flex holding register 10 | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 14 | Flex holding register 11 | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 15 | Flex holding register 12 | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 16 | Flex holding register 13 | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 17 | Flex holding register 14 | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 18 | Flex holding register 15 | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 19 | Flex holding register 16 | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 20 | Flex holding register 17 | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 21 | Flex holding register 18 | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 22 | Flex holding register 19 | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 23 | Flex holding register 20 | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 24 | Flex holding register 21 | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 25 | Flex holding register 22 | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 26 | Flex holding register 23 | Un-signed16 | Value | R/W(C0) |  |  |

|                                  |      |      |    |                          |             |       |         |  |  |
|----------------------------------|------|------|----|--------------------------|-------------|-------|---------|--|--|
| Holding Register (Flexible area) | 0x03 | 0x06 | 27 | Flex holding register 24 | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 28 | Flex holding register 25 | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 29 | Flex holding register 26 | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 30 | Flex holding register 27 | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 31 | Flex holding register 28 | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 32 | Flex holding register 29 | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 33 | Flex holding register 30 | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 34 | Flex holding register 31 | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 35 | Flex holding register 32 | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 36 | Flex holding register 33 | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 37 | Flex holding register 34 | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 38 | Flex holding register 35 | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 39 | Flex holding register 36 | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 40 | Flex holding register 37 | Un-signed16 | Value | R/W(C0) |  |  |

|                                  |      |      |     |                               |             |        |         |                                                                                                           |                        |
|----------------------------------|------|------|-----|-------------------------------|-------------|--------|---------|-----------------------------------------------------------------------------------------------------------|------------------------|
| Holding Register (Flexible area) | 0x03 | 0x06 | 41  | Flex holding register 38      | Un-signed16 | Value  | R/W(C0) |                                                                                                           |                        |
| Holding Register (Flexible area) | 0x03 | 0x06 | 42  | Flex holding register 39      | Un-signed16 | Value  | R/W(C0) |                                                                                                           |                        |
| Holding Register (Flexible area) | 0x03 | 0x06 | 43  | Flex holding register 40      | Un-signed16 | Value  | R/W(C0) |                                                                                                           |                        |
| Holding Register                 | 0x03 | 0x06 | 512 | Modbus device address         | Un-signed8  | Value  | R/W(C1) |                                                                                                           |                        |
| Holding Register                 | 0x03 | 0x06 | 513 | Modbus baud rate              | Un-signed8  | Enum   | R/W(C1) | 0:1200bps<br>1:2400bps<br>2:4800bps<br>3:9600bps<br>4:19200bps<br>5:38400bps<br>6:57600bps<br>7:115200bps |                        |
| Holding Register                 | 0x03 | 0x06 | 514 | Modbus transfer mode          | Un-signed8  | Enum   | R/W(C1) | 0:RTU<br>1:ASCII                                                                                          |                        |
| Holding Register                 | 0x03 | 0x06 | 515 | Modbus parity                 | Un-signed8  | Enum   | R/W(C1) | 0:None<br>1:Odd<br>2:Even                                                                                 |                        |
| Holding Register                 | 0x03 | 0x06 | 516 | Modbus stop bit               | Un-signed8  | Enum   | R/W(C1) | 0:1stop bit<br>1:2stop bit                                                                                |                        |
| Holding Register                 | 0x03 | 0x06 | 517 | Modbus response delay time    | Un-signed16 | Value  | R/W(C1) |                                                                                                           | ms                     |
| Holding Register                 | 0x03 | 0x10 | 528 | Reference temperature         | Float       | Value  | R/W(C2) |                                                                                                           | [Temperature unit]     |
| Holding Register                 | 0x03 | 0x10 | 530 | Temperature coeff A           | Float       | Evalue | R/W(C2) |                                                                                                           | [1/Temperature unit]   |
| Holding Register                 | 0x03 | 0x10 | 532 | Temperature coeff B           | Float       | Evalue | R/W(C2) |                                                                                                           | [1/Temperature unit^2] |
| Holding Register                 | 0x03 | 0x06 | 536 | Reference density trim select | Un-signed8  | Enum   | R/W(C2) | 0:Inhibit<br>1:Enable                                                                                     |                        |
| Holding Register                 | 0x03 | 0x10 | 537 | Reference density trim offset | Float       | Evalue | R/W(C2) |                                                                                                           | [Density unit]         |
| Holding Register                 | 0x03 | 0x10 | 539 | Reference density trim gain   | Float       | Value  | R/W(C2) |                                                                                                           |                        |
| Holding Register                 | 0x03 | 0x10 | 542 | Reference density damping     | Float       | Value  | R/W(C2) |                                                                                                           | s                      |
| Holding Register                 | 0x03 | 0x10 | 544 | Reference density lowcut      | Float       | Value  | R/W(C2) |                                                                                                           | [Density unit]         |
| Holding Register                 | 0x03 | 0x10 | 546 | Reference density LRV         | Float       | Value  | R/W(C2) |                                                                                                           | [Density unit]         |
| Holding Register                 | 0x03 | 0x10 | 548 | Reference density URV         | Float       | Value  | R/W(C2) |                                                                                                           | [Density unit]         |

|                  |      |      |     |                                             |            |        |         |                                                                                                                                                    |                 |
|------------------|------|------|-----|---------------------------------------------|------------|--------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Holding Register | 0x03 | 0x10 | 551 | Reference density low alarm                 | Float      | Value  | R/W(C2) |                                                                                                                                                    | [Density unit]  |
| Holding Register | 0x03 | 0x10 | 553 | Reference density high alarm                | Float      | Value  | R/W(C2) |                                                                                                                                                    | [Density unit]  |
| Holding Register | 0x03 | 0x10 | 555 | Reference density low low alarm             | Float      | Value  | R/W(C2) |                                                                                                                                                    | [Density unit]  |
| Holding Register | 0x03 | 0x10 | 557 | Reference density high high alarm           | Float      | Value  | R/W(C2) |                                                                                                                                                    | [Density unit]  |
| Holding Register | 0x03 | 0x10 | 560 | Reference density fixed value               | Float      | Value  | R/W(C2) |                                                                                                                                                    | [Density unit]  |
| Holding Register | 0x03 | 0x06 | 562 | Reference density value select              | Un-signed8 | Enum   | R/W(C2) | 0:Measured value<br>1:Fixed value                                                                                                                  |                 |
| Holding Register | 0x03 | 0x10 | 563 | Reference pressure                          | Float      | Value  | R/W(C2) |                                                                                                                                                    | [Pressure unit] |
| Holding Register | 0x03 | 0x06 | 580 | Relative density reference select           | Un-signed8 | Enum   | R/W(C2) | 0:Actual density<br>1:Reference density                                                                                                            |                 |
| Holding Register | 0x03 | 0x06 | 581 | Relative density indication/equation select | Un-signed8 | Enum   | R/W(C2) | 0:No function<br>1:SG 4degC<br>2:SG 15degC<br>3:SG 20degC<br>4:SG 60degF<br>5:degAPI<br>6:degBaum hv<br>7:degBaum lt<br>8:Bh<br>9:BI<br>10:degSake |                 |
| Holding Register | 0x03 | 0x06 | 583 | Relative density trim select                | Un-signed8 | Enum   | R/W(C2) | 0:Inhibit<br>1:Enable                                                                                                                              |                 |
| Holding Register | 0x03 | 0x10 | 584 | Relative density trim offset                | Float      | Evalue | R/W(C2) |                                                                                                                                                    |                 |
| Holding Register | 0x03 | 0x10 | 586 | Relative density trim gain                  | Float      | Value  | R/W(C2) |                                                                                                                                                    |                 |
| Holding Register | 0x03 | 0x10 | 588 | Relative density LRV                        | Float      | Value  | R/W(C2) |                                                                                                                                                    |                 |
| Holding Register | 0x03 | 0x10 | 590 | Relative density URV                        | Float      | Value  | R/W(C2) |                                                                                                                                                    |                 |
| Holding Register | 0x03 | 0x10 | 594 | Relative density low alarm                  | Float      | Value  | R/W(C2) |                                                                                                                                                    |                 |
| Holding Register | 0x03 | 0x10 | 596 | Relative density high alarm                 | Float      | Value  | R/W(C2) |                                                                                                                                                    |                 |
| Holding Register | 0x03 | 0x10 | 598 | Relative density low low alarm              | Float      | Value  | R/W(C2) |                                                                                                                                                    |                 |
| Holding Register | 0x03 | 0x10 | 600 | Relative density high high alarm            | Float      | Value  | R/W(C2) |                                                                                                                                                    |                 |
| Holding Register | 0x03 | 0x10 | 602 | Relative density damping                    | Float      | Value  | R/W(C2) |                                                                                                                                                    | s               |

|                  |      |      |     |                                        |            |       |         |  |                    |
|------------------|------|------|-----|----------------------------------------|------------|-------|---------|--|--------------------|
| Holding Register | 0x03 | 0x06 | 620 | Concentration temperature set 1 number | Un-signed8 | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 621 | Concentration temperature 1 set 1      | Float      | Value | R/W(C2) |  | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 623 | Concentration A 1 set 1                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 626 | Concentration B 1 set 1                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 628 | Concentration C 1 set 1                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 630 | Concentration D 1 set 1                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 633 | Concentration temperature 2 set 1      | Float      | Value | R/W(C2) |  | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 635 | Concentration A 2 set 1                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 637 | Concentration B 2 set 1                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 640 | Concentration C 2 set 1                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 642 | Concentration D 2 set 1                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 644 | Concentration temperature 3 set 1      | Float      | Value | R/W(C2) |  | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 647 | Concentration A 3 set 1                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 649 | Concentration B 3 set 1                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 651 | Concentration C 3 set 1                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 654 | Concentration D 3 set 1                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 656 | Concentration temperature 4 set 1      | Float      | Value | R/W(C2) |  | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 658 | Concentration A 4 set 1                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 661 | Concentration B 4 set 1                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 663 | Concentration C 4 set 1                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 665 | Concentration D 4 set 1                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 668 | Concentration temperature 5 set 1      | Float      | Value | R/W(C2) |  | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 670 | Concentration A 5 set 1                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 672 | Concentration B 5 set 1                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 675 | Concentration C 5 set 1                | Float      | Value | R/W(C2) |  |                    |

|                  |      |      |     |                                        |            |       |         |  |                    |
|------------------|------|------|-----|----------------------------------------|------------|-------|---------|--|--------------------|
| Holding Register | 0x03 | 0x10 | 677 | Concentration D 5 set 1                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 679 | Concentration temperature 6 set 1      | Float      | Value | R/W(C2) |  | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 682 | Concentration A 6 set 1                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 684 | Concentration B 6 set 1                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 686 | Concentration C 6 set 1                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 689 | Concentration D 6 set 1                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 691 | Concentration temperature 7 set 1      | Float      | Value | R/W(C2) |  | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 693 | Concentration A 7 set 1                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 696 | Concentration B 7 set 1                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 698 | Concentration C 7 set 1                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 700 | Concentration D 7 set 1                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 703 | Concentration temperature 8 set 1      | Float      | Value | R/W(C2) |  | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 705 | Concentration A 8 set 1                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 707 | Concentration B 8 set 1                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 710 | Concentration C 8 set 1                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 712 | Concentration D 8 set 1                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x06 | 715 | Concentration temperature set 2 number | Un-signed8 | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 716 | Concentration temperature 1 set 2      | Float      | Value | R/W(C2) |  | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 718 | Concentration A 1 set 2                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 721 | Concentration B 1 set 2                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 723 | Concentration C 1 set 2                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 725 | Concentration D 1 set 2                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 728 | Concentration temperature 2 set 2      | Float      | Value | R/W(C2) |  | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 730 | Concentration A 2 set 2                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 732 | Concentration B 2 set 2                | Float      | Value | R/W(C2) |  |                    |



|                  |      |      |     |                                   |       |       |             |  |                    |
|------------------|------|------|-----|-----------------------------------|-------|-------|-------------|--|--------------------|
| Holding Register | 0x03 | 0x10 | 735 | Concentration C 2 set 2           | Float | Value | R/<br>W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 737 | Concentration D 2 set 2           | Float | Value | R/<br>W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 739 | Concentration temperature 3 set 2 | Float | Value | R/<br>W(C2) |  | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 742 | Concentration A 3 set 2           | Float | Value | R/<br>W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 744 | Concentration B 3 set 2           | Float | Value | R/<br>W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 746 | Concentration C 3 set 2           | Float | Value | R/<br>W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 749 | Concentration D 3 set 2           | Float | Value | R/<br>W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 751 | Concentration temperature 4 set 2 | Float | Value | R/<br>W(C2) |  | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 753 | Concentration A 4 set 2           | Float | Value | R/<br>W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 756 | Concentration B 4 set 2           | Float | Value | R/<br>W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 758 | Concentration C 4 set 2           | Float | Value | R/<br>W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 760 | Concentration D 4 set 2           | Float | Value | R/<br>W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 763 | Concentration temperature 5 set 2 | Float | Value | R/<br>W(C2) |  | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 765 | Concentration A 5 set 2           | Float | Value | R/<br>W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 767 | Concentration B 5 set 2           | Float | Value | R/<br>W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 770 | Concentration C 5 set 2           | Float | Value | R/<br>W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 772 | Concentration D 5 set 2           | Float | Value | R/<br>W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 774 | Concentration temperature 6 set 2 | Float | Value | R/<br>W(C2) |  | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 777 | Concentration A 6 set 2           | Float | Value | R/<br>W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 779 | Concentration B 6 set 2           | Float | Value | R/<br>W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 781 | Concentration C 6 set 2           | Float | Value | R/<br>W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 784 | Concentration D 6 set 2           | Float | Value | R/<br>W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 786 | Concentration temperature 7 set 2 | Float | Value | R/<br>W(C2) |  | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 788 | Concentration A 7 set 2           | Float | Value | R/<br>W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 791 | Concentration B 7 set 2           | Float | Value | R/<br>W(C2) |  |                    |



|                  |      |      |     |                                        |            |       |         |  |                    |
|------------------|------|------|-----|----------------------------------------|------------|-------|---------|--|--------------------|
| Holding Register | 0x03 | 0x10 | 793 | Concentration C 7 set 2                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 795 | Concentration D 7 set 2                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 798 | Concentration temperature 8 set 2      | Float      | Value | R/W(C2) |  | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 800 | Concentration A 8 set 2                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 802 | Concentration B 8 set 2                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 805 | Concentration C 8 set 2                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 807 | Concentration D 8 set 2                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x06 | 810 | Concentration temperature set 3 number | Un-signed8 | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 811 | Concentration temperature 1 set 3      | Float      | Value | R/W(C2) |  | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 813 | Concentration A 1 set 3                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 816 | Concentration B 1 set 3                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 818 | Concentration C 1 set 3                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 820 | Concentration D 1 set 3                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 823 | Concentration temperature 2 set 3      | Float      | Value | R/W(C2) |  | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 825 | Concentration A 2 set 3                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 827 | Concentration B 2 set 3                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 830 | Concentration C 2 set 3                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 832 | Concentration D 2 set 3                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 834 | Concentration temperature 3 set 3      | Float      | Value | R/W(C2) |  | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 837 | Concentration A 3 set 3                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 839 | Concentration B 3 set 3                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 841 | Concentration C 3 set 3                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 844 | Concentration D 3 set 3                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 846 | Concentration temperature 4 set 3      | Float      | Value | R/W(C2) |  | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 848 | Concentration A 4 set 3                | Float      | Value | R/W(C2) |  |                    |

|                  |      |      |     |                                        |            |       |         |  |                    |
|------------------|------|------|-----|----------------------------------------|------------|-------|---------|--|--------------------|
| Holding Register | 0x03 | 0x10 | 851 | Concentration B 4 set 3                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 853 | Concentration C 4 set 3                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 855 | Concentration D 4 set 3                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 858 | Concentration temperature 5 set 3      | Float      | Value | R/W(C2) |  | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 860 | Concentration A 5 set 3                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 862 | Concentration B 5 set 3                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 865 | Concentration C 5 set 3                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 867 | Concentration D 5 set 3                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 869 | Concentration temperature 6 set 3      | Float      | Value | R/W(C2) |  | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 872 | Concentration A 6 set 3                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 874 | Concentration B 6 set 3                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 876 | Concentration C 6 set 3                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 879 | Concentration D 6 set 3                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 881 | Concentration temperature 7 set 3      | Float      | Value | R/W(C2) |  | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 883 | Concentration A 7 set 3                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 886 | Concentration B 7 set 3                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 888 | Concentration C 7 set 3                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 890 | Concentration D 7 set 3                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 893 | Concentration temperature 8 set 3      | Float      | Value | R/W(C2) |  | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 895 | Concentration A 8 set 3                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 897 | Concentration B 8 set 3                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 900 | Concentration C 8 set 3                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 902 | Concentration D 8 set 3                | Float      | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x06 | 905 | Concentration temperature set 4 number | Un-signed8 | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 906 | Concentration temperature 1 set 4      | Float      | Value | R/W(C2) |  | [Temperature unit] |

|                  |      |      |     |                                   |       |       |         |  |                    |
|------------------|------|------|-----|-----------------------------------|-------|-------|---------|--|--------------------|
| Holding Register | 0x03 | 0x10 | 908 | Concentration A 1 set 4           | Float | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 911 | Concentration B 1 set 4           | Float | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 913 | Concentration C 1 set 4           | Float | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 915 | Concentration D 1 set 4           | Float | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 918 | Concentration temperature 2 set 4 | Float | Value | R/W(C2) |  | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 920 | Concentration A 2 set 4           | Float | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 922 | Concentration B 2 set 4           | Float | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 925 | Concentration C 2 set 4           | Float | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 927 | Concentration D 2 set 4           | Float | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 929 | Concentration temperature 3 set 4 | Float | Value | R/W(C2) |  | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 932 | Concentration A 3 set 4           | Float | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 934 | Concentration B 3 set 4           | Float | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 936 | Concentration C 3 set 4           | Float | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 939 | Concentration D 3 set 4           | Float | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 941 | Concentration temperature 4 set 4 | Float | Value | R/W(C2) |  | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 943 | Concentration A 4 set 4           | Float | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 946 | Concentration B 4 set 4           | Float | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 948 | Concentration C 4 set 4           | Float | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 950 | Concentration D 4 set 4           | Float | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 953 | Concentration temperature 5 set 4 | Float | Value | R/W(C2) |  | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 955 | Concentration A 5 set 4           | Float | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 957 | Concentration B 5 set 4           | Float | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 960 | Concentration C 5 set 4           | Float | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 962 | Concentration D 5 set 4           | Float | Value | R/W(C2) |  |                    |
| Holding Register | 0x03 | 0x10 | 964 | Concentration temperature 6 set 4 | Float | Value | R/W(C2) |  | [Temperature unit] |

|                  |      |      |      |                                   |             |       |              |                            |                    |
|------------------|------|------|------|-----------------------------------|-------------|-------|--------------|----------------------------|--------------------|
| Holding Register | 0x03 | 0x10 | 967  | Concentration A 6 set 4           | Float       | Value | R/W(C2)      |                            |                    |
| Holding Register | 0x03 | 0x10 | 969  | Concentration B 6 set 4           | Float       | Value | R/W(C2)      |                            |                    |
| Holding Register | 0x03 | 0x10 | 971  | Concentration C 6 set 4           | Float       | Value | R/W(C2)      |                            |                    |
| Holding Register | 0x03 | 0x06 | 976  | Autozero time                     | Un-signed16 | Value | R/W(C0)<br>a |                            | s                  |
| Holding Register | 0x03 | 0x06 | 977  | Clear autozero                    | Un-signed8  | Enum  | R/W(C0)<br>a | 0:Not execute<br>1:Execute |                    |
| Holding Register | 0x03 | 0x06 | 978  | Clear autozero failure            | Un-signed8  | Enum  | R/W(C0)<br>a | 0:Not execute<br>1:Execute |                    |
| Holding Register | 0x03 | 0x10 | 980  | Concentration D 6 set 4           | Float       | Value | R/W(C2)      |                            |                    |
| Holding Register | 0x03 | 0x10 | 982  | Concentration temperature 7 set 4 | Float       | Value | R/W(C2)      |                            | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 984  | Concentration A 7 set 4           | Float       | Value | R/W(C2)      |                            |                    |
| Holding Register | 0x03 | 0x10 | 987  | Concentration B 7 set 4           | Float       | Value | R/W(C2)      |                            |                    |
| Holding Register | 0x03 | 0x10 | 989  | Concentration C 7 set 4           | Float       | Value | R/W(C2)      |                            |                    |
| Holding Register | 0x03 | 0x06 | 992  | Autozero execute                  | Un-signed8  | Enum  | R/W(C0)<br>a | 0:Not execute<br>1:Execute |                    |
| Holding Register | 0x03 | 0x10 | 994  | Concentration D 7 set 4           | Float       | Value | R/W(C2)      |                            |                    |
| Holding Register | 0x03 | 0x10 | 996  | Concentration temperature 8 set 4 | Float       | Value | R/W(C2)      |                            | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 998  | Concentration A 8 set 4           | Float       | Value | R/W(C2)      |                            |                    |
| Holding Register | 0x03 | 0x10 | 1001 | Concentration B 8 set 4           | Float       | Value | R/W(C2)      |                            |                    |
| Holding Register | 0x03 | 0x10 | 1003 | Concentration C 8 set 4           | Float       | Value | R/W(C2)      |                            |                    |
| Holding Register | 0x03 | 0x10 | 1005 | Concentration D 8 set 4           | Float       | Value | R/W(C2)      |                            |                    |
| Holding Register | 0x03 | 0x06 | 1056 | Flow direction                    | Un-signed8  | Enum  | R/W(C1)      | 0:Forward<br>1:Reverse     |                    |

|                  |      |      |      |                                       |               |        |         |                                                                                                                                                                                                                                                                    |                  |
|------------------|------|------|------|---------------------------------------|---------------|--------|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| Holding Register | 0x03 | 0x06 | 1072 | Mass flow unit                        | Un-signed8    | Enum   | R/W(C1) | 0:g/s<br>1:g/min<br>2:g/h<br>3:kg/s<br>4:kg/min<br>5:kg/h<br>6:kg/d<br>7:t/min<br>8:t/h<br>9:t/d<br>15:ton(US)/min<br>16:ton(US)/h<br>17:ton(US)/d<br>18:ton(UK)/min<br>19:ton(UK)/h<br>20:ton(UK)/d<br>10:lb/s<br>11:lb/min<br>12:lb/h<br>13:lb/d<br>14:User unit |                  |
| Holding Register | 0x03 | 0x10 | 1073 | Mass flow user unit                   | Un-signed8[8] | ASCII  | R/W(C2) |                                                                                                                                                                                                                                                                    |                  |
| Holding Register | 0x03 | 0x10 | 1077 | Mass flow user unit conversion factor | Float         | Value  | R/W(C2) |                                                                                                                                                                                                                                                                    | 1/(kg/h)         |
| Holding Register | 0x03 | 0x10 | 1088 | Mass flow LRV                         | Float         | Value  | R/W(C1) |                                                                                                                                                                                                                                                                    | [Mass flow unit] |
| Holding Register | 0x03 | 0x10 | 1104 | Mass flow URV                         | Float         | Value  | R/W(C1) |                                                                                                                                                                                                                                                                    | [Mass flow unit] |
| Holding Register | 0x03 | 0x10 | 1120 | Mass flow damping                     | Float         | Value  | R/W(C1) |                                                                                                                                                                                                                                                                    | s                |
| Holding Register | 0x03 | 0x10 | 1122 | Mass flow damping pulse/total         | Float         | Value  | R/W(C2) |                                                                                                                                                                                                                                                                    | s                |
| Holding Register | 0x03 | 0x06 | 1124 | Mass flow bi-directional mode         | Un-signed8    | Enum   | R/W(C2) | 0:Not active<br>1:Active                                                                                                                                                                                                                                           |                  |
| Holding Register | 0x03 | 0x10 | 1130 | Mass flow low alarm                   | Float         | Value  | R/W(C2) |                                                                                                                                                                                                                                                                    | [Mass flow unit] |
| Holding Register | 0x03 | 0x10 | 1132 | Mass flow high alarm                  | Float         | Value  | R/W(C2) |                                                                                                                                                                                                                                                                    | [Mass flow unit] |
| Holding Register | 0x03 | 0x10 | 1136 | Mass flow low-cut                     | Float         | Value  | R/W(C2) |                                                                                                                                                                                                                                                                    | [Mass flow unit] |
| Holding Register | 0x03 | 0x10 | 1139 | Mass flow low low alarm               | Float         | Value  | R/W(C2) |                                                                                                                                                                                                                                                                    | [Mass flow unit] |
| Holding Register | 0x03 | 0x10 | 1141 | Mass flow high high alarm             | Float         | Value  | R/W(C2) |                                                                                                                                                                                                                                                                    | [Mass flow unit] |
| Holding Register | 0x03 | 0x06 | 1216 | Mass flow trim select                 | Un-signed8    | Enum   | R/W(C2) | 0:Inhibit<br>1:Enable                                                                                                                                                                                                                                              |                  |
| Holding Register | 0x03 | 0x10 | 1232 | Mass flow trim offset                 | Float         | Evalue | R/W(C2) |                                                                                                                                                                                                                                                                    | [Mass flow unit] |
| Holding Register | 0x03 | 0x10 | 1234 | Mass flow trim gain                   | Float         | Value  | R/W(C2) |                                                                                                                                                                                                                                                                    |                  |

|                  |      |      |      |                                         |               |       |             |                                                                                                                                                                                                                                                                                                                                                          |                    |
|------------------|------|------|------|-----------------------------------------|---------------|-------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| Holding Register | 0x03 | 0x06 | 1248 | Volume flow unit                        | Un-signed8    | Enum  | R/<br>W(C1) | 0:cm3/s<br>1:cm3/min<br>2:cm3/h<br>3:L/s<br>4:L/min<br>5:L/h<br>6:L/d<br>7:m3/s<br>8:m3/min<br>9:m3/h<br>10:m3/d<br>11:gal/s<br>12:gal/min<br>13:gal/h<br>14:gal/d<br>15:ft3/s<br>16:ft3/min<br>17:ft3/h<br>18:ft3/d<br>19:bbbl/s<br>20:bbbl/min<br>21:bbbl/h<br>22:bbbl/d<br>23:Impgal/s<br>24:Impgal/min<br>25:Impgal/h<br>26:Impgal/d<br>27:User unit |                    |
| Holding Register | 0x03 | 0x10 | 1249 | Volume flow user unit                   | Un-signed8[8] | ASCII | R/<br>W(C2) |                                                                                                                                                                                                                                                                                                                                                          |                    |
| Holding Register | 0x03 | 0x10 | 1253 | Volume flow user unit conversion factor | Float         | Value | R/<br>W(C2) |                                                                                                                                                                                                                                                                                                                                                          | 1/(m3/h)           |
| Holding Register | 0x03 | 0x10 | 1264 | Volume flow LRV                         | Float         | Value | R/<br>W(C1) |                                                                                                                                                                                                                                                                                                                                                          | [Volume flow unit] |
| Holding Register | 0x03 | 0x10 | 1280 | Volume flow URV                         | Float         | Value | R/<br>W(C1) |                                                                                                                                                                                                                                                                                                                                                          | [Volume flow unit] |
| Holding Register | 0x03 | 0x10 | 1296 | Volume flow damping                     | Float         | Value | R/<br>W(C1) |                                                                                                                                                                                                                                                                                                                                                          | s                  |
| Holding Register | 0x03 | 0x10 | 1298 | Volume flow damping pulse/total         | Float         | Value | R/<br>W(C2) |                                                                                                                                                                                                                                                                                                                                                          | s                  |
| Holding Register | 0x03 | 0x06 | 1304 | Volume flow bi-directional mode         | Un-signed8    | Enum  | R/<br>W(C2) | 0:Not active<br>1:Active                                                                                                                                                                                                                                                                                                                                 |                    |
| Holding Register | 0x03 | 0x06 | 1305 | Volume flow trim select                 | Un-signed8    | Enum  | R/<br>W(C2) | 0:Inhibit<br>1:Enable                                                                                                                                                                                                                                                                                                                                    |                    |
| Holding Register | 0x03 | 0x10 | 1306 | Volume flow trim offset                 | Float         | Value | R/<br>W(C2) |                                                                                                                                                                                                                                                                                                                                                          | [Volume flow unit] |
| Holding Register | 0x03 | 0x10 | 1308 | Volume flow trim gain                   | Float         | Value | R/<br>W(C2) |                                                                                                                                                                                                                                                                                                                                                          |                    |
| Holding Register | 0x03 | 0x10 | 1312 | Volume flow lowcut                      | Float         | Value | R/<br>W(C2) |                                                                                                                                                                                                                                                                                                                                                          | [Volume flow unit] |
| Holding Register | 0x03 | 0x10 | 1316 | Volume flow low alarm                   | Float         | Value | R/<br>W(C2) |                                                                                                                                                                                                                                                                                                                                                          | [Volume flow unit] |
| Holding Register | 0x03 | 0x10 | 1318 | Volume flow high alarm                  | Float         | Value | R/<br>W(C2) |                                                                                                                                                                                                                                                                                                                                                          | [Volume flow unit] |



|                  |      |      |      |                                     |               |        |         |                                                                                                                           |                    |
|------------------|------|------|------|-------------------------------------|---------------|--------|---------|---------------------------------------------------------------------------------------------------------------------------|--------------------|
| Holding Register | 0x03 | 0x10 | 1320 | Volume flow low low alarm           | Float         | Value  | R/W(C2) |                                                                                                                           | [Volume flow unit] |
| Holding Register | 0x03 | 0x10 | 1322 | Volume flow high high alarm         | Float         | Value  | R/W(C2) |                                                                                                                           | [Volume flow unit] |
| Holding Register | 0x03 | 0x06 | 1392 | Density unit                        | Un-signed8    | Enum   | R/W(C1) | 0:g/mL<br>1:kg/L<br>8:kg/cm3<br>9:kg/dm3<br>2:kg/m3<br>3:lb/gal<br>4:lb/ft3<br>5:g/cm3<br>10:g/cc<br>6:g/L<br>7:User unit |                    |
| Holding Register | 0x03 | 0x10 | 1393 | Density user unit                   | Un-signed8[8] | ASCII  | R/W(C2) |                                                                                                                           |                    |
| Holding Register | 0x03 | 0x10 | 1397 | Density user unit conversion factor | Float         | Value  | R/W(C2) |                                                                                                                           | 1/(kg/L)           |
| Holding Register | 0x03 | 0x06 | 1400 | Density trim select                 | Un-signed8    | Enum   | R/W(C2) | 0:Inhibit<br>1:Enable                                                                                                     |                    |
| Holding Register | 0x03 | 0x10 | 1401 | Density trim offset                 | Float         | Evalue | R/W(C2) |                                                                                                                           | [Density unit]     |
| Holding Register | 0x03 | 0x10 | 1403 | Density trim gain                   | Float         | Value  | R/W(C2) |                                                                                                                           |                    |
| Holding Register | 0x03 | 0x10 | 1408 | Density LRV                         | Float         | Value  | R/W(C1) |                                                                                                                           | [Density unit]     |
| Holding Register | 0x03 | 0x10 | 1415 | Density low alarm                   | Float         | Value  | R/W(C2) |                                                                                                                           | [Density unit]     |
| Holding Register | 0x03 | 0x10 | 1417 | Density high alarm                  | Float         | Value  | R/W(C2) |                                                                                                                           | [Density unit]     |
| Holding Register | 0x03 | 0x10 | 1419 | Density low low alarm               | Float         | Value  | R/W(C2) |                                                                                                                           | [Density unit]     |
| Holding Register | 0x03 | 0x10 | 1421 | Density high high alarm             | Float         | Value  | R/W(C2) |                                                                                                                           | [Density unit]     |
| Holding Register | 0x03 | 0x10 | 1424 | Density URV                         | Float         | Value  | R/W(C1) |                                                                                                                           | [Density unit]     |
| Holding Register | 0x03 | 0x10 | 1440 | Density damping                     | Float         | Value  | R/W(C1) |                                                                                                                           | s                  |
| Holding Register | 0x03 | 0x10 | 1456 | Density lowcut                      | Float         | Value  | R/W(C2) |                                                                                                                           | [Density unit]     |
| Holding Register | 0x03 | 0x06 | 1536 | Density value select                | Un-signed8    | Enum   | R/W(C2) | 0:Measured value<br>1:Fixed value<br>2:Calculated value                                                                   |                    |
| Holding Register | 0x03 | 0x10 | 1552 | Density fixed value                 | Float         | Value  | R/W(C2) |                                                                                                                           | [Density unit]     |
| Holding Register | 0x03 | 0x10 | 1568 | Density offset orientation          | Float         | Evalue | R/W(C1) |                                                                                                                           | [Density unit]     |
| Holding Register | 0x03 | 0x10 | 1584 | Pressure fixed value                | Float         | Value  | R/W(C1) |                                                                                                                           | [Pressure unit]    |
| Holding Register | 0x03 | 0x06 | 1586 | Absolute/Gauge select               | Un-signed8    | Enum   | R/W(C2) | 0:Absolute<br>1:Gauge                                                                                                     |                    |

|                  |      |      |      |                             |            |        |         |                                                                                                                                                                                                                              |                    |
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| Holding Register | 0x03 | 0x10 | 1587 | Gas density pressure        | Float      | Value  | R/W(C2) |                                                                                                                                                                                                                              | [Pressure unit]    |
| Holding Register | 0x03 | 0x06 | 1590 | Pressure trim select        | Un-signed8 | Enum   | R/W(C2) | 0:Inhibit<br>1:Enable                                                                                                                                                                                                        |                    |
| Holding Register | 0x03 | 0x10 | 1591 | Pressure trim offset        | Float      | Evalue | R/W(C2) |                                                                                                                                                                                                                              | [Pressure unit]    |
| Holding Register | 0x03 | 0x10 | 1593 | Pressure trim gain          | Float      | Value  | R/W(C2) |                                                                                                                                                                                                                              |                    |
| Holding Register | 0x03 | 0x10 | 1595 | Pressure damping            | Float      | Value  | R/W(C2) |                                                                                                                                                                                                                              | s                  |
| Holding Register | 0x03 | 0x06 | 1600 | Pressure unit               | Un-signed8 | Enum   | R/W(C2) | 0:inH2O(68degF)<br>1:inHg<br>2:ftH2O(68degF)<br>3:mmH2O(68degF)<br>4:mmHg<br>5:psi<br>6:bar<br>7:mbar<br>8:g/cm2<br>9:kg/cm2<br>10:Pa<br>11:kPa<br>12:torr<br>13:atm<br>14:MPa<br>15:inH2O<br>16:mmH2O<br>17:ftH2O<br>18:hPa |                    |
| Holding Register | 0x03 | 0x10 | 1601 | Pressure LRV                | Float      | Value  | R/W(C2) |                                                                                                                                                                                                                              | [Pressure unit]    |
| Holding Register | 0x03 | 0x10 | 1603 | Pressure URV                | Float      | Value  | R/W(C2) |                                                                                                                                                                                                                              | [Pressure unit]    |
| Holding Register | 0x03 | 0x10 | 1606 | Pressure low alarm          | Float      | Value  | R/W(C2) |                                                                                                                                                                                                                              | [Pressure unit]    |
| Holding Register | 0x03 | 0x10 | 1608 | Pressure high alarm         | Float      | Value  | R/W(C2) |                                                                                                                                                                                                                              | [Pressure unit]    |
| Holding Register | 0x03 | 0x10 | 1610 | Pressure low low alarm      | Float      | Value  | R/W(C2) |                                                                                                                                                                                                                              | [Pressure unit]    |
| Holding Register | 0x03 | 0x10 | 1612 | Pressure high high alarm    | Float      | Value  | R/W(C2) |                                                                                                                                                                                                                              | [Pressure unit]    |
| Holding Register | 0x03 | 0x06 | 1616 | Temperature unit            | Un-signed8 | Enum   | R/W(C1) | 0:degC<br>1:degF<br>2:degR<br>3:K                                                                                                                                                                                            |                    |
| Holding Register | 0x03 | 0x10 | 1632 | Temperature LRV             | Float      | Value  | R/W(C1) |                                                                                                                                                                                                                              | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 1648 | Temperature URV             | Float      | Value  | R/W(C1) |                                                                                                                                                                                                                              | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 1664 | Temperature damping         | Float      | Value  | R/W(C1) |                                                                                                                                                                                                                              | s                  |
| Holding Register | 0x03 | 0x06 | 1744 | Temperature function select | Un-signed8 | Enum   | R/W(C2) | 0:Internal value<br>1:Fixed value                                                                                                                                                                                            |                    |
| Holding Register | 0x03 | 0x10 | 1760 | Temperature fixed value     | Float      | Value  | R/W(C2) |                                                                                                                                                                                                                              | [Temperature unit] |
| Holding Register | 0x03 | 0x06 | 1773 | Temperature trim select     | Un-signed8 | Enum   | R/W(C2) | 0:Inhibit<br>1:Enable                                                                                                                                                                                                        |                    |



|                  |      |      |      |                             |            |        |         |                                                                                                                                                                                                                                                                                                                                                         |                    |
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| Holding Register | 0x03 | 0x10 | 1774 | Temperature trim offset     | Float      | Evalue | R/W(C2) |                                                                                                                                                                                                                                                                                                                                                         | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 1776 | Temperature trim gain       | Float      | Value  | R/W(C2) |                                                                                                                                                                                                                                                                                                                                                         |                    |
| Holding Register | 0x03 | 0x10 | 1780 | Temperature low alarm       | Float      | Value  | R/W(C2) |                                                                                                                                                                                                                                                                                                                                                         | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 1782 | Temperature high alarm      | Float      | Value  | R/W(C2) |                                                                                                                                                                                                                                                                                                                                                         | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 1784 | Temperature low low alarm   | Float      | Value  | R/W(C2) |                                                                                                                                                                                                                                                                                                                                                         | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 1786 | Temperature high high alarm | Float      | Value  | R/W(C2) |                                                                                                                                                                                                                                                                                                                                                         | [Temperature unit] |
| Holding Register | 0x03 | 0x06 | 1792 | Velocity unit               | Un-signed8 | Enum   | R/W(C2) | 0:m/s<br>1:ft/s                                                                                                                                                                                                                                                                                                                                         |                    |
| Holding Register | 0x03 | 0x06 | 1800 | Total 1 channel             | Un-signed8 | Enum   | R/W(C1) | 0:Mass flow<br>1:Volume flow<br>2:Corrected volume flow<br>3:Energy<br>4:Net mass flow 1<br>5:Net mass flow 2<br>6:Net volume flow 1<br>7:Net volume flow 2<br>8:Net corrected volume flow<br>9:Off                                                                                                                                                     |                    |
| Holding Register | 0x03 | 0x06 | 1801 | Total 1 option              | Un-signed8 | Enum   | R/W(C2) | 0:Balanced<br>1:Absolute<br>2:Positive only<br>3:Negative only<br>4:Hold<br>5:Density (Balanced)<br>6:Density (Absolute)<br>7:Density (Positive only)<br>8:Density (Negative only)<br>9:Density + Temperature (Balanced)<br>10:Density + Temperature (Absolute)<br>11:Density + Temperature (Positive only)<br>12:Density + Temperature (Negative only) |                    |
| Holding Register | 0x03 | 0x06 | 1802 | Total 1 failure option      | Un-signed8 | Enum   | R/W(C1) | 0:Run<br>1:Hold<br>2:Last valid value                                                                                                                                                                                                                                                                                                                   |                    |

|                  |      |      |      |                                    |               |          |         |                                                                                                                                                           |                                                                                                                                                                                                      |
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| Holding Register | 0x03 | 0x06 | 1803 | Total 1 start/stop                 | Un-signed8    | Enum     | R/W(C1) | 0:Stop<br>1:Start                                                                                                                                         |                                                                                                                                                                                                      |
| Holding Register | 0x03 | 0x06 | 1804 | Total 1 reset/preset               | Un-signed8    | Enum     | R/W(C1) | 0:Not execute<br>1:Reset<br>2:Preset                                                                                                                      |                                                                                                                                                                                                      |
| Holding Register | 0x03 | 0x10 | 1806 | Total 1 set point                  | Float         | Value    | R/W(C2) |                                                                                                                                                           | [Total 1 unit]                                                                                                                                                                                       |
| Holding Register | 0x03 | 0x10 | 1808 | Total 1 preset value               | Float         | Value    | R/W(C1) |                                                                                                                                                           | [Total 1 unit]                                                                                                                                                                                       |
| Holding Register | 0x03 | 0x10 | 1810 | Total 1 conversion factor          | Float         | Value    | R/W(C2) |                                                                                                                                                           | When [Total 1 unit] is 0-3<br>1/kg<br>When [Total 1 unit] is 4-12<br>1/m3<br>When [Total 1 unit] is 13-18<br>1/Sm3<br>When [Total 1 unit] is 19-20<br>1/MJ<br>When [Total 1 unit] is 21<br>User unit |
| Holding Register | 0x03 | 0x10 | 1813 | Total 1 density lower value        | Float         | Value    | R/W(C2) |                                                                                                                                                           | [Density unit]                                                                                                                                                                                       |
| Holding Register | 0x03 | 0x10 | 1815 | Total 1 density upper value        | Float         | Value    | R/W(C2) |                                                                                                                                                           | [Density unit]                                                                                                                                                                                       |
| Holding Register | 0x03 | 0x06 | 1817 | Total 24hours value manual setting | Un-signed8    | Enum     | R/W(C2) | 0:Inhibit<br>1:Enable                                                                                                                                     |                                                                                                                                                                                                      |
| Holding Register | 0x03 | 0x06 | 1818 | Total 24hours value manual update  | Un-signed8    | Bit-Enum | R/W(C2) | bit0:Total 1 execute<br>bit1:Total 2 execute<br>bit2:Total 3 execute<br>bit3:Reserved<br>bit4:Reserved<br>bit5:Reserved<br>bit6:Reserved<br>bit7:Reserved |                                                                                                                                                                                                      |
| Holding Register | 0x03 | 0x10 | 1820 | Total 1 user unit                  | Un-signed8[8] | ASCII    | R/W(C2) |                                                                                                                                                           |                                                                                                                                                                                                      |

|                  |      |      |      |                 |            |      |         |                                                                                                                                                                                                                                                  |  |
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| Holding Register | 0x03 | 0x06 | 1824 | Total 1 unit    | Un-signed8 | Enum | R/W(C1) | 0:g<br>1:kg<br>2:t<br>22:ton(US)<br>23:ton(UK)<br>3:lb<br>4:cm3<br>5:L<br>6:m3<br>7:gal<br>8:kgal<br>9:ft3<br>10:bbl<br>11:Impgal<br>12:kImpgal<br>13:NL<br>14:Nm3<br>15:SL<br>16:Sft3<br>17:MMSft3<br>18:Sm3<br>19:MJ<br>20:Btu<br>21:User unit |  |
| Holding Register | 0x03 | 0x06 | 1826 | Total 2 channel | Un-signed8 | Enum | R/W(C1) | 0:Mass flow<br>1:Volume flow<br>2:Corrected volume flow<br>3:Energy<br>4:Net mass flow 1<br>5:Net mass flow 2<br>6:Net volume flow 1<br>7:Net volume flow 2<br>8:Net corrected volume flow<br>9:Off                                              |  |

|                  |      |      |      |                           |            |       |         |                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                              |
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| Holding Register | 0x03 | 0x06 | 1827 | Total 2 option            | Un-signed8 | Enum  | R/W(C2) | 0:Balanced<br>1:Absolute<br>2:Positive only<br>3:Negative only<br>4:Hold<br>5:Density (Balanced)<br>6:Density (Absolute)<br>7:Density (Positive only)<br>8:Density (Negative only)<br>9:Density + Temperature (Balanced)<br>10:Density + Temperature (Absolute)<br>11:Density + Temperature (Positive only)<br>12:Density + Temperature (Negative only) |                                                                                                                                                                                                                              |
| Holding Register | 0x03 | 0x06 | 1828 | Total 2 failure option    | Un-signed8 | Enum  | R/W(C1) | 0:Run<br>1:Hold<br>2:Last valid value                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                              |
| Holding Register | 0x03 | 0x06 | 1829 | Total 2 start/stop        | Un-signed8 | Enum  | R/W(C1) | 0:Stop<br>1:Start                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                              |
| Holding Register | 0x03 | 0x06 | 1830 | Total 2 reset/preset      | Un-signed8 | Enum  | R/W(C1) | 0:Not execute<br>1:Reset<br>2:Preset                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                              |
| Holding Register | 0x03 | 0x10 | 1832 | Total 2 set point         | Float      | Value | R/W(C2) |                                                                                                                                                                                                                                                                                                                                                         | [Total 2 unit]                                                                                                                                                                                                               |
| Holding Register | 0x03 | 0x10 | 1834 | Total 2 conversion factor | Float      | Value | R/W(C2) |                                                                                                                                                                                                                                                                                                                                                         | When [Total 2 unit] is 0-3<br>1/kg<br>When [Total 2 unit] is 4-12<br>1/m <sup>3</sup><br>When [Total 2 unit] is 13-18<br>1/Sm <sup>3</sup><br>When [Total 2 unit] is 19-20<br>1/MJ<br>When [Total 2 unit] is 21<br>User unit |
| Holding Register | 0x03 | 0x10 | 1836 | Total 2 preset value      | Float      | Value | R/W(C1) |                                                                                                                                                                                                                                                                                                                                                         | [Total 2 unit]                                                                                                                                                                                                               |

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| Holding Register | 0x03 | 0x06 | 1840 | Total 2 unit                | Un-signed8    | Enum  | R/W(C1) | 0:g<br>1:kg<br>2:t<br>22:ton(US)<br>23:ton(UK)<br>3:lb<br>4:cm3<br>5:L<br>6:m3<br>7:gal<br>8:kgal<br>9:ft3<br>10:bbl<br>11:Impgal<br>12:kImpgal<br>13:NL<br>14:Nm3<br>15:SL<br>16:Sft3<br>17:MMSft3<br>18:Sm3<br>19:MJ<br>20:Btu<br>21:User unit |                |
| Holding Register | 0x03 | 0x10 | 1841 | Total 2 user unit           | Un-signed8[8] | ASCII | R/W(C2) |                                                                                                                                                                                                                                                  |                |
| Holding Register | 0x03 | 0x10 | 1846 | Total 2 density lower value | Float         | Value | R/W(C2) |                                                                                                                                                                                                                                                  | [Density unit] |
| Holding Register | 0x03 | 0x10 | 1848 | Total 2 density upper value | Float         | Value | R/W(C2) |                                                                                                                                                                                                                                                  | [Density unit] |
| Holding Register | 0x03 | 0x06 | 1851 | Total 3 channel             | Un-signed8    | Enum  | R/W(C1) | 0:Mass flow<br>1:Volume flow<br>2:Corrected volume flow<br>3:Energy<br>4:Net mass flow 1<br>5:Net mass flow 2<br>6:Net volume flow 1<br>7:Net volume flow 2<br>8:Net corrected volume flow<br>9:Off                                              |                |

|                  |      |      |      |                        |            |       |         |                                                                                                                                                                                                                                                                                                                                                         |                |
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| Holding Register | 0x03 | 0x06 | 1852 | Total 3 option         | Un-signed8 | Enum  | R/W(C2) | 0:Balanced<br>1:Absolute<br>2:Positive only<br>3:Negative only<br>4:Hold<br>5:Density (Balanced)<br>6:Density (Absolute)<br>7:Density (Positive only)<br>8:Density (Negative only)<br>9:Density + Temperature (Balanced)<br>10:Density + Temperature (Absolute)<br>11:Density + Temperature (Positive only)<br>12:Density + Temperature (Negative only) |                |
| Holding Register | 0x03 | 0x06 | 1853 | Total 3 failure option | Un-signed8 | Enum  | R/W(C1) | 0:Run<br>1:Hold<br>2:Last valid value                                                                                                                                                                                                                                                                                                                   |                |
| Holding Register | 0x03 | 0x06 | 1854 | Total 3 start/stop     | Un-signed8 | Enum  | R/W(C1) | 0:Stop<br>1:Start                                                                                                                                                                                                                                                                                                                                       |                |
| Holding Register | 0x03 | 0x06 | 1855 | Total 3 reset/preset   | Un-signed8 | Enum  | R/W(C1) | 0:Not execute<br>1:Reset<br>2:Preset                                                                                                                                                                                                                                                                                                                    |                |
| Holding Register | 0x03 | 0x06 | 1856 | Total 3 unit           | Un-signed8 | Enum  | R/W(C1) | 0:g<br>1:kg<br>2:t<br>22:ton(US)<br>23:ton(UK)<br>3:lb<br>4:cm3<br>5:L<br>6:m3<br>7:gal<br>8:kgal<br>9:ft3<br>10:bbl<br>11:Impgal<br>12:kImpgal<br>13:NL<br>14:Nm3<br>15:SL<br>16:Sft3<br>17:MMSft3<br>18:Sm3<br>19:MJ<br>20:Btu<br>21:User unit                                                                                                        |                |
| Holding Register | 0x03 | 0x10 | 1858 | Total 3 set point      | Float      | Value | R/W(C2) |                                                                                                                                                                                                                                                                                                                                                         | [Total 3 unit] |

|                  |      |      |      |                             |            |       |         |                                                                                                                                                                                                      |
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| Holding Register | 0x03 | 0x10 | 1860 | Total 3 conversion factor   | Float      | Value | R/W(C2) | When [Total 3 unit] is 0-3<br>1/kg<br>When [Total 3 unit] is 4-12<br>1/m3<br>When [Total 3 unit] is 13-18<br>1/Sm3<br>When [Total 3 unit] is 19-20<br>1/MJ<br>When [Total 3 unit] is 21<br>User unit |
| Holding Register | 0x03 | 0x10 | 1862 | Total 3 preset value        | Float      | Value | R/W(C1) | [Total 3 unit]                                                                                                                                                                                       |
| Holding Register | 0x03 | 0x10 | 1865 | Total 3 density lower value | Float      | Value | R/W(C2) | [Density unit]                                                                                                                                                                                       |
| Holding Register | 0x03 | 0x10 | 1867 | Total 3 density upper value | Float      | Value | R/W(C2) | [Density unit]                                                                                                                                                                                       |
| Holding Register | 0x03 | 0x06 | 1870 | Total 4 channel             | Un-signed8 | Enum  | R/W(C2) | 0:Mass flow<br>1:Volume flow<br>2:Corrected volume flow<br>3:Energy<br>4:Net mass flow 1<br>5:Net mass flow 2<br>6:Net volume flow 1<br>7:Net volume flow 2<br>8:Net corrected volume flow<br>9:Off  |
| Holding Register | 0x03 | 0x06 | 1871 | Total 4 option              | Un-signed8 | Enum  | R/W(C2) | 0:Balanced<br>1:Absolute<br>2:Positive only<br>3:Negative only<br>4:Hold                                                                                                                             |

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| Holding Register | 0x03 | 0x06 | 1872 | Total 4 unit              | Un-signed8    | Enum  | R/W(C2) | 0:g<br>1:kg<br>2:t<br>22:ton(US)<br>23:ton(UK)<br>3:lb<br>4:cm3<br>5:L<br>6:m3<br>7:gal<br>8:kgal<br>9:ft3<br>10:bbl<br>11:Impgal<br>12:kImpgal<br>13:NL<br>14:Nm3<br>15:SL<br>16:Sft3<br>17:MMSft3<br>18:Sm3<br>19:MJ<br>20:Btu<br>21:User unit |                                                                                                                                                                                                      |
| Holding Register | 0x03 | 0x06 | 1873 | Total 4 failure option    | Un-signed8    | Enum  | R/W(C2) | 0:Run<br>1:Hold<br>2:Last valid value                                                                                                                                                                                                            |                                                                                                                                                                                                      |
| Holding Register | 0x03 | 0x06 | 1874 | Total 4 start/stop        | Un-signed8    | Enum  | R/W(C2) | 0:Stop<br>1:Start                                                                                                                                                                                                                                |                                                                                                                                                                                                      |
| Holding Register | 0x03 | 0x10 | 1876 | Total 3 user unit         | Un-signed8[8] | ASCII | R/W(C2) |                                                                                                                                                                                                                                                  |                                                                                                                                                                                                      |
| Holding Register | 0x03 | 0x10 | 1881 | Total 4 set point         | Float         | Value | R/W(C2) |                                                                                                                                                                                                                                                  | [Total 4 unit]                                                                                                                                                                                       |
| Holding Register | 0x03 | 0x10 | 1883 | Total 4 conversion factor | Float         | Value | R/W(C2) |                                                                                                                                                                                                                                                  | When [Total 4 unit] is 0-3<br>1/kg<br>When [Total 4 unit] is 4-12<br>1/m3<br>When [Total 4 unit] is 13-18<br>1/Sm3<br>When [Total 4 unit] is 19-20<br>1/MJ<br>When [Total 4 unit] is 21<br>User unit |
| Holding Register | 0x03 | 0x10 | 1885 | Total 4 preset value      | Float         | Value | R/W(C2) |                                                                                                                                                                                                                                                  | [Total 4 unit]                                                                                                                                                                                       |
| Holding Register | 0x03 | 0x10 | 1888 | Total 4 user unit         | Un-signed8[8] | ASCII | R/W(C2) |                                                                                                                                                                                                                                                  |                                                                                                                                                                                                      |
| Holding Register | 0x03 | 0x06 | 1892 | Total 4 reset/preset      | Un-signed8    | Enum  | R/W(C2) | 0:Not execute<br>1:Reset<br>2:Preset                                                                                                                                                                                                             |                                                                                                                                                                                                      |



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| Holding Register | 0x03 | 0x06 | 1894 | Total 5 channel           | Un-signed8 | Enum  | R/W(C2) | 0:Mass flow<br>1:Volume flow<br>2:Corrected volume flow<br>3:Energy<br>4:Net mass flow 1<br>5:Net mass flow 2<br>6:Net volume flow 1<br>7:Net volume flow 2<br>8:Net corrected volume flow<br>9:Off |                                                                                                                                                                                                      |
| Holding Register | 0x03 | 0x06 | 1895 | Total 5 option            | Un-signed8 | Enum  | R/W(C2) | 0:Balanced<br>1:Absolute<br>2:Positive only<br>3:Negative only<br>4:Hold                                                                                                                            |                                                                                                                                                                                                      |
| Holding Register | 0x03 | 0x06 | 1896 | Total 5 failure option    | Un-signed8 | Enum  | R/W(C2) | 0:Run<br>1:Hold<br>2:Last valid value                                                                                                                                                               |                                                                                                                                                                                                      |
| Holding Register | 0x03 | 0x06 | 1897 | Total 5 start/stop        | Un-signed8 | Enum  | R/W(C2) | 0:Stop<br>1:Start                                                                                                                                                                                   |                                                                                                                                                                                                      |
| Holding Register | 0x03 | 0x06 | 1898 | Total 5 reset/preset      | Un-signed8 | Enum  | R/W(C2) | 0:Not execute<br>1:Reset<br>2:Preset                                                                                                                                                                |                                                                                                                                                                                                      |
| Holding Register | 0x03 | 0x10 | 1900 | Total 5 set point         | Float      | Value | R/W(C2) |                                                                                                                                                                                                     | [Total 5 unit]                                                                                                                                                                                       |
| Holding Register | 0x03 | 0x10 | 1902 | Total 5 conversion factor | Float      | Value | R/W(C2) |                                                                                                                                                                                                     | When [Total 5 unit] is 0-3<br>1/kg<br>When [Total 5 unit] is 4-12<br>1/m3<br>When [Total 5 unit] is 13-18<br>1/Sm3<br>When [Total 5 unit] is 19-20<br>1/MJ<br>When [Total 5 unit] is 21<br>User unit |
| Holding Register | 0x03 | 0x10 | 1904 | Total 5 preset value      | Float      | Value | R/W(C2) |                                                                                                                                                                                                     | [Total 5 unit]                                                                                                                                                                                       |

|                  |      |      |      |                           |           |       |         |                                                                                                                                                                                                     |                                                                                                                                                                                                      |
|------------------|------|------|------|---------------------------|-----------|-------|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Holding Register | 0x03 | 0x06 | 1907 | Total 6 channel           | Unsigned8 | Enum  | R/W(C2) | 0:Mass flow<br>1:Volume flow<br>2:Corrected volume flow<br>3:Energy<br>4:Net mass flow 1<br>5:Net mass flow 2<br>6:Net volume flow 1<br>7:Net volume flow 2<br>8:Net corrected volume flow<br>9:Off |                                                                                                                                                                                                      |
| Holding Register | 0x03 | 0x06 | 1908 | Total 6 option            | Unsigned8 | Enum  | R/W(C2) | 0:Balanced<br>1:Absolute<br>2:Positive only<br>3:Negative only<br>4:Hold                                                                                                                            |                                                                                                                                                                                                      |
| Holding Register | 0x03 | 0x06 | 1909 | Total 6 failure option    | Unsigned8 | Enum  | R/W(C2) | 0:Run<br>1:Hold<br>2:Last valid value                                                                                                                                                               |                                                                                                                                                                                                      |
| Holding Register | 0x03 | 0x06 | 1910 | Total 6 start/stop        | Unsigned8 | Enum  | R/W(C2) | 0:Stop<br>1:Start                                                                                                                                                                                   |                                                                                                                                                                                                      |
| Holding Register | 0x03 | 0x06 | 1911 | Total 6 reset/preset      | Unsigned8 | Enum  | R/W(C2) | 0:Not execute<br>1:Reset<br>2:Preset                                                                                                                                                                |                                                                                                                                                                                                      |
| Holding Register | 0x03 | 0x10 | 1913 | Total 6 set point         | Float     | Value | R/W(C2) |                                                                                                                                                                                                     | [Total 6 unit]                                                                                                                                                                                       |
| Holding Register | 0x03 | 0x10 | 1915 | Total 6 conversion factor | Float     | Value | R/W(C2) |                                                                                                                                                                                                     | When [Total 6 unit] is 0-3<br>1/kg<br>When [Total 6 unit] is 4-12<br>1/m3<br>When [Total 6 unit] is 13-18<br>1/Sm3<br>When [Total 6 unit] is 19-20<br>1/MJ<br>When [Total 6 unit] is 21<br>User unit |
| Holding Register | 0x03 | 0x10 | 1917 | Total 6 preset value      | Float     | Value | R/W(C2) |                                                                                                                                                                                                     | [Total 6 unit]                                                                                                                                                                                       |

|                  |      |      |      |                                 |               |       |          |                                                                                                                                                                                                                                                  |                    |
|------------------|------|------|------|---------------------------------|---------------|-------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| Holding Register | 0x03 | 0x06 | 1920 | Total 5 unit                    | Un-signed8    | Enum  | R/W(C2)  | 0:g<br>1:kg<br>2:t<br>22:ton(US)<br>23:ton(UK)<br>3:lb<br>4:cm3<br>5:L<br>6:m3<br>7:gal<br>8:kgal<br>9:ft3<br>10:bbl<br>11:Impgal<br>12:klmpgal<br>13:NL<br>14:Nm3<br>15:SL<br>16:Sft3<br>17:MMSft3<br>18:Sm3<br>19:MJ<br>20:Btu<br>21:User unit |                    |
| Holding Register | 0x03 | 0x06 | 1921 | Total 6 unit                    | Un-signed8    | Enum  | R/W(C2)  | 0:g<br>1:kg<br>2:t<br>22:ton(US)<br>23:ton(UK)<br>3:lb<br>4:cm3<br>5:L<br>6:m3<br>7:gal<br>8:kgal<br>9:ft3<br>10:bbl<br>11:Impgal<br>12:klmpgal<br>13:NL<br>14:Nm3<br>15:SL<br>16:Sft3<br>17:MMSft3<br>18:Sm3<br>19:MJ<br>20:Btu<br>21:User unit |                    |
| Holding Register | 0x03 | 0x10 | 1922 | Total 5 user unit               | Un-signed8[8] | ASCII | R/W(C2)  |                                                                                                                                                                                                                                                  |                    |
| Holding Register | 0x03 | 0x10 | 1927 | Total 6 user unit               | Un-signed8[8] | ASCII | R/W(C2)  |                                                                                                                                                                                                                                                  |                    |
| Holding Register | 0x03 | 0x10 | 1932 | Total 1 temperature lower value | Float         | Value | R/W(C0)a |                                                                                                                                                                                                                                                  | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 1934 | Total 1 temperature upper value | Float         | Value | R/W(C0)a |                                                                                                                                                                                                                                                  | [Temperature unit] |

|                  |      |      |      |                                 |            |        |          |                                                              |                    |
|------------------|------|------|------|---------------------------------|------------|--------|----------|--------------------------------------------------------------|--------------------|
| Holding Register | 0x03 | 0x10 | 1936 | Total 2 temperature lower value | Float      | Value  | R/W(C0)a |                                                              | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 1938 | Total 2 temperature upper value | Float      | Value  | R/W(C0)a |                                                              | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 1940 | Total 3 temperature lower value | Float      | Value  | R/W(C0)a |                                                              | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 1942 | Total 3 temperature upper value | Float      | Value  | R/W(C0)a |                                                              | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 1944 | Drive current LRV               | Float      | Value  | R/W(C0)a |                                                              |                    |
| Holding Register | 0x03 | 0x10 | 1946 | Drive current URV               | Float      | Value  | R/W(C0)a |                                                              |                    |
| Holding Register | 0x03 | 0x10 | 1984 | Device ID                       | Unsigned32 | Value  | R        |                                                              |                    |
| Holding Register | 0x03 | 0x10 | 2016 | SK20                            | Float      | Value  | R/W(C2)  |                                                              | MHz*kg/h           |
| Holding Register | 0x03 | 0x10 | 2018 | SK20 reverse                    | Float      | Value  | R/W(C2)  |                                                              | MHz*kg/h           |
| Holding Register | 0x03 | 0x06 | 2020 | Installation orientation        | Unsigned8  | Enum   | R/W(C1)  | 0:Vertical<br>1:Horizontal bend down<br>2:Horizontal bend up |                    |
| Holding Register | 0x03 | 0x10 | 2032 | SKT                             | Float      | Evalue | R/W(C2)  |                                                              | 1/K                |
| Holding Register | 0x03 | 0x10 | 2048 | SKTK                            | Float      | Evalue | R/W(C2)  |                                                              | 1/K2               |
| Holding Register | 0x03 | 0x10 | 2128 | KD                              | Float      | Value  | R/W(C2)  |                                                              | kg/L               |
| Holding Register | 0x03 | 0x10 | 2144 | FL20                            | Float      | Value  | R/W(C2)  |                                                              | Hz                 |
| Holding Register | 0x03 | 0x10 | 2160 | FTC1                            | Float      | Evalue | R/W(C2)  |                                                              | 1/K                |
| Holding Register | 0x03 | 0x10 | 2176 | FTCK                            | Float      | Evalue | R/W(C2)  |                                                              | 1/K2               |
| Holding Register | 0x03 | 0x10 | 2216 | SKT1                            | Float      | Evalue | R/W(C0)a |                                                              |                    |
| Holding Register | 0x03 | 0x10 | 2218 | SKT2                            | Float      | Evalue | R/W(C0)a |                                                              |                    |
| Holding Register | 0x03 | 0x10 | 2220 | SKT3                            | Float      | Evalue | R/W(C0)a |                                                              |                    |
| Holding Register | 0x03 | 0x10 | 2223 | FT1                             | Float      | Evalue | R/W(C0)a |                                                              |                    |
| Holding Register | 0x03 | 0x10 | 2225 | FT2                             | Float      | Evalue | R/W(C0)a |                                                              |                    |

|                  |      |      |      |                                                 |            |        |                  |                            |                        |
|------------------|------|------|------|-------------------------------------------------|------------|--------|------------------|----------------------------|------------------------|
| Holding Register | 0x03 | 0x10 | 2227 | FT3                                             | Float      | Evalue | R/<br>W(C0)<br>a |                            |                        |
| Holding Register | 0x03 | 0x06 | 2235 | VKT1                                            | Float      | Evalue | R/<br>W(C0)<br>a |                            |                        |
| Holding Register | 0x03 | 0x06 | 2237 | VKT2                                            | Float      | Evalue | R/<br>W(C0)<br>a |                            |                        |
| Holding Register | 0x03 | 0x10 | 2242 | Sound velocity at reference temperature         | Float      | Evalue | R/<br>W(C0)<br>a |                            | m/s                    |
| Holding Register | 0x03 | 0x10 | 2244 | Reference temperature for sound velocity        | Float      | Evalue | R/<br>W(C0)<br>a |                            | degC                   |
| Holding Register | 0x03 | 0x10 | 2246 | Sound velocity temperature coefficient          | Float      | Evalue | R/<br>W(C0)<br>a |                            | m/(s*K)                |
| Holding Register | 0x03 | 0x06 | 2248 | VKT0                                            | Float      | Evalue | R/<br>W(C0)<br>a |                            | cSt                    |
| Holding Register | 0x03 | 0x06 | 2256 | Modbus init                                     | Un-signed8 | Enum   | R/<br>W(C1)      | 0:Not execute<br>1:Execute |                        |
| Holding Register | 0x03 | 0x10 | 2272 | Concentration reference temperature set 1       | Float      | Value  | R/<br>W(C2)      |                            | [Temperature unit]     |
| Holding Register | 0x03 | 0x10 | 2276 | Concentration reference temperature set 2       | Float      | Value  | R/<br>W(C2)      |                            | [Temperature unit]     |
| Holding Register | 0x03 | 0x10 | 2278 | Concentration reference density carrier set 2   | Float      | Value  | R/<br>W(C2)      |                            | [Density unit]         |
| Holding Register | 0x03 | 0x10 | 2280 | Concentration temperature coeff A carrier set 2 | Float      | Evalue | R/<br>W(C2)      |                            | [1/Temperature unit]   |
| Holding Register | 0x03 | 0x10 | 2283 | Concentration temperature coeff B carrier set 2 | Float      | Evalue | R/<br>W(C2)      |                            | [1/Temperature unit^2] |
| Holding Register | 0x03 | 0x10 | 2285 | Concentration reference density product set 2   | Float      | Value  | R/<br>W(C2)      |                            | [Density unit]         |
| Holding Register | 0x03 | 0x10 | 2288 | Concentration reference density carrier set 1   | Float      | Value  | R/<br>W(C2)      |                            | [Density unit]         |
| Holding Register | 0x03 | 0x10 | 2292 | Concentration temperature coeff A product set 2 | Float      | Evalue | R/<br>W(C2)      |                            | [1/Temperature unit]   |
| Holding Register | 0x03 | 0x10 | 2294 | Concentration temperature coeff B product set 2 | Float      | Evalue | R/<br>W(C2)      |                            | [1/Temperature unit^2] |

|                  |      |      |      |                                                 |       |        |         |  |                                    |
|------------------|------|------|------|-------------------------------------------------|-------|--------|---------|--|------------------------------------|
| Holding Register | 0x03 | 0x10 | 2297 | Concentration reference temperature set 3       | Float | Value  | R/W(C2) |  | [Temperature unit]                 |
| Holding Register | 0x03 | 0x10 | 2299 | Concentration reference density carrier set 3   | Float | Value  | R/W(C2) |  | [Density unit]                     |
| Holding Register | 0x03 | 0x10 | 2304 | Concentration temperature coeff A carrier set 1 | Float | Evalue | R/W(C2) |  | [1/Temperature unit]               |
| Holding Register | 0x03 | 0x10 | 2309 | Concentration temperature coeff A carrier set 3 | Float | Evalue | R/W(C2) |  | [1/Temperature unit]               |
| Holding Register | 0x03 | 0x10 | 2311 | Concentration reference density product set 3   | Float | Value  | R/W(C2) |  | [Density unit]                     |
| Holding Register | 0x03 | 0x10 | 2313 | Concentration temperature coeff A product set 3 | Float | Evalue | R/W(C2) |  | [1/Temperature unit]               |
| Holding Register | 0x03 | 0x10 | 2316 | Concentration temperature coeff B product set 3 | Float | Evalue | R/W(C2) |  | [1/Temperature unit <sup>2</sup> ] |
| Holding Register | 0x03 | 0x10 | 2318 | Concentration temperature coeff B carrier set 3 | Float | Evalue | R/W(C2) |  | [1/Temperature unit <sup>2</sup> ] |
| Holding Register | 0x03 | 0x10 | 2320 | Concentration temperature coeff B carrier set 1 | Float | Evalue | R/W(C2) |  | [1/Temperature unit <sup>2</sup> ] |
| Holding Register | 0x03 | 0x10 | 2324 | Concentration reference temperature set 4       | Float | Value  | R/W(C2) |  | [Temperature unit]                 |
| Holding Register | 0x03 | 0x10 | 2326 | Concentration reference density carrier set 4   | Float | Value  | R/W(C2) |  | [Density unit]                     |
| Holding Register | 0x03 | 0x10 | 2328 | Concentration temperature coeff A carrier set 4 | Float | Evalue | R/W(C2) |  | [1/Temperature unit]               |
| Holding Register | 0x03 | 0x10 | 2331 | Concentration temperature coeff B carrier set 4 | Float | Evalue | R/W(C2) |  | [1/Temperature unit <sup>2</sup> ] |
| Holding Register | 0x03 | 0x10 | 2333 | Concentration reference density product set 4   | Float | Value  | R/W(C2) |  | [Density unit]                     |
| Holding Register | 0x03 | 0x10 | 2336 | Concentration reference density product set 1   | Float | Value  | R/W(C2) |  | [Density unit]                     |

|                  |      |      |      |                                                 |            |        |         |                                                                                                    |                                        |
|------------------|------|------|------|-------------------------------------------------|------------|--------|---------|----------------------------------------------------------------------------------------------------|----------------------------------------|
| Holding Register | 0x03 | 0x10 | 2340 | Concentration temperature coeff A product set 4 | Float      | Evalue | R/W(C2) |                                                                                                    | [1/Temperature unit]                   |
| Holding Register | 0x03 | 0x10 | 2342 | Concentration temperature coeff B product set 4 | Float      | Evalue | R/W(C2) |                                                                                                    | [1/Temperature unit^2]                 |
| Holding Register | 0x03 | 0x06 | 2345 | Concentration measurement unit set 2            | Un-signed8 | Enum   | R/W(C2) | 0:degBrix<br>1:Wt% sol<br>2:Vol% sol<br>3:Wt %<br>4:Vol %<br>5:Wt % User unit<br>6:Vol % User unit |                                        |
| Holding Register | 0x03 | 0x10 | 2346 | Concentration measurement LRV set 2             | Float      | Value  | R/W(C2) |                                                                                                    | [Concentration measurement unit set 2] |
| Holding Register | 0x03 | 0x10 | 2348 | Concentration measurement URV set 2             | Float      | Value  | R/W(C2) |                                                                                                    | [Concentration measurement unit set 2] |
| Holding Register | 0x03 | 0x10 | 2352 | Concentration temperature coeff A product set 1 | Float      | Evalue | R/W(C2) |                                                                                                    | [1/Temperature unit]                   |
| Holding Register | 0x03 | 0x06 | 2355 | Concentration measurement unit set 3            | Un-signed8 | Enum   | R/W(C2) | 0:degBrix<br>1:Wt% sol<br>2:Vol% sol<br>3:Wt %<br>4:Vol %<br>5:Wt % User unit<br>6:Vol % User unit |                                        |
| Holding Register | 0x03 | 0x10 | 2356 | Concentration measurement LRV set 3             | Float      | Value  | R/W(C2) |                                                                                                    | [Concentration measurement unit set 3] |
| Holding Register | 0x03 | 0x10 | 2358 | Concentration measurement URV set 3             | Float      | Value  | R/W(C2) |                                                                                                    | [Concentration measurement unit set 3] |
| Holding Register | 0x03 | 0x06 | 2361 | Concentration measurement unit set 4            | Un-signed8 | Enum   | R/W(C2) | 0:degBrix<br>1:Wt% sol<br>2:Vol% sol<br>3:Wt %<br>4:Vol %<br>5:Wt % User unit<br>6:Vol % User unit |                                        |
| Holding Register | 0x03 | 0x10 | 2363 | Concentration measurement LRV set 4             | Float      | Value  | R/W(C2) |                                                                                                    | [Concentration measurement unit set 4] |
| Holding Register | 0x03 | 0x10 | 2365 | Concentration measurement URV set 4             | Float      | Value  | R/W(C2) |                                                                                                    | [Concentration measurement unit set 4] |
| Holding Register | 0x03 | 0x10 | 2368 | Concentration temperature coeff B product set 1 | Float      | Evalue | R/W(C2) |                                                                                                    | [1/Temperature unit^2]                 |
| Holding Register | 0x03 | 0x06 | 2371 | Concentration trim select                       | Un-signed8 | Enum   | R/W(C2) | 0:Inhibit<br>1:Enable                                                                              |                                        |

|                  |      |      |      |                                                 |            |        |             |                                                                                                    |                                                                                                                                                                                                                                                                |
|------------------|------|------|------|-------------------------------------------------|------------|--------|-------------|----------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Holding Register | 0x03 | 0x10 | 2372 | Concentration trim offset                       | Float      | Evalue | R/<br>W(C2) |                                                                                                    | When Selected concentration set is 0:Set1<br>[Concentration measurement unit set 1]<br>When 1:Set2<br>[Concentration measurement unit set 2]<br>When 2:Set3<br>[Concentration measurement unit set 3]<br>When 3:Set4<br>[Concentration measurement unit set 4] |
| Holding Register | 0x03 | 0x10 | 2374 | Concentration trim gain                         | Float      | Value  | R/<br>W(C2) |                                                                                                    |                                                                                                                                                                                                                                                                |
| Holding Register | 0x03 | 0x06 | 2384 | Concentration measurement unit set 1            | Un-signed8 | Enum   | R/<br>W(C2) | 0:degBrix<br>1:Wt% sol<br>2:Vol% sol<br>3:Wt %<br>4:Vol %<br>5:Wt % User unit<br>6:Vol % User unit |                                                                                                                                                                                                                                                                |
| Holding Register | 0x03 | 0x10 | 2386 | Concentration measurement low alarm set 1       | Float      | Value  | R/<br>W(C2) |                                                                                                    | [Concentration measurement unit set 1]                                                                                                                                                                                                                         |
| Holding Register | 0x03 | 0x10 | 2388 | Concentration measurement high alarm set 1      | Float      | Value  | R/<br>W(C2) |                                                                                                    | [Concentration measurement unit set 1]                                                                                                                                                                                                                         |
| Holding Register | 0x03 | 0x10 | 2390 | Concentration measurement low low alarm set 1   | Float      | Value  | R/<br>W(C2) |                                                                                                    | [Concentration measurement unit set 1]                                                                                                                                                                                                                         |
| Holding Register | 0x03 | 0x10 | 2392 | Concentration measurement high high alarm set 1 | Float      | Value  | R/<br>W(C2) |                                                                                                    | [Concentration measurement unit set 1]                                                                                                                                                                                                                         |
| Holding Register | 0x03 | 0x10 | 2400 | Concentration measurement LRV set 1             | Float      | Value  | R/<br>W(C2) |                                                                                                    | [Concentration measurement unit set 1]                                                                                                                                                                                                                         |
| Holding Register | 0x03 | 0x10 | 2403 | Concentration measurement low alarm set 2       | Float      | Value  | R/<br>W(C2) |                                                                                                    | [Concentration measurement unit set 2]                                                                                                                                                                                                                         |
| Holding Register | 0x03 | 0x10 | 2405 | Concentration measurement high alarm set 2      | Float      | Value  | R/<br>W(C2) |                                                                                                    | [Concentration measurement unit set 2]                                                                                                                                                                                                                         |
| Holding Register | 0x03 | 0x10 | 2407 | Concentration measurement low low alarm set 2   | Float      | Value  | R/<br>W(C2) |                                                                                                    | [Concentration measurement unit set 2]                                                                                                                                                                                                                         |



|                  |      |      |      |                                                 |               |       |         |                                          |                                        |
|------------------|------|------|------|-------------------------------------------------|---------------|-------|---------|------------------------------------------|----------------------------------------|
| Holding Register | 0x03 | 0x10 | 2409 | Concentration measurement high high alarm set 2 | Float         | Value | R/W(C2) |                                          | [Concentration measurement unit set 2] |
| Holding Register | 0x03 | 0x10 | 2416 | Concentration measurement URV set 1             | Float         | Value | R/W(C2) |                                          | [Concentration measurement unit set 1] |
| Holding Register | 0x03 | 0x10 | 2419 | Concentration measurement low alarm set 3       | Float         | Value | R/W(C2) |                                          | [Concentration measurement unit set 3] |
| Holding Register | 0x03 | 0x10 | 2421 | Concentration measurement high alarm set 3      | Float         | Value | R/W(C2) |                                          | [Concentration measurement unit set 3] |
| Holding Register | 0x03 | 0x10 | 2423 | Concentration measurement low low alarm set 3   | Float         | Value | R/W(C2) |                                          | [Concentration measurement unit set 3] |
| Holding Register | 0x03 | 0x10 | 2425 | Concentration measurement high high alarm set 3 | Float         | Value | R/W(C2) |                                          | [Concentration measurement unit set 3] |
| Holding Register | 0x03 | 0x10 | 2432 | Concentration damping                           | Float         | Value | R/W(C2) |                                          | s                                      |
| Holding Register | 0x03 | 0x10 | 2435 | Concentration measurement low alarm set 4       | Float         | Value | R/W(C2) |                                          | [Concentration measurement unit set 4] |
| Holding Register | 0x03 | 0x10 | 2437 | Concentration measurement high alarm set 4      | Float         | Value | R/W(C2) |                                          | [Concentration measurement unit set 4] |
| Holding Register | 0x03 | 0x10 | 2439 | Concentration measurement low low alarm set 4   | Float         | Value | R/W(C2) |                                          | [Concentration measurement unit set 4] |
| Holding Register | 0x03 | 0x10 | 2441 | Concentration measurement high high alarm set 4 | Float         | Value | R/W(C2) |                                          | [Concentration measurement unit set 4] |
| Holding Register | 0x03 | 0x06 | 2444 | Select concentration set manual                 | Un-signed8    | Enum  | R/W(C2) | 0:Set 1<br>1:Set 2<br>2:Set 3<br>3:Set 4 |                                        |
| Holding Register | 0x03 | 0x10 | 2445 | Concentration measurement user unit set 1       | Un-signed8[8] | ASCII | R/W(C2) |                                          |                                        |
| Holding Register | 0x03 | 0x10 | 2450 | Concentration measurement user unit set 2       | Un-signed8[8] | ASCII | R/W(C2) |                                          |                                        |
| Holding Register | 0x03 | 0x10 | 2455 | Concentration measurement user unit set 3       | Un-signed8[8] | ASCII | R/W(C2) |                                          |                                        |
| Holding Register | 0x03 | 0x10 | 2460 | Concentration measurement user unit set 4       | Un-signed8[8] | ASCII | R/W(C2) |                                          |                                        |

|                  |      |      |      |                                             |                |        |         |                                                                                                                                                                                                                                                                    |                        |
|------------------|------|------|------|---------------------------------------------|----------------|--------|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| Holding Register | 0x03 | 0x10 | 2465 | Concentration name set 1                    | Un-signed8[16] | ASCII  | R/W(C2) |                                                                                                                                                                                                                                                                    |                        |
| Holding Register | 0x03 | 0x10 | 2474 | Concentration name set 2                    | Un-signed8[16] | ASCII  | R/W(C2) |                                                                                                                                                                                                                                                                    |                        |
| Holding Register | 0x03 | 0x10 | 2483 | Concentration name set 3                    | Un-signed8[16] | ASCII  | R/W(C2) |                                                                                                                                                                                                                                                                    |                        |
| Holding Register | 0x03 | 0x10 | 2492 | Concentration name set 4                    | Un-signed8[16] | ASCII  | R/W(C2) |                                                                                                                                                                                                                                                                    |                        |
| Holding Register | 0x03 | 0x06 | 2544 | Net mass flow 1 unit                        | Un-signed8     | Enum   | R/W(C2) | 0:g/s<br>1:g/min<br>2:g/h<br>3:kg/s<br>4:kg/min<br>5:kg/h<br>6:kg/d<br>7:t/min<br>8:t/h<br>9:t/d<br>15:ton(US)/min<br>16:ton(US)/h<br>17:ton(US)/d<br>18:ton(UK)/min<br>19:ton(UK)/h<br>20:ton(UK)/d<br>10:lb/s<br>11:lb/min<br>12:lb/h<br>13:lb/d<br>14:User unit |                        |
| Holding Register | 0x03 | 0x10 | 2545 | Net mass flow 1 user unit                   | Un-signed8[8]  | ASCII  | R/W(C2) |                                                                                                                                                                                                                                                                    |                        |
| Holding Register | 0x03 | 0x06 | 2550 | Net mass flow 1 trim select                 | Un-signed8     | Enum   | R/W(C2) | 0:Inhibit<br>1:Enable                                                                                                                                                                                                                                              |                        |
| Holding Register | 0x03 | 0x10 | 2551 | Net mass flow 1 trim offset                 | Float          | Evalue | R/W(C2) |                                                                                                                                                                                                                                                                    | [Net mass flow 1 unit] |
| Holding Register | 0x03 | 0x10 | 2553 | Net mass flow 1 trim gain                   | Float          | Value  | R/W(C2) |                                                                                                                                                                                                                                                                    |                        |
| Holding Register | 0x03 | 0x06 | 2557 | Net mass flow 1 bi-directional mode         | Un-signed8     | Enum   | R/W(C2) | 0:Not active<br>1:Active                                                                                                                                                                                                                                           |                        |
| Holding Register | 0x03 | 0x10 | 2558 | Net mass flow 1 user unit conversion factor | Float          | Value  | R/W(C2) |                                                                                                                                                                                                                                                                    | 1/(kg/h)               |
| Holding Register | 0x03 | 0x10 | 2560 | Net mass flow 1 LRV                         | Float          | Value  | R/W(C2) |                                                                                                                                                                                                                                                                    | [Net mass flow 1 unit] |
| Holding Register | 0x03 | 0x10 | 2563 | Net mass flow 1 low alarm                   | Float          | Value  | R/W(C2) |                                                                                                                                                                                                                                                                    | [Net mass flow 1 unit] |
| Holding Register | 0x03 | 0x10 | 2565 | Net mass flow 1 high alarm                  | Float          | Value  | R/W(C2) |                                                                                                                                                                                                                                                                    | [Net mass flow 1 unit] |
| Holding Register | 0x03 | 0x10 | 2567 | Net mass flow 1 low low alarm               | Float          | Value  | R/W(C2) |                                                                                                                                                                                                                                                                    | [Net mass flow 1 unit] |

|                  |      |      |      |                                     |            |        |         |                                                                                                                                                                                                                                                                    |                        |
|------------------|------|------|------|-------------------------------------|------------|--------|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| Holding Register | 0x03 | 0x10 | 2569 | Net mass flow 1 high high alarm     | Float      | Value  | R/W(C2) |                                                                                                                                                                                                                                                                    | [Net mass flow 1 unit] |
| Holding Register | 0x03 | 0x10 | 2576 | Net mass flow 1 URV                 | Float      | Value  | R/W(C2) |                                                                                                                                                                                                                                                                    | [Net mass flow 1 unit] |
| Holding Register | 0x03 | 0x10 | 2592 | Net mass flow 1 damping             | Float      | Value  | R/W(C2) |                                                                                                                                                                                                                                                                    | s                      |
| Holding Register | 0x03 | 0x10 | 2594 | Net mass flow 1 damping pulse/total | Float      | Value  | R/W(C2) |                                                                                                                                                                                                                                                                    | s                      |
| Holding Register | 0x03 | 0x10 | 2608 | Net mass flow 1 lowcut              | Float      | Value  | R/W(C2) |                                                                                                                                                                                                                                                                    | [Net mass flow 1 unit] |
| Holding Register | 0x03 | 0x06 | 2620 | Net mass flow 2 unit                | Un-signed8 | Enum   | R/W(C2) | 0:g/s<br>1:g/min<br>2:g/h<br>3:kg/s<br>4:kg/min<br>5:kg/h<br>6:kg/d<br>7:t/min<br>8:t/h<br>9:t/d<br>15:ton(US)/min<br>16:ton(US)/h<br>17:ton(US)/d<br>18:ton(UK)/min<br>19:ton(UK)/h<br>20:ton(UK)/d<br>10:lb/s<br>11:lb/min<br>12:lb/h<br>13:lb/d<br>14:User unit |                        |
| Holding Register | 0x03 | 0x10 | 2621 | Net mass flow 2 LRV                 | Float      | Value  | R/W(C2) |                                                                                                                                                                                                                                                                    | [Net mass flow 2 unit] |
| Holding Register | 0x03 | 0x10 | 2623 | Net mass flow 2 URV                 | Float      | Value  | R/W(C2) |                                                                                                                                                                                                                                                                    | [Net mass flow 2 unit] |
| Holding Register | 0x03 | 0x06 | 2626 | Net mass flow 2 trim select         | Un-signed8 | Enum   | R/W(C2) | 0:Inhibit<br>1:Enable                                                                                                                                                                                                                                              |                        |
| Holding Register | 0x03 | 0x10 | 2627 | Net mass flow 2 trim offset         | Float      | Evalue | R/W(C2) |                                                                                                                                                                                                                                                                    | [Net mass flow 2 unit] |
| Holding Register | 0x03 | 0x10 | 2629 | Net mass flow 2 trim gain           | Float      | Value  | R/W(C2) |                                                                                                                                                                                                                                                                    |                        |
| Holding Register | 0x03 | 0x10 | 2632 | Net mass flow 2 damping             | Float      | Value  | R/W(C2) |                                                                                                                                                                                                                                                                    | s                      |
| Holding Register | 0x03 | 0x10 | 2634 | Net mass flow 2 damping pulse/total | Float      | Value  | R/W(C2) |                                                                                                                                                                                                                                                                    | s                      |
| Holding Register | 0x03 | 0x10 | 2636 | Net mass flow 2 lowcut              | Float      | Value  | R/W(C2) |                                                                                                                                                                                                                                                                    | [Net mass flow 2 unit] |
| Holding Register | 0x03 | 0x10 | 2639 | Net mass flow 2 low alarm           | Float      | Value  | R/W(C2) |                                                                                                                                                                                                                                                                    | [Net mass flow 2 unit] |
| Holding Register | 0x03 | 0x10 | 2641 | Net mass flow 2 high alarm          | Float      | Value  | R/W(C2) |                                                                                                                                                                                                                                                                    | [Net mass flow 2 unit] |
| Holding Register | 0x03 | 0x10 | 2643 | Net mass flow 2 low low alarm       | Float      | Value  | R/W(C2) |                                                                                                                                                                                                                                                                    | [Net mass flow 2 unit] |

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| Holding Register | 0x03 | 0x10 | 2645 | Net mass flow 2 high high alarm             | Float         | Value | R/W(C2) |                                             | [Net mass flow 2 unit] |
| Holding Register | 0x03 | 0x06 | 2648 | Net mass flow 2 bi-directional mode         | Un-signed8    | Enum  | R/W(C2) | 0:Not active<br>1:Active                    |                        |
| Holding Register | 0x03 | 0x10 | 2649 | Net mass flow 2 user unit conversion factor | Float         | Value | R/W(C2) |                                             | 1/(kg/h)               |
| Holding Register | 0x03 | 0x10 | 2652 | Net mass flow 2 user unit                   | Un-signed8[8] | ASCII | R/W(C2) |                                             |                        |
| Holding Register | 0x03 | 0x10 | 2704 | Slug detection level                        | Float         | Value | R/W(C2) |                                             | mApp                   |
| Holding Register | 0x03 | 0x10 | 2706 | Slug alarm delay                            | Float         | Value | R/W(C2) |                                             | s                      |
| Holding Register | 0x03 | 0x10 | 2709 | After slug mass flow fixed value            | Float         | Value | R/W(C2) |                                             | [Mass flow unit]       |
| Holding Register | 0x03 | 0x10 | 2711 | After slug density fixed value              | Float         | Value | R/W(C2) |                                             | [Density unit]         |
| Holding Register | 0x03 | 0x06 | 2713 | Average start time                          | Un-signed8    | Value | R/W(C2) |                                             | s                      |
| Holding Register | 0x03 | 0x06 | 2714 | Average end time                            | Un-signed8    | Value | R/W(C2) |                                             | s                      |
| Holding Register | 0x03 | 0x10 | 2720 | Slug hysteresis                             | Float         | Value | R/W(C2) |                                             | %                      |
| Holding Register | 0x03 | 0x06 | 2736 | After slug mass flow                        | Un-signed8    | Enum  | R/W(C2) | 0:Measured value<br>1:Hold<br>2:Fixed value |                        |
| Holding Register | 0x03 | 0x06 | 2738 | After slug density                          | Un-signed8    | Enum  | R/W(C2) | 0:Measured value<br>1:Hold<br>2:Fixed value |                        |
| Holding Register | 0x03 | 0x10 | 2752 | Drive current damping                       | Float         | Value | R/W(C2) |                                             | s                      |
| Holding Register | 0x03 | 0x10 | 2784 | Empty pipe criteria                         | Float         | Value | R/W(C2) |                                             | [Density unit]         |
| Holding Register | 0x03 | 0x10 | 2788 | Empty pipe alarm delay                      | Float         | Value | R/W(C2) |                                             | min                    |
| Holding Register | 0x03 | 0x10 | 2791 | Tube leakage criteria                       | Float         | Value | R/W(C2) |                                             | [Pressure unit]        |
| Holding Register | 0x03 | 0x06 | 2793 | Clear tube leakage detection                | Un-signed8    | Enum  | R/W(C2) | 0:Not execute<br>1:Execute                  |                        |
| Holding Register | 0x03 | 0x06 | 2800 | After empty pipe                            | Un-signed8    | Enum  | R/W(C2) | 0:0%<br>1:Measured value<br>2:Hold          |                        |
| Holding Register | 0x03 | 0x10 | 2848 | Corrosion criteria                          | Float         | Value | R/W(C2) |                                             | [Density unit]         |
| Holding Register | 0x03 | 0x10 | 2864 | Corrosion damping                           | Float         | Value | R/W(C2) |                                             | h                      |
| Holding Register | 0x03 | 0x06 | 2880 | Device reset                                | Un-signed8    | Enum  | R/W(C0) | 0:Not execute<br>1:Execute                  |                        |

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| Holding Register | 0x03 | 0x06 | 2912 | IRSW operation             | Un-signed8     | Enum    | R/W(C0)<br>d | 0:Inhibit<br>1:Enable                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |
| Holding Register | 0x03 | 0x10 | 3376 | Tag                        | Un-signed8[8]  | ASCII   | R/W(C2)      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |
| Holding Register | 0x03 | 0x10 | 3392 | Long tag                   | Un-signed8[32] | Latin-1 | R/W(C2)      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |
| Holding Register | 0x03 | 0x06 | 3414 | Autozero failure detection | Un-signed8     | Enum    | R/W(C0)<br>a | 0:Off<br>1:On                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
|                  |      |      |      |                            |                |         |              | 1:Mass flow<br>2:Density<br>3:Temperature<br>4:Volume flow<br>5:Reference density<br>6:Relative density<br>7:Corrected volume flow<br>8:Pressure<br>9:Totalizer 1<br>10:Totalizer 2<br>11:Totalizer 3<br>12:Totalizer 4<br>13:Totalizer 5<br>14:Totalizer 6<br>15:Mass flow % graph<br>16:Volume flow % graph<br>17:Corrected volume flow % graph<br>18:Tag<br>19:Long tag<br>20:Velocity<br>21:Concentration<br>22:Net mass flow 1<br>23:Net mass flow 2<br>24:Net volume flow 1<br>25:Net volume flow 2<br>26:Net corrected volume flow<br>34:Viscosity<br>27:Drive current<br>28:24hours totalizer 1<br>29:24hours totalizer 2<br>30:24hours totalizer 3<br>31:Gas void fraction<br>32:Mass flow dual<br>33:Density dual |  |
| Holding Register | 0x03 | 0x06 | 3616 | Display select 1           | Un-signed8     | Enum    | R/W(C0)<br>d |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |

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| Holding Register | 0x03 | 0x06 | 3617 | Display select 5 | Un-signed8 | Enum | R/<br>W(C0)<br>d | 0:None<br>1:Mass flow<br>2:Density<br>3:Temperature<br>4:Volume flow<br>5:Reference density<br>6:Relative density<br>7:Corrected volume flow<br>8:Pressure<br>9:Totalizer 1<br>10:Totalizer 2<br>11:Totalizer 3<br>12:Totalizer 4<br>13:Totalizer 5<br>14:Totalizer 6<br>15:Mass flow % graph<br>16:Volume flow % graph<br>17:Corrected volume flow % graph<br>18:Tag<br>19:Long tag<br>20:Velocity<br>21:Concentration<br>22:Net mass flow 1<br>23:Net mass flow 2<br>24:Net volume flow 1<br>25:Net volume flow 2<br>26:Net corrected volume flow<br>34:Viscosity<br>27:Drive current<br>28:24hours totalizer 1<br>29:24hours totalizer 2<br>30:24hours totalizer 3<br>31:Gas void fraction<br>32:Mass flow dual<br>33:Density dual |  |
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| Holding Register | 0x03 | 0x06 | 3618 | Display select 6 | Un-signed8 | Enum | R/W(C0)<br>d | 0:None<br>1:Mass flow<br>2:Density<br>3:Temperature<br>4:Volume flow<br>5:Reference density<br>6:Relative density<br>7:Corrected volume flow<br>8:Pressure<br>9:Totalizer 1<br>10:Totalizer 2<br>11:Totalizer 3<br>12:Totalizer 4<br>13:Totalizer 5<br>14:Totalizer 6<br>15:Mass flow % graph<br>16:Volume flow % graph<br>17:Corrected volume flow % graph<br>18:Tag<br>19:Long tag<br>20:Velocity<br>21:Concentration<br>22:Net mass flow 1<br>23:Net mass flow 2<br>24:Net volume flow 1<br>25:Net volume flow 2<br>26:Net corrected volume flow<br>34:Viscosity<br>27:Drive current<br>28:24hours totalizer 1<br>29:24hours totalizer 2<br>30:24hours totalizer 3<br>31:Gas void fraction<br>32:Mass flow dual<br>33:Density dual |
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| Holding Register | 0x03 | 0x06 | 3619 | Display select 7 | Unsigned8 | Enum | R/<br>W(C0)<br>d | 0:None<br>1:Mass flow<br>2:Density<br>3:Temperature<br>4:Volume flow<br>5:Reference density<br>6:Relative density<br>7:Corrected volume flow<br>8:Pressure<br>9:Totalizer 1<br>10:Totalizer 2<br>11:Totalizer 3<br>12:Totalizer 4<br>13:Totalizer 5<br>14:Totalizer 6<br>15:Mass flow % graph<br>16:Volume flow % graph<br>17:Corrected volume flow % graph<br>18:Tag<br>19:Long tag<br>20:Velocity<br>21:Concentration<br>22:Net mass flow 1<br>23:Net mass flow 2<br>24:Net volume flow 1<br>25:Net volume flow 2<br>26:Net corrected volume flow<br>34:Viscosity<br>27:Drive current<br>28:24hours totalizer 1<br>29:24hours totalizer 2<br>30:24hours totalizer 3<br>31:Gas void fraction<br>32:Mass flow dual<br>33:Density dual |  |
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| Holding Register | 0x03 | 0x06 | 3620 | Display select 8 | Un-signed8 | Enum | R/W(C0)<br>d | 0:None<br>1:Mass flow<br>2:Density<br>3:Temperature<br>4:Volume flow<br>5:Reference density<br>6:Relative density<br>7:Corrected volume flow<br>8:Pressure<br>9:Totalizer 1<br>10:Totalizer 2<br>11:Totalizer 3<br>12:Totalizer 4<br>13:Totalizer 5<br>14:Totalizer 6<br>15:Mass flow % graph<br>16:Volume flow % graph<br>17:Corrected volume flow % graph<br>18:Tag<br>19:Long tag<br>20:Velocity<br>21:Concentration<br>22:Net mass flow 1<br>23:Net mass flow 2<br>24:Net volume flow 1<br>25:Net volume flow 2<br>26:Net corrected volume flow<br>34:Viscosity<br>27:Drive current<br>28:24hours totalizer 1<br>29:24hours totalizer 2<br>30:24hours totalizer 3<br>31:Gas void fraction<br>32:Mass flow dual<br>33:Density dual |  |
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| Holding Register | 0x03 | 0x06 | 3622 | Display select 9 | Unsigned8 | Enum | R/<br>W(C0)<br>d | 0:None<br>1:Mass flow<br>2:Density<br>3:Temperature<br>4:Volume flow<br>5:Reference density<br>6:Relative density<br>7:Corrected volume flow<br>8:Pressure<br>9:Totalizer 1<br>10:Totalizer 2<br>11:Totalizer 3<br>12:Totalizer 4<br>13:Totalizer 5<br>14:Totalizer 6<br>15:Mass flow % graph<br>16:Volume flow % graph<br>17:Corrected volume flow % graph<br>18:Tag<br>19:Long tag<br>20:Velocity<br>21:Concentration<br>22:Net mass flow 1<br>23:Net mass flow 2<br>24:Net volume flow 1<br>25:Net volume flow 2<br>26:Net corrected volume flow<br>34:Viscosity<br>27:Drive current<br>28:24hours totalizer 1<br>29:24hours totalizer 2<br>30:24hours totalizer 3<br>31:Gas void fraction<br>32:Mass flow dual<br>33:Density dual |  |
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| Holding Register | 0x03 | 0x06 | 3623 | Display select 10 | Un-signed8 | Enum | R/W(C0)<br>d | 0:None<br>1:Mass flow<br>2:Density<br>3:Temperature<br>4:Volume flow<br>5:Reference density<br>6:Relative density<br>7:Corrected volume flow<br>8:Pressure<br>9:Totalizer 1<br>10:Totalizer 2<br>11:Totalizer 3<br>12:Totalizer 4<br>13:Totalizer 5<br>14:Totalizer 6<br>15:Mass flow % graph<br>16:Volume flow % graph<br>17:Corrected volume flow % graph<br>18:Tag<br>19:Long tag<br>20:Velocity<br>21:Concentration<br>22:Net mass flow 1<br>23:Net mass flow 2<br>24:Net volume flow 1<br>25:Net volume flow 2<br>26:Net corrected volume flow<br>34:Viscosity<br>27:Drive current<br>28:24hours totalizer 1<br>29:24hours totalizer 2<br>30:24hours totalizer 3<br>31:Gas void fraction<br>32:Mass flow dual<br>33:Density dual |  |
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| Holding Register | 0x03 | 0x06 | 3624 | Display select 11 | Unsigned8 | Enum | R/<br>W(C0)<br>d<br>0:None<br>1:Mass flow<br>2:Density<br>3:Temperature<br>4:Volume flow<br>5:Reference density<br>6:Relative density<br>7:Corrected volume flow<br>8:Pressure<br>9:Totalizer 1<br>10:Totalizer 2<br>11:Totalizer 3<br>12:Totalizer 4<br>13:Totalizer 5<br>14:Totalizer 6<br>15:Mass flow % graph<br>16:Volume flow % graph<br>17:Corrected volume flow % graph<br>18:Tag<br>19:Long tag<br>20:Velocity<br>21:Concentration<br>22:Net mass flow 1<br>23:Net mass flow 2<br>24:Net volume flow 1<br>25:Net volume flow 2<br>26:Net corrected volume flow<br>34:Viscosity<br>27:Drive current<br>28:24hours totalizer 1<br>29:24hours totalizer 2<br>30:24hours totalizer 3<br>31:Gas void fraction<br>32:Mass flow dual<br>33:Density dual |  |
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| Holding Register | 0x03 | 0x06 | 3625 | Display select 12 | Un-signed8 | Enum | R/W(C0)<br>d | 0:None<br>1:Mass flow<br>2:Density<br>3:Temperature<br>4:Volume flow<br>5:Reference density<br>6:Relative density<br>7:Corrected volume flow<br>8:Pressure<br>9:Totalizer 1<br>10:Totalizer 2<br>11:Totalizer 3<br>12:Totalizer 4<br>13:Totalizer 5<br>14:Totalizer 6<br>15:Mass flow % graph<br>16:Volume flow % graph<br>17:Corrected volume flow % graph<br>18:Tag<br>19:Long tag<br>20:Velocity<br>21:Concentration<br>22:Net mass flow 1<br>23:Net mass flow 2<br>24:Net volume flow 1<br>25:Net volume flow 2<br>26:Net corrected volume flow<br>34:Viscosity<br>27:Drive current<br>28:24hours totalizer 1<br>29:24hours totalizer 2<br>30:24hours totalizer 3<br>31:Gas void fraction<br>32:Mass flow dual<br>33:Density dual |  |
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| Holding Register | 0x03 | 0x06 | 3626 | Display select 13 | Unsigned8 | Enum | R/<br>W(C0)<br>d | 0:None<br>1:Mass flow<br>2:Density<br>3:Temperature<br>4:Volume flow<br>5:Reference density<br>6:Relative density<br>7:Corrected volume flow<br>8:Pressure<br>9:Totalizer 1<br>10:Totalizer 2<br>11:Totalizer 3<br>12:Totalizer 4<br>13:Totalizer 5<br>14:Totalizer 6<br>15:Mass flow % graph<br>16:Volume flow % graph<br>17:Corrected volume flow % graph<br>18:Tag<br>19:Long tag<br>20:Velocity<br>21:Concentration<br>22:Net mass flow 1<br>23:Net mass flow 2<br>24:Net volume flow 1<br>25:Net volume flow 2<br>26:Net corrected volume flow<br>34:Viscosity<br>27:Drive current<br>28:24hours totalizer 1<br>29:24hours totalizer 2<br>30:24hours totalizer 3<br>31:Gas void fraction<br>32:Mass flow dual<br>33:Density dual |  |
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| Holding Register | 0x03 | 0x06 | 3632 | Display select 2 | Un-signed8 | Enum | R/W(C0)<br>d | 0:None<br>1:Mass flow<br>2:Density<br>3:Temperature<br>4:Volume flow<br>5:Reference density<br>6:Relative density<br>7:Corrected volume flow<br>8:Pressure<br>9:Totalizer 1<br>10:Totalizer 2<br>11:Totalizer 3<br>12:Totalizer 4<br>13:Totalizer 5<br>14:Totalizer 6<br>15:Mass flow % graph<br>16:Volume flow % graph<br>17:Corrected volume flow % graph<br>18:Tag<br>19:Long tag<br>20:Velocity<br>21:Concentration<br>22:Net mass flow 1<br>23:Net mass flow 2<br>24:Net volume flow 1<br>25:Net volume flow 2<br>26:Net corrected volume flow<br>34:Viscosity<br>27:Drive current<br>28:24hours totalizer 1<br>29:24hours totalizer 2<br>30:24hours totalizer 3<br>31:Gas void fraction<br>32:Mass flow dual<br>33:Density dual |  |
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| Holding Register | 0x03 | 0x06 | 3633 | Display select 14 | Unsigned8 | Enum | R/<br>W(C0)<br>d<br>0:None<br>1:Mass flow<br>2:Density<br>3:Temperature<br>4:Volume flow<br>5:Reference density<br>6:Relative density<br>7:Corrected volume flow<br>8:Pressure<br>9:Totalizer 1<br>10:Totalizer 2<br>11:Totalizer 3<br>12:Totalizer 4<br>13:Totalizer 5<br>14:Totalizer 6<br>15:Mass flow % graph<br>16:Volume flow % graph<br>17:Corrected volume flow % graph<br>18:Tag<br>19:Long tag<br>20:Velocity<br>21:Concentration<br>22:Net mass flow 1<br>23:Net mass flow 2<br>24:Net volume flow 1<br>25:Net volume flow 2<br>26:Net corrected volume flow<br>34:Viscosity<br>27:Drive current<br>28:24hours totalizer 1<br>29:24hours totalizer 2<br>30:24hours totalizer 3<br>31:Gas void fraction<br>32:Mass flow dual<br>33:Density dual |  |
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| Holding Register | 0x03 | 0x06 | 3634 | Display select 15 | Un-signed8 | Enum | R/W(C0)<br>d | 0:None<br>1:Mass flow<br>2:Density<br>3:Temperature<br>4:Volume flow<br>5:Reference density<br>6:Relative density<br>7:Corrected volume flow<br>8:Pressure<br>9:Totalizer 1<br>10:Totalizer 2<br>11:Totalizer 3<br>12:Totalizer 4<br>13:Totalizer 5<br>14:Totalizer 6<br>15:Mass flow % graph<br>16:Volume flow % graph<br>17:Corrected volume flow % graph<br>18:Tag<br>19:Long tag<br>20:Velocity<br>21:Concentration<br>22:Net mass flow 1<br>23:Net mass flow 2<br>24:Net volume flow 1<br>25:Net volume flow 2<br>26:Net corrected volume flow<br>34:Viscosity<br>27:Drive current<br>28:24hours totalizer 1<br>29:24hours totalizer 2<br>30:24hours totalizer 3<br>31:Gas void fraction<br>32:Mass flow dual<br>33:Density dual |  |
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| Holding Register | 0x03 | 0x06 | 3635 | Display select 16 | Unsigned8 | Enum | R/<br>W(C0)<br>d | 0:None<br>1:Mass flow<br>2:Density<br>3:Temperature<br>4:Volume flow<br>5:Reference density<br>6:Relative density<br>7:Corrected volume flow<br>8:Pressure<br>9:Totalizer 1<br>10:Totalizer 2<br>11:Totalizer 3<br>12:Totalizer 4<br>13:Totalizer 5<br>14:Totalizer 6<br>15:Mass flow % graph<br>16:Volume flow % graph<br>17:Corrected volume flow % graph<br>18:Tag<br>19:Long tag<br>20:Velocity<br>21:Concentration<br>22:Net mass flow 1<br>23:Net mass flow 2<br>24:Net volume flow 1<br>25:Net volume flow 2<br>26:Net corrected volume flow<br>34:Viscosity<br>27:Drive current<br>28:24hours totalizer 1<br>29:24hours totalizer 2<br>30:24hours totalizer 3<br>31:Gas void fraction<br>32:Mass flow dual<br>33:Density dual |  |
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| Holding Register | 0x03 | 0x06 | 3636 | Display select 17 | Un-signed8 | Enum | R/W(C0)<br>d | 0:None<br>1:Mass flow<br>2:Density<br>3:Temperature<br>4:Volume flow<br>5:Reference density<br>6:Relative density<br>7:Corrected volume flow<br>8:Pressure<br>9:Totalizer 1<br>10:Totalizer 2<br>11:Totalizer 3<br>12:Totalizer 4<br>13:Totalizer 5<br>14:Totalizer 6<br>15:Mass flow % graph<br>16:Volume flow % graph<br>17:Corrected volume flow % graph<br>18:Tag<br>19:Long tag<br>20:Velocity<br>21:Concentration<br>22:Net mass flow 1<br>23:Net mass flow 2<br>24:Net volume flow 1<br>25:Net volume flow 2<br>26:Net corrected volume flow<br>34:Viscosity<br>27:Drive current<br>28:24hours totalizer 1<br>29:24hours totalizer 2<br>30:24hours totalizer 3<br>31:Gas void fraction<br>32:Mass flow dual<br>33:Density dual |
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| Holding Register | 0x03 | 0x06 | 3638 | Display select 18 | Unsigned8 | Enum | R/<br>W(C0)<br>d<br>0:None<br>1:Mass flow<br>2:Density<br>3:Temperature<br>4:Volume flow<br>5:Reference density<br>6:Relative density<br>7:Corrected volume flow<br>8:Pressure<br>9:Totalizer 1<br>10:Totalizer 2<br>11:Totalizer 3<br>12:Totalizer 4<br>13:Totalizer 5<br>14:Totalizer 6<br>15:Mass flow % graph<br>16:Volume flow % graph<br>17:Corrected volume flow % graph<br>18:Tag<br>19:Long tag<br>20:Velocity<br>21:Concentration<br>22:Net mass flow 1<br>23:Net mass flow 2<br>24:Net volume flow 1<br>25:Net volume flow 2<br>26:Net corrected volume flow<br>34:Viscosity<br>27:Drive current<br>28:24hours totalizer 1<br>29:24hours totalizer 2<br>30:24hours totalizer 3<br>31:Gas void fraction<br>32:Mass flow dual<br>33:Density dual |  |
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| Holding Register | 0x03 | 0x06 | 3639 | Display select 19 | Un-signed8 | Enum | R/W(C0)<br>d | 0:None<br>1:Mass flow<br>2:Density<br>3:Temperature<br>4:Volume flow<br>5:Reference density<br>6:Relative density<br>7:Corrected volume flow<br>8:Pressure<br>9:Totalizer 1<br>10:Totalizer 2<br>11:Totalizer 3<br>12:Totalizer 4<br>13:Totalizer 5<br>14:Totalizer 6<br>15:Mass flow % graph<br>16:Volume flow % graph<br>17:Corrected volume flow % graph<br>18:Tag<br>19:Long tag<br>20:Velocity<br>21:Concentration<br>22:Net mass flow 1<br>23:Net mass flow 2<br>24:Net volume flow 1<br>25:Net volume flow 2<br>26:Net corrected volume flow<br>34:Viscosity<br>27:Drive current<br>28:24hours totalizer 1<br>29:24hours totalizer 2<br>30:24hours totalizer 3<br>31:Gas void fraction<br>32:Mass flow dual<br>33:Density dual |  |
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| Holding Register | 0x03 | 0x06 | 3640 | Display select 20 | Unsigned8 | Enum | R/<br>W(C0)<br>d | 0:None<br>1:Mass flow<br>2:Density<br>3:Temperature<br>4:Volume flow<br>5:Reference density<br>6:Relative density<br>7:Corrected volume flow<br>8:Pressure<br>9:Totalizer 1<br>10:Totalizer 2<br>11:Totalizer 3<br>12:Totalizer 4<br>13:Totalizer 5<br>14:Totalizer 6<br>15:Mass flow % graph<br>16:Volume flow % graph<br>17:Corrected volume flow % graph<br>18:Tag<br>19:Long tag<br>20:Velocity<br>21:Concentration<br>22:Net mass flow 1<br>23:Net mass flow 2<br>24:Net volume flow 1<br>25:Net volume flow 2<br>26:Net corrected volume flow<br>34:Viscosity<br>27:Drive current<br>28:24hours totalizer 1<br>29:24hours totalizer 2<br>30:24hours totalizer 3<br>31:Gas void fraction<br>32:Mass flow dual<br>33:Density dual |  |
| Holding Register | 0x03 | 0x06 | 3642 | Language          | Unsigned8 | Enum | R/<br>W(C0)<br>d | 0:English<br>1:French<br>2:German<br>3:Italian<br>4:Spanish<br>5:Portuguese<br>6:Russian<br>7:Kazafh<br>8:Chinese<br>9:Japanese<br>10:Polish                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |

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| Holding Register | 0x03 | 0x06 | 3643 | Display format date | Un-signed8 | Enum | R/W(C0)<br>d | 0:MM/DD/YYYY<br>1:DD/MM/YYYY<br>2:YYYY/MM/DD                         |  |
| Holding Register | 0x03 | 0x06 | 3644 | Display rotation    | Un-signed8 | Enum | R/W(C0)<br>d | 0:Normal<br>1:Reverse                                                |  |
| Holding Register | 0x03 | 0x06 | 3645 | Display line        | Un-signed8 | Enum | R/W(C0)<br>d | 0:1line (big)<br>1:1line<br>2:2line<br>3:3line<br>4:4line            |  |
| Holding Register | 0x03 | 0x06 | 3646 | Display scroll      | Un-signed8 | Enum | R/W(C0)<br>d | 0:Off<br>1:Manual<br>2:Auto (2.0s)<br>3:Auto (4.0s)<br>4:Auto (8.0s) |  |

|                  |      |      |      |                   |           |      |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |
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| Holding Register | 0x03 | 0x06 | 3648 | Display select 3  | Unsigned8 | Enum | R/W(C0)<br>d | 0:None<br>1:Mass flow<br>2:Density<br>3:Temperature<br>4:Volume flow<br>5:Reference density<br>6:Relative density<br>7:Corrected volume flow<br>8:Pressure<br>9:Totalizer 1<br>10:Totalizer 2<br>11:Totalizer 3<br>12:Totalizer 4<br>13:Totalizer 5<br>14:Totalizer 6<br>15:Mass flow % graph<br>16:Volume flow % graph<br>17:Corrected volume flow % graph<br>18:Tag<br>19:Long tag<br>20:Velocity<br>21:Concentration<br>22:Net mass flow 1<br>23:Net mass flow 2<br>24:Net volume flow 1<br>25:Net volume flow 2<br>26:Net corrected volume flow<br>34:Viscosity<br>27:Drive current<br>28:24hours totalizer 1<br>29:24hours totalizer 2<br>30:24hours totalizer 3<br>31:Gas void fraction<br>32:Mass flow dual<br>33:Density dual |  |
| Holding Register | 0x03 | 0x06 | 3649 | Display NE 107    | Unsigned8 | Enum | R/W(C0)<br>d | 0:Normal<br>1:NE 107                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Holding Register | 0x03 | 0x06 | 3650 | Display alarm     | Unsigned8 | Enum | R/W(C0)<br>d | 0:Normal<br>1:Detail                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Holding Register | 0x03 | 0x06 | 3651 | Display inversion | Unsigned8 | Enum | R/W(C0)<br>d | 0:Normal<br>1:Invert                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |



|                  |      |      |      |                        |            |      |                  |                                                                                                        |  |
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| Holding Register | 0x03 | 0x06 | 3653 | Display format total 1 | Un-signed8 | Enum | R/<br>W(C0)<br>d | 0:Auto<br>1:0digit<br>2:1digit<br>3:2digit<br>4:3digit<br>5:4digit<br>6:5digit<br>7:6digit<br>8:7digit |  |
| Holding Register | 0x03 | 0x06 | 3654 | Display format total 2 | Un-signed8 | Enum | R/<br>W(C0)<br>d | 0:Auto<br>1:0digit<br>2:1digit<br>3:2digit<br>4:3digit<br>5:4digit<br>6:5digit<br>7:6digit<br>8:7digit |  |
| Holding Register | 0x03 | 0x06 | 3655 | Display format total 3 | Un-signed8 | Enum | R/<br>W(C0)<br>d | 0:Auto<br>1:0digit<br>2:1digit<br>3:2digit<br>4:3digit<br>5:4digit<br>6:5digit<br>7:6digit<br>8:7digit |  |
| Holding Register | 0x03 | 0x06 | 3656 | Display format total 4 | Un-signed8 | Enum | R/<br>W(C0)<br>d | 0:Auto<br>1:0digit<br>2:1digit<br>3:2digit<br>4:3digit<br>5:4digit<br>6:5digit<br>7:6digit<br>8:7digit |  |
| Holding Register | 0x03 | 0x06 | 3657 | Display format total 5 | Un-signed8 | Enum | R/<br>W(C0)<br>d | 0:Auto<br>1:0digit<br>2:1digit<br>3:2digit<br>4:3digit<br>5:4digit<br>6:5digit<br>7:6digit<br>8:7digit |  |
| Holding Register | 0x03 | 0x06 | 3658 | Display format total 6 | Un-signed8 | Enum | R/<br>W(C0)<br>d | 0:Auto<br>1:0digit<br>2:1digit<br>3:2digit<br>4:3digit<br>5:4digit<br>6:5digit<br>7:6digit<br>8:7digit |  |

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| Holding Register | 0x03 | 0x06 | 3664 | Display select 4            | Un-signed8 | Enum | R/<br>W(C0)<br>d | 0:None<br>1:Mass flow<br>2:Density<br>3:Temperature<br>4:Volume flow<br>5:Reference density<br>6:Relative density<br>7:Corrected volume flow<br>8:Pressure<br>9:Totalizer 1<br>10:Totalizer 2<br>11:Totalizer 3<br>12:Totalizer 4<br>13:Totalizer 5<br>14:Totalizer 6<br>15:Mass flow % graph<br>16:Volume flow % graph<br>17:Corrected volume flow % graph<br>18:Tag<br>19:Long tag<br>20:Velocity<br>21:Concentration<br>22:Net mass flow 1<br>23:Net mass flow 2<br>24:Net volume flow 1<br>25:Net volume flow 2<br>26:Net corrected volume flow<br>34:Viscosity<br>27:Drive current<br>28:24hours totalizer 1<br>29:24hours totalizer 2<br>30:24hours totalizer 3<br>31:Gas void fraction<br>32:Mass flow dual<br>33:Density dual |  |
| Holding Register | 0x03 | 0x06 | 3665 | Display unit selection      | Un-signed8 | Enum | R/<br>W(C0)<br>d | 0:Metric<br>1:US<br>2:UK<br>3:Russia<br>4:Japan                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |
| Holding Register | 0x03 | 0x06 | 3666 | Display measurement mode    | Un-signed8 | Enum | R/<br>W(C2)      | 0:Normal<br>1:Trend online<br>2:Batch control                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
| Holding Register | 0x03 | 0x06 | 3667 | Display total health result | Un-signed8 | Enum | R/<br>W(C0)<br>d | 0:Off<br>1:On                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |

|                  |      |      |      |                        |           |       |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |   |
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| Holding Register | 0x03 | 0x10 | 3669 | Trend offline LRV      | Float     | Value | R/W(C2)      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |   |
| Holding Register | 0x03 | 0x10 | 3671 | Trend offline URV      | Float     | Value | R/W(C2)      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |   |
| Holding Register | 0x03 | 0x06 | 3680 | Display contrast       | Unsigned8 | Enum  | R/W(C0)<br>d | 0:-5<br>1:-4<br>2:-3<br>3:-2<br>4:-1<br>5:0<br>6:1<br>7:2<br>8:3<br>9:4<br>10:5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |   |
| Holding Register | 0x03 | 0x10 | 3681 | Display damping        | Float     | Value | R/W(C0)<br>d |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | s |
| Holding Register | 0x03 | 0x06 | 3684 | Batch display select 1 | Unsigned8 | Enum  | R/W(C0)<br>d | 1:Batch quantity<br>2:Batch upwards value<br>3:Batch downwards value<br>4:Batch total quantity<br>5:Batch counter value<br>6:Batch select<br>7:Batch variable select<br>8:Compensation value<br>9:Internal close point<br>10:Internal close time<br>11:Batch time<br>12:Mass flow value<br>13:Density value<br>14:Temperature<br>15:Volume flow value<br>16:Reference density<br>17:Corrected volume flow select<br>18:Pressure value<br>19:Tag<br>20:Long Tag<br>21:Net mass flow 1<br>22:Net mass flow 2<br>23:Net volume flow 1<br>24:Net volume flow 2<br>25:Net corrected volume flow |   |

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| Holding Register | 0x03 | 0x06 | 3685 | Batch display select 2 | Un-signed8 | Enum | R/<br>W(C0)<br>d<br>0:None<br>1:Batch quantity<br>2:Batch upwards value<br>3:Batch downwards value<br>4:Batch total quantity<br>5:Batch counter value<br>6:Batch select<br>7:Batch variable select<br>8:Compensation value<br>9:Internal close point<br>10:Internal close time<br>11:Batch time<br>12:Mass flow value<br>13:Density value<br>14:Temperature<br>15:Volume flow value<br>16:Reference density<br>17:Corrected volume flow select<br>18:Pressure value<br>19:Tag<br>20:Long Tag<br>21:Net mass flow 1<br>22:Net mass flow 2<br>23:Net volume flow 1<br>24:Net volume flow 2<br>25:Net corrected volume flow |  |
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| Holding Register | 0x03 | 0x06 | 3686 | Batch display select 3 | Un-signed8 | Enum | R/<br>W(C0)<br>d | 0:None<br>1:Batch quantity<br>2:Batch upwards value<br>3:Batch downwards value<br>4:Batch total quantity<br>5:Batch counter value<br>6:Batch select<br>7:Batch variable select<br>8:Compensation value<br>9:Internal close point<br>10:Internal close time<br>11:Batch time<br>12:Mass flow value<br>13:Density value<br>14:Temperature<br>15:Volume flow value<br>16:Reference density<br>17:Corrected volume flow select<br>18:Pressure value<br>19:Tag<br>20:Long Tag<br>21:Net mass flow 1<br>22:Net mass flow 2<br>23:Net volume flow 1<br>24:Net volume flow 2<br>25:Net corrected volume flow |  |
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| Holding Register | 0x03 | 0x06 | 3687 | Batch display select 4   | Un-signed8 | Enum | R/<br>W(C0)<br>d | 0:None<br>1:Batch quantity<br>2:Batch upwards value<br>3:Batch downwards value<br>4:Batch total quantity<br>5:Batch counter value<br>6:Batch select<br>7:Batch variable select<br>8:Compensation value<br>9:Internal close point<br>10:Internal close time<br>11:Batch time<br>12:Mass flow value<br>13:Density value<br>14:Temperature<br>15:Volume flow value<br>16:Reference density<br>17:Corrected volume flow select<br>18:Pressure value<br>19:Tag<br>20:Long Tag<br>21:Net mass flow 1<br>22:Net mass flow 2<br>23:Net volume flow 1<br>24:Net volume flow 2<br>25:Net corrected volume flow |  |
| Holding Register | 0x03 | 0x06 | 3696 | Display period           | Un-signed8 | Enum | R/<br>W(C0)<br>d | 0:0.2s<br>1:0.4s<br>2:1.0s<br>3:2.0s<br>4:4.0s<br>5:8.0s                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |
| Holding Register | 0x03 | 0x06 | 3712 | Display format mass flow | Un-signed8 | Enum | R/<br>W(C0)<br>d | 0:Auto<br>1:0digit<br>2:1digit<br>3:2digit<br>4:3digit<br>5:4digit<br>6:5digit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |

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| Holding Register | 0x03 | 0x06 | 3713 | Display format pressure              | Un-signed8 | Enum | R/<br>W(C0)<br>d | 0:Auto<br>1:0digit<br>2:1digit<br>3:2digit<br>4:3digit<br>5:4digit<br>6:5digit |  |
| Holding Register | 0x03 | 0x06 | 3714 | Display format reference density     | Un-signed8 | Enum | R/<br>W(C0)<br>d | 0:Auto<br>1:0digit<br>2:1digit<br>3:2digit<br>4:3digit<br>5:4digit<br>6:5digit |  |
| Holding Register | 0x03 | 0x06 | 3715 | Display format relative density      | Un-signed8 | Enum | R/<br>W(C0)<br>d | 0:Auto<br>1:0digit<br>2:1digit<br>3:2digit<br>4:3digit<br>5:4digit<br>6:5digit |  |
| Holding Register | 0x03 | 0x06 | 3716 | Display format corrected volume flow | Un-signed8 | Enum | R/<br>W(C0)<br>d | 0:Auto<br>1:0digit<br>2:1digit<br>3:2digit<br>4:3digit<br>5:4digit<br>6:5digit |  |
| Holding Register | 0x03 | 0x06 | 3728 | Display format volume flow           | Un-signed8 | Enum | R/<br>W(C0)<br>d | 0:Auto<br>1:0digit<br>2:1digit<br>3:2digit<br>4:3digit<br>5:4digit<br>6:5digit |  |
| Holding Register | 0x03 | 0x06 | 3744 | Display format density               | Un-signed8 | Enum | R/<br>W(C0)<br>d | 0:Auto<br>1:0digit<br>2:1digit<br>3:2digit<br>4:3digit<br>5:4digit<br>6:5digit |  |
| Holding Register | 0x03 | 0x06 | 3760 | Display format temperature           | Un-signed8 | Enum | R/<br>W(C0)<br>d | 0:Auto<br>1:0digit<br>2:1digit<br>3:2digit<br>4:3digit<br>5:4digit<br>6:5digit |  |
| Holding Register | 0x03 | 0x06 | 3776 | Display format concentration         | Un-signed8 | Enum | R/<br>W(C0)<br>d | 0:Auto<br>1:0digit<br>2:1digit<br>3:2digit<br>4:3digit<br>5:4digit<br>6:5digit |  |

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| Holding Register | 0x03 | 0x06 | 3792 | Display format net mass flow 1           | Un-signed8    | Enum  | R/W(C0)<br>d | 0:Auto<br>1:0digit<br>2:1digit<br>3:2digit<br>4:3digit<br>5:4digit<br>6:5digit                             |    |
| Holding Register | 0x03 | 0x06 | 3793 | Display format net mass flow 2           | Un-signed8    | Enum  | R/W(C0)<br>d | 0:Auto<br>1:0digit<br>2:1digit<br>3:2digit<br>4:3digit<br>5:4digit<br>6:5digit                             |    |
| Holding Register | 0x03 | 0x06 | 3794 | Display format net volume flow 1         | Un-signed8    | Enum  | R/W(C0)<br>d | 0:Auto<br>1:0digit<br>2:1digit<br>3:2digit<br>4:3digit<br>5:4digit<br>6:5digit                             |    |
| Holding Register | 0x03 | 0x06 | 3795 | Display format net volume flow 2         | Un-signed8    | Enum  | R/W(C0)<br>d | 0:Auto<br>1:0digit<br>2:1digit<br>3:2digit<br>4:3digit<br>5:4digit<br>6:5digit                             |    |
| Holding Register | 0x03 | 0x06 | 3796 | Display format net corrected volume flow | Un-signed8    | Enum  | R/W(C0)<br>d | 0:Auto<br>1:0digit<br>2:1digit<br>3:2digit<br>4:3digit<br>5:4digit<br>6:5digit                             |    |
| Holding Register | 0x03 | 0x06 | 3808 | LCD test                                 | Un-signed8    | Enum  | R/W(C0)      | 0:Not execute<br>1:Execute<br>2:Show pattern 1<br>3:Show pattern 2<br>4:Show pattern 3<br>5:Show pattern 4 |    |
| Holding Register | 0x03 | 0x06 | 3809 | Squawk                                   | Un-signed8    | Enum  | R/W(C0)      | 0:Off<br>1:On<br>2:Squawk once                                                                             |    |
| Holding Register | 0x03 | 0x10 | 3840 | Enable write 10min                       | Un-signed8[8] | ASCII | R/W(C0)      |                                                                                                            |    |
| Holding Register | 0x03 | 0x10 | 3856 | New password                             | Un-signed8[8] | ASCII | R/W(C1)      |                                                                                                            |    |
| Holding Register | 0x03 | 0x10 | 4208 | Analog output test                       | Float         | Value | R/W(C1)      |                                                                                                            | mA |
| Holding Register | 0x03 | 0x06 | 4210 | Test mode                                | Un-signed8    | Enum  | R/W(C1)      | 0:Off<br>1:On                                                                                              |    |
| Holding Register | 0x03 | 0x10 | 4212 | Trim who                                 | Un-signed8[8] | ASCII | R/W(C1)      |                                                                                                            |    |



|                  |      |      |      |                          |                |       |         |                                                                                                                                                                                                                                                                                                                                         |    |
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| Holding Register | 0x03 | 0x10 | 4217 | Trim location            | Un-signed8[8]  | ASCII | R/W(C1) |                                                                                                                                                                                                                                                                                                                                         |    |
| Holding Register | 0x03 | 0x10 | 4224 | Frequency output 1 test  | Float          | Value | R/W(C1) |                                                                                                                                                                                                                                                                                                                                         | Hz |
| Holding Register | 0x03 | 0x06 | 4226 | Test auto release time   | Un-signed8     | Enum  | R/W(C1) | 0:10min<br>1:30min<br>2:60min<br>3:3hour<br>4:6hour<br>5:12hour                                                                                                                                                                                                                                                                         |    |
| Holding Register | 0x03 | 0x10 | 4228 | AI trim 4mA              | Float          | Value | R/W(C1) |                                                                                                                                                                                                                                                                                                                                         | mA |
| Holding Register | 0x03 | 0x10 | 4230 | AI trim 20mA             | Float          | Value | R/W(C1) |                                                                                                                                                                                                                                                                                                                                         | mA |
| Holding Register | 0x03 | 0x10 | 4238 | Trim date                | Un-signed32    | Date  | R/W(C1) |                                                                                                                                                                                                                                                                                                                                         |    |
| Holding Register | 0x03 | 0x06 | 4240 | Status output 1 test     | Un-signed8     | Enum  | R/W(C1) | 0:Open(Off)<br>1:Closed(On)<br>2:Test exit                                                                                                                                                                                                                                                                                              |    |
| Holding Register | 0x03 | 0x06 | 4242 | Clear D/A trim           | Un-signed8     | Enum  | R/W(C1) | 0:Not execute<br>1:Execute                                                                                                                                                                                                                                                                                                              |    |
| Holding Register | 0x03 | 0x06 | 4243 | Clear AI trim            | Un-signed8     | Enum  | R/W(C1) | 0:Not execute<br>1:Execute                                                                                                                                                                                                                                                                                                              |    |
| Holding Register | 0x03 | 0x10 | 4245 | Trim description         | Un-signed8[16] | ASCII | R/W(C1) |                                                                                                                                                                                                                                                                                                                                         |    |
| Holding Register | 0x03 | 0x10 | 4256 | Frequency output 2 test  | Float          | Value | R/W(C1) |                                                                                                                                                                                                                                                                                                                                         | Hz |
| Holding Register | 0x03 | 0x10 | 4258 | Double pulse output test | Float          | Value | R/W(C1) |                                                                                                                                                                                                                                                                                                                                         | Hz |
| Holding Register | 0x03 | 0x06 | 4272 | Status output 2 test     | Un-signed8     | Enum  | R/W(C1) | 0:Open(Off)<br>1:Closed(On)<br>2:Test exit                                                                                                                                                                                                                                                                                              |    |
| Holding Register | 0x03 | 0x06 | 4304 | Analog output select     | Un-signed8     | Enum  | R/W(C1) | 0:None<br>1:Mass flow<br>2:Density<br>3:Temperature<br>4:Pressure<br>5:Volume flow<br>6:Reference density<br>7:Relative density<br>8:Corrected volume flow<br>9:Concentration<br>10:Net mass flow 1<br>11:Net mass flow 2<br>12:Net volume flow 1<br>13:Net volume flow 2<br>14:Net corrected volume flow<br>15:Reserved<br>16:Reserved |    |

|                  |      |      |      |                               |            |       |         |                                                                                                                                                                                                                              |                                 |
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| Holding Register | 0x03 | 0x06 | 4305 | NAMUR NE 43 option            | Un-signed8 | Enum  | R/W(C2) | 0:Not NAMUR NE 43<br>1:NAMUR 43                                                                                                                                                                                              |                                 |
| Holding Register | 0x03 | 0x06 | 4307 | Analog input function         | Un-signed8 | Enum  | R/W(C2) | 0:None<br>1:Pressure compensation<br>2:Temperature compensation<br>3:Sensor pressure alarm<br>4:Calorific value<br>5:Viscosity delta pressure<br>6:Pressure compensation and NOC<br>7:Pressure NOC                           |                                 |
| Holding Register | 0x03 | 0x10 | 4308 | Analog input low limit        | Float      | Value | R/W(C2) |                                                                                                                                                                                                                              | mA                              |
| Holding Register | 0x03 | 0x10 | 4310 | Analog input high limit       | Float      | Value | R/W(C2) |                                                                                                                                                                                                                              | mA                              |
| Holding Register | 0x03 | 0x06 | 4314 | Analog input temperature unit | Un-signed8 | Enum  | R/W(C2) | 0:degC<br>1:degF<br>2:degR<br>3:K                                                                                                                                                                                            |                                 |
| Holding Register | 0x03 | 0x10 | 4315 | Analog input temperature LRV  | Float      | Value | R/W(C2) |                                                                                                                                                                                                                              | [Analog input temperature unit] |
| Holding Register | 0x03 | 0x10 | 4317 | Analog input temperature URV  | Float      | Value | R/W(C2) |                                                                                                                                                                                                                              | [Analog input temperature unit] |
| Holding Register | 0x03 | 0x06 | 4320 | Analog output alarm output    | Un-signed8 | Enum  | R/W(C1) | 0:< 2.4 mA<br>1:4 mA<br>2:> 21.6 mA<br>3:Measured value<br>4:Hold                                                                                                                                                            |                                 |
| Holding Register | 0x03 | 0x06 | 4322 | Analog input pressure unit    | Un-signed8 | Enum  | R/W(C2) | 0:inH2O(68degF)<br>1:inHg<br>2:ftH2O(68degF)<br>3:mmH2O(68degF)<br>4:mmHg<br>5:psi<br>6:bar<br>7:mbar<br>8:g/cm2<br>9:kg/cm2<br>10:Pa<br>11:kPa<br>12:torr<br>13:atm<br>14:MPa<br>15:inH2O<br>16:mmH2O<br>17:ftH2O<br>18:hPa |                                 |
| Holding Register | 0x03 | 0x10 | 4323 | Analog input pressure LRV     | Float      | Value | R/W(C2) |                                                                                                                                                                                                                              | [Analog input pressure unit]    |

|                  |      |      |      |                                         |            |       |         |                                                                                                                                                                                                     |                               |
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| Holding Register | 0x03 | 0x10 | 4325 | Analog input pressure URV               | Float      | Value | R/W(C2) |                                                                                                                                                                                                     | [Analog input pressure unit]  |
| Holding Register | 0x03 | 0x06 | 4328 | Analog input calorific unit             | Un-signed8 | Enum  | R/W(C2) | 0: MJ/kg<br>1: Btu/lb<br>2: MJ/m3<br>3: Btu/gal<br>4: MJ/Nm3<br>5: Btu/Sft3                                                                                                                         |                               |
| Holding Register | 0x03 | 0x10 | 4329 | Analog input calorific LRV              | Float      | Value | R/W(C2) |                                                                                                                                                                                                     | [Analog input calorific unit] |
| Holding Register | 0x03 | 0x10 | 4331 | Analog input calorific URV              | Float      | Value | R/W(C2) |                                                                                                                                                                                                     | [Analog input calorific unit] |
| Holding Register | 0x03 | 0x10 | 4336 | Analog output low limit                 | Float      | Value | R/W(C1) |                                                                                                                                                                                                     | mA                            |
| Holding Register | 0x03 | 0x10 | 4352 | Analog output high limit                | Float      | Value | R/W(C1) |                                                                                                                                                                                                     | mA                            |
| Holding Register | 0x03 | 0x06 | 4367 | Pulse/Status output type                | Un-signed8 | Enum  | R/W(C1) | 0: Single pulse<br>1: Double pulse                                                                                                                                                                  |                               |
| Holding Register | 0x03 | 0x06 | 4368 | Pulse/Status output 1 mode              | Un-signed8 | Enum  | R/W(C1) | 0: No function<br>1: Fixed pulse output<br>2: Frequency output<br>3: Status output                                                                                                                  |                               |
| Holding Register | 0x03 | 0x06 | 4369 | Pulse output 1 flow direction           | Un-signed8 | Enum  | R/W(C2) | 0: Forward<br>1: Reverse                                                                                                                                                                            |                               |
| Holding Register | 0x03 | 0x06 | 4370 | Frequency output 1 alarm action         | Un-signed8 | Enum  | R/W(C1) | 0: 0.0Hz<br>1: Measured value<br>2: Hold<br>3: User set value                                                                                                                                       |                               |
| Holding Register | 0x03 | 0x10 | 4372 | Pulse output 1 user set alarm value     | Float      | Value | R/W(C1) |                                                                                                                                                                                                     | PPS                           |
| Holding Register | 0x03 | 0x10 | 4374 | Frequency output 1 user set alarm value | Float      | Value | R/W(C1) |                                                                                                                                                                                                     | Hz                            |
| Holding Register | 0x03 | 0x06 | 4384 | Pulse output 1 select                   | Un-signed8 | Enum  | R/W(C1) | 0: Mass flow<br>1: Volume flow<br>2: Corrected volume flow<br>3: Energy<br>4: Net mass flow 1<br>5: Net mass flow 2<br>6: Net volume flow 1<br>7: Net volume flow 2<br>8: Net corrected volume flow |                               |

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| Holding Register | 0x03 | 0x06 | 4385 | Frequency output 1 select | Un-signed8 | Enum  | R/<br>W(C1) | 0:Mass flow<br>1:Density<br>2:Temperature<br>3:Pressure<br>4:Volume flow<br>5:Reference density<br>6:Relative density<br>7:Corrected volume flow<br>8:Concentration<br>9:Net mass flow 1<br>10:Net mass flow 2<br>11:Net volume flow 1<br>12:Net volume flow 2<br>13:Net corrected volume flow<br>14:Viscosity<br>15:Drive current |    |
| Holding Register | 0x03 | 0x10 | 4386 | Max frequency 1           | Float      | Value | R/<br>W(C1) |                                                                                                                                                                                                                                                                                                                                    | Hz |
| Holding Register | 0x03 | 0x10 | 4388 | Min frequency 1           | Float      | Value | R/<br>W(C1) |                                                                                                                                                                                                                                                                                                                                    | Hz |

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| Holding Register | 0x03 | 0x06 | 4400 | Pulse output 1 unit select | Un-signed8 | Enum  | R/W(C1) | 0:g/P<br>1:kg/P<br>2:t/P<br>40:ton(US)/P<br>41:ton(UK)/P<br>3:lb/P<br>4:P/g<br>5:P/kg<br>6:P/t<br>42:P/ton(US)<br>43:P/ton(UK)<br>7:P/lb<br>8:cm3/P<br>9:L/P<br>10:m3/P<br>11:gal/P<br>12:kgal/P<br>13:ft3/P<br>14:bbl/P<br>15:Impgal/P<br>16:kImpgal/P<br>17:P/cm3<br>18:P/L<br>19:P/m3<br>20:P/gal<br>21:P/kgal<br>22:P/ft3<br>23:P/bbl<br>24:P/Impgal<br>25:P/kImpgal<br>26:NL/P<br>27:Nm3/P<br>28:SL/P<br>29:Sft3/P<br>30:Sm3/P<br>31:P/NL<br>32:P/Nm3<br>33:P/SL<br>34:P/Sft3<br>35:P/Sm3<br>36:MJ/P<br>37:Btu/P<br>38:P/MJ<br>39:P/Btu |                              |
| Holding Register | 0x03 | 0x10 | 4416 | Pulse output 1 rate        | Float      | Value | R/W(C1) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | [Pulse output 1 unit select] |
| Holding Register | 0x03 | 0x06 | 4432 | Pulse output 1 active mode | Un-signed8 | Enum  | R/W(C2) | 0:Off active<br>1:On active                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                              |

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| Holding Register | 0x03 | 0x06 | 4448 | Pulse output 1 width        | Un-signed8 | Enum | R/<br>W(C1) | 0:0.05ms<br>1:0.1ms<br>2:0.5ms<br>3:1ms<br>4:5ms<br>5:10ms<br>6:20ms<br>7:33ms<br>8:50ms<br>9:100ms<br>10:200ms<br>11:330ms<br>12:500ms<br>13:1000ms<br>14:2000ms |  |
| Holding Register | 0x03 | 0x06 | 4464 | Pulse output 1 alarm action | Un-signed8 | Enum | R/<br>W(C1) | 0:0.0pulse<br>1:Measured value<br>2:Hold<br>3:User set value                                                                                                      |  |

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|                  |      |      |      |                             |            |      |         | 0:Off<br>1:Flow direction<br>2:Total limit 1<br>3:Total limit 2<br>4:Total limit 3<br>5:Total limit 4<br>6:Total limit 5<br>7:Total limit 6<br>8:F category<br>9:S,C,M category<br>10:F + S,C,M category<br>11:Slug detection<br>12:Empty pipe<br>13:Corrosion detection<br>14:Mass flow high low alarm<br>15:Density high low alarm<br>16:Reference density high low alarm<br>17:Relative density high low alarm<br>18:Temperature high low alarm<br>19:Pressure high low alarm<br>20:Volume flow high low alarm<br>21:Corrected volume flow high low alarm<br>22:Concentration high low alarm<br>23:Net mass flow 1 high low alarm<br>24:Net mass flow 2 high low alarm<br>25:Net volume flow 1 high low alarm<br>26:Net volume flow 2 high low alarm<br>27:Net corrected volume flow high low alarm<br>28:Batch function<br>29:Viscosity high low alarm |  |
| Holding Register | 0x03 | 0x06 | 4480 | Status output 1 function    | Un-signed8 | Enum | R/W(C1) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |
| Holding Register | 0x03 | 0x06 | 4496 | Status output 1 active mode | Un-signed8 | Enum | R/W(C2) | 0:Off active<br>1:On active                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| Holding Register | 0x03 | 0x06 | 4512 | Pulse/Status output 2 mode  | Un-signed8 | Enum | R/W(C1) | 0:No function<br>1:Fixed pulse output<br>2:Frequency output<br>3:Status output                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |

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| Holding Register | 0x03 | 0x06 | 4513 | Pulse/Status output 2 active pulse mode | Un-signed8 | Enum  | R/W(C2) | 0:Normal<br>1:Magnetic counter                                                                                                                                                                                                                                                                                                     |     |
| Holding Register | 0x03 | 0x06 | 4514 | Pulse output 2 flow direction           | Un-signed8 | Enum  | R/W(C2) | 0:Forward<br>1:Reverse                                                                                                                                                                                                                                                                                                             |     |
| Holding Register | 0x03 | 0x06 | 4515 | Frequency output 2 alarm action         | Un-signed8 | Enum  | R/W(C1) | 0:0.0Hz<br>1:Measured value<br>2:Hold<br>3:User set value                                                                                                                                                                                                                                                                          |     |
| Holding Register | 0x03 | 0x06 | 4516 | Analog input failure option             | Un-signed8 | Enum  | R/W(C2) | 0:Fixed value<br>1:Hold                                                                                                                                                                                                                                                                                                            |     |
| Holding Register | 0x03 | 0x10 | 4518 | Pulse output 2 user set alarm value     | Float      | Value | R/W(C1) |                                                                                                                                                                                                                                                                                                                                    | PPS |
| Holding Register | 0x03 | 0x10 | 4520 | Frequency output 2 user set alarm value | Float      | Value | R/W(C1) |                                                                                                                                                                                                                                                                                                                                    | Hz  |
| Holding Register | 0x03 | 0x06 | 4528 | Pulse output 2 select                   | Un-signed8 | Enum  | R/W(C1) | 0:Mass flow<br>1:Volume flow<br>2:Corrected volume flow<br>3:Energy<br>4:Net mass flow 1<br>5:Net mass flow 2<br>6:Net volume flow 1<br>7:Net volume flow 2<br>8:Net corrected volume flow                                                                                                                                         |     |
| Holding Register | 0x03 | 0x06 | 4529 | Frequency output 2 select               | Un-signed8 | Enum  | R/W(C1) | 0:Mass flow<br>1:Density<br>2:Temperature<br>3:Pressure<br>4:Volume flow<br>5:Reference density<br>6:Relative density<br>7:Corrected volume flow<br>8:Concentration<br>9:Net mass flow 1<br>10:Net mass flow 2<br>11:Net volume flow 1<br>12:Net volume flow 2<br>13:Net corrected volume flow<br>14:Viscosity<br>15:Drive current |     |
| Holding Register | 0x03 | 0x10 | 4530 | Max Frequency 2                         | Float      | Value | R/W(C1) |                                                                                                                                                                                                                                                                                                                                    | Hz  |



|                  |      |      |      |                               |            |        |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                              |
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| Holding Register | 0x03 | 0x10 | 4532 | Min Frequency 2               | Float      | Value  | R/W(C1) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Hz                           |
|                  |      |      |      |                               |            |        |         | 0:g/P<br>1:kg/P<br>2:t/P<br>40:ton(US)/P<br>41:ton(UK)/P<br>3:lb/P<br>4:P/g<br>5:P/kg<br>6:P/t<br>42:P/ton(US)<br>43:P/ton(UK)<br>7:P/lb<br>8:cm3/P<br>9:L/P<br>10:m3/P<br>11:gal/P<br>12:kgal/P<br>13:ft3/P<br>14:bbl/P<br>15:Impgal/P<br>16:kImpgal/P<br>17:P/cm3<br>18:P/L<br>19:P/m3<br>20:P/gal<br>21:P/kgal<br>22:P/ft3<br>23:P/bbl<br>24:P/Impgal<br>25:P/kImpgal<br>26:NL/P<br>27:Nm3/P<br>28:SL/P<br>29:Sft3/P<br>30:Sm3/P<br>31:P/NL<br>32:P/Nm3<br>33:P/SL<br>34:P/Sft3<br>35:P/Sm3<br>36:MJ/P<br>37:Btu/P<br>38:P/MJ<br>39:P/Btu |                              |
| Holding Register | 0x03 | 0x06 | 4544 | Pulse output 2 unit select    | Un-signed8 | Enum   | R/W(C1) | 17:P/cm3<br>18:P/L<br>19:P/m3<br>20:P/gal<br>21:P/kgal<br>22:P/ft3<br>23:P/bbl<br>24:P/Impgal<br>25:P/kImpgal<br>26:NL/P<br>27:Nm3/P<br>28:SL/P<br>29:Sft3/P<br>30:Sm3/P<br>31:P/NL<br>32:P/Nm3<br>33:P/SL<br>34:P/Sft3<br>35:P/Sm3<br>36:MJ/P<br>37:Btu/P<br>38:P/MJ<br>39:P/Btu                                                                                                                                                                                                                                                            |                              |
| Holding Register | 0x03 | 0x06 | 4546 | Double pulse phase shift mode | Un-signed8 | Enum   | R/W(C1) | 0:0 deg<br>1:180 deg<br>2:-90 deg<br>3:+90 deg<br>4:Quadrature                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                              |
| Holding Register | 0x03 | 0x10 | 4547 | Double pulse rate             | Float      | Evalue | R/W(C1) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | [Pulse output 1 unit select] |
| Holding Register | 0x03 | 0x10 | 4560 | Pulse output 2 rate           | Float      | Value  | R/W(C1) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | [Pulse output 2 unit select] |
| Holding Register | 0x03 | 0x06 | 4576 | Pulse output 2 active mode    | Un-signed8 | Enum   | R/W(C2) | 0:Off active<br>1:On active                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                              |

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| Holding Register | 0x03 | 0x06 | 4592 | Pulse output 2 width        | Un-signed8 | Enum | R/<br>W(C1) | 0:0.05ms<br>1:0.1ms<br>2:0.5ms<br>3:1ms<br>4:5ms<br>5:10ms<br>6:20ms<br>7:33ms<br>8:50ms<br>9:100ms<br>10:200ms<br>11:330ms<br>12:500ms<br>13:1000ms<br>14:2000ms |  |
| Holding Register | 0x03 | 0x06 | 4608 | Pulse output 2 alarm action | Un-signed8 | Enum | R/<br>W(C1) | 0:0.0pulse<br>1:Measured value<br>2:Hold<br>3:User set value                                                                                                      |  |

|                  |      |      |      |                             |           |       |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |    |
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|                  |      |      |      |                             |           |       |         | 0:Off<br>1:Flow direction<br>2:Total limit 1<br>3:Total limit 2<br>4:Total limit 3<br>5:Total limit 4<br>6:Total limit 5<br>7:Total limit 6<br>8:F category<br>9:S,C,M category<br>10:F + S,C,M category<br>11:Slug detection<br>12:Empty pipe<br>13:Corrosion detection<br>14:Mass flow high low alarm<br>15:Density high low alarm<br>16:Reference density high low alarm<br>17:Relative density high low alarm<br>18:Temperature high low alarm<br>19:Pressure high low alarm<br>20:Volume flow high low alarm<br>21:Corrected volume flow high low alarm<br>22:Concentration high low alarm<br>23:Net mass flow 1 high low alarm<br>24:Net mass flow 2 high low alarm<br>25:Net volume flow 1 high low alarm<br>26:Net volume flow 2 high low alarm<br>27:Net corrected volume flow high low alarm<br>28:Batch function<br>29:Viscosity high low alarm |    |
| Holding Register | 0x03 | 0x06 | 4624 | Status output 2 function    | Unsigned8 | Enum  | R/W(C1) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |    |
| Holding Register | 0x03 | 0x06 | 4640 | Status output 2 active mode | Unsigned8 | Enum  | R/W(C2) | 0:Off active<br>1:On active                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |    |
| Holding Register | 0x03 | 0x10 | 4752 | AO trim 4mA                 | Float     | Value | R/W(C1) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | mA |
| Holding Register | 0x03 | 0x10 | 4768 | AO trim 20mA                | Float     | Value | R/W(C1) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | mA |

|                  |      |      |      |                                       |            |        |             |                                                                                                                                                                                                                                                                                                                                                      |                          |
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| Holding Register | 0x03 | 0x06 | 4800 | Net volume flow 1 unit                | Un-signed8 | Enum   | R/<br>W(C2) | 0:cm3/s<br>1:cm3/min<br>2:cm3/h<br>3:L/s<br>4:L/min<br>5:L/h<br>6:L/d<br>7:m3/s<br>8:m3/min<br>9:m3/h<br>10:m3/d<br>11:gal/s<br>12:gal/min<br>13:gal/h<br>14:gal/d<br>15:ft3/s<br>16:ft3/min<br>17:ft3/h<br>18:ft3/d<br>19:bb1/s<br>20:bb1/min<br>21:bb1/h<br>22:bb1/d<br>23:Impgal/s<br>24:Impgal/min<br>25:Impgal/h<br>26:Impgal/d<br>27:User unit |                          |
| Holding Register | 0x03 | 0x10 | 4801 | Net volume flow 1 LRV                 | Float      | Value  | R/<br>W(C2) |                                                                                                                                                                                                                                                                                                                                                      | [Net volume flow 1 unit] |
| Holding Register | 0x03 | 0x10 | 4803 | Net volume flow 1 URV                 | Float      | Value  | R/<br>W(C2) |                                                                                                                                                                                                                                                                                                                                                      | [Net volume flow 1 unit] |
| Holding Register | 0x03 | 0x06 | 4806 | Net volume flow 1 trim select         | Un-signed8 | Enum   | R/<br>W(C2) | 0:Inhibit<br>1:Enable                                                                                                                                                                                                                                                                                                                                |                          |
| Holding Register | 0x03 | 0x10 | 4807 | Net volume flow 1 trim offset         | Float      | Evalue | R/<br>W(C2) |                                                                                                                                                                                                                                                                                                                                                      | [Net volume flow 1 unit] |
| Holding Register | 0x03 | 0x10 | 4809 | Net volume flow 1 trim gain           | Float      | Value  | R/<br>W(C2) |                                                                                                                                                                                                                                                                                                                                                      |                          |
| Holding Register | 0x03 | 0x10 | 4812 | Net volume flow 1 damping             | Float      | Value  | R/<br>W(C2) |                                                                                                                                                                                                                                                                                                                                                      | s                        |
| Holding Register | 0x03 | 0x10 | 4814 | Net volume flow 1 damping pulse/total | Float      | Value  | R/<br>W(C2) |                                                                                                                                                                                                                                                                                                                                                      | s                        |
| Holding Register | 0x03 | 0x10 | 4816 | Net volume flow 1 lowcut              | Float      | Value  | R/<br>W(C2) |                                                                                                                                                                                                                                                                                                                                                      | [Net volume flow 1 unit] |
| Holding Register | 0x03 | 0x10 | 4819 | Net volume flow 1 low alarm           | Float      | Value  | R/<br>W(C2) |                                                                                                                                                                                                                                                                                                                                                      | [Net volume flow 1 unit] |
| Holding Register | 0x03 | 0x10 | 4821 | Net volume flow 1 high alarm          | Float      | Value  | R/<br>W(C2) |                                                                                                                                                                                                                                                                                                                                                      | [Net volume flow 1 unit] |
| Holding Register | 0x03 | 0x10 | 4823 | Net volume flow 1 low low alarm       | Float      | Value  | R/<br>W(C2) |                                                                                                                                                                                                                                                                                                                                                      | [Net volume flow 1 unit] |

|                  |      |      |      |                                               |               |        |         |                                                                                                                                                                                                                                                                                                                                                      |                          |
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| Holding Register | 0x03 | 0x10 | 4825 | Net volume flow 1 high high alarm             | Float         | Value  | R/W(C2) |                                                                                                                                                                                                                                                                                                                                                      | [Net volume flow 1 unit] |
| Holding Register | 0x03 | 0x06 | 4828 | Net volume flow 1 bi-directional mode         | Un-signed8    | Enum   | R/W(C2) | 0:Not active<br>1:Active                                                                                                                                                                                                                                                                                                                             |                          |
| Holding Register | 0x03 | 0x10 | 4829 | Net volume flow 1 user unit conversion factor | Float         | Value  | R/W(C2) |                                                                                                                                                                                                                                                                                                                                                      | 1/(m3/h)                 |
| Holding Register | 0x03 | 0x10 | 4832 | Net volume flow 1 user unit                   | Un-signed8[8] | ASCII  | R/W(C2) |                                                                                                                                                                                                                                                                                                                                                      |                          |
| Holding Register | 0x03 | 0x06 | 4850 | Net volume flow 2 unit                        | Un-signed8    | Enum   | R/W(C2) | 0:cm3/s<br>1:cm3/min<br>2:cm3/h<br>3:L/s<br>4:L/min<br>5:L/h<br>6:L/d<br>7:m3/s<br>8:m3/min<br>9:m3/h<br>10:m3/d<br>11:gal/s<br>12:gal/min<br>13:gal/h<br>14:gal/d<br>15:ft3/s<br>16:ft3/min<br>17:ft3/h<br>18:ft3/d<br>19:bbl/s<br>20:bbl/min<br>21:bbl/h<br>22:bbl/d<br>23:Impgal/s<br>24:Impgal/min<br>25:Impgal/h<br>26:Impgal/d<br>27:User unit |                          |
| Holding Register | 0x03 | 0x10 | 4851 | Net volume flow 2 LRV                         | Float         | Value  | R/W(C2) |                                                                                                                                                                                                                                                                                                                                                      | [Net volume flow 2 unit] |
| Holding Register | 0x03 | 0x10 | 4853 | Net volume flow 2 URV                         | Float         | Value  | R/W(C2) |                                                                                                                                                                                                                                                                                                                                                      | [Net volume flow 2 unit] |
| Holding Register | 0x03 | 0x06 | 4856 | Net volume flow 2 trim select                 | Un-signed8    | Enum   | R/W(C2) | 0:Inhibit<br>1:Enable                                                                                                                                                                                                                                                                                                                                |                          |
| Holding Register | 0x03 | 0x10 | 4857 | Net volume flow 2 trim offset                 | Float         | Evalue | R/W(C2) |                                                                                                                                                                                                                                                                                                                                                      | [Net volume flow 2 unit] |
| Holding Register | 0x03 | 0x10 | 4859 | Net volume flow 2 trim gain                   | Float         | Value  | R/W(C2) |                                                                                                                                                                                                                                                                                                                                                      |                          |
| Holding Register | 0x03 | 0x10 | 4862 | Net volume flow 2 damping                     | Float         | Value  | R/W(C2) |                                                                                                                                                                                                                                                                                                                                                      | s                        |
| Holding Register | 0x03 | 0x10 | 4864 | Net volume flow 2 damping pulse/total         | Float         | Value  | R/W(C2) |                                                                                                                                                                                                                                                                                                                                                      | s                        |

|                  |      |      |      |                                               |               |        |         |                                                                                                                                                                                                |                                  |
|------------------|------|------|------|-----------------------------------------------|---------------|--------|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| Holding Register | 0x03 | 0x10 | 4866 | Net volume flow 2 lowcut                      | Float         | Value  | R/W(C2) |                                                                                                                                                                                                | [Net volume flow 2 unit]         |
| Holding Register | 0x03 | 0x10 | 4869 | Net volume flow 2 low alarm                   | Float         | Value  | R/W(C2) |                                                                                                                                                                                                | [Net volume flow 2 unit]         |
| Holding Register | 0x03 | 0x10 | 4871 | Net volume flow 2 high alarm                  | Float         | Value  | R/W(C2) |                                                                                                                                                                                                | [Net volume flow 2 unit]         |
| Holding Register | 0x03 | 0x10 | 4873 | Net volume flow 2 low low alarm               | Float         | Value  | R/W(C2) |                                                                                                                                                                                                | [Net volume flow 2 unit]         |
| Holding Register | 0x03 | 0x10 | 4875 | Net volume flow 2 high high alarm             | Float         | Value  | R/W(C2) |                                                                                                                                                                                                | [Net volume flow 2 unit]         |
| Holding Register | 0x03 | 0x06 | 4877 | Net volume flow 2 bi-directional mode         | Un-signed8    | Enum   | R/W(C2) | 0:Not active<br>1:Active                                                                                                                                                                       |                                  |
| Holding Register | 0x03 | 0x10 | 4878 | Net volume flow 2 user unit conversion factor | Float         | Value  | R/W(C2) |                                                                                                                                                                                                | 1/(m3/h)                         |
| Holding Register | 0x03 | 0x10 | 4881 | Net volume flow 2 user unit                   | Un-signed8[8] | ASCII  | R/W(C2) |                                                                                                                                                                                                |                                  |
| Holding Register | 0x03 | 0x06 | 4900 | Net corrected volume flow unit                | Un-signed8    | Enum   | R/W(C2) | 8:SL/s<br>9:SL/min<br>10:SL/h<br>11:SL/d<br>12:Sft3/s<br>13:Sft3/min<br>14:Sft3/h<br>15:Sft3/d<br>16:Sm3/s<br>17:Sm3/min<br>18:Sm3/h<br>19:Sm3/d<br>21:MMSft3/h<br>22:MMSft3/d<br>20:User unit |                                  |
| Holding Register | 0x03 | 0x10 | 4901 | Net corrected volume flow LRV                 | Float         | Value  | R/W(C2) |                                                                                                                                                                                                | [Net corrected volume flow unit] |
| Holding Register | 0x03 | 0x10 | 4903 | Net corrected volume flow URV                 | Float         | Value  | R/W(C2) |                                                                                                                                                                                                | [Net corrected volume flow unit] |
| Holding Register | 0x03 | 0x06 | 4906 | Net corrected volume flow trim select         | Un-signed8    | Enum   | R/W(C2) | 0:Inhibit<br>1:Enable                                                                                                                                                                          |                                  |
| Holding Register | 0x03 | 0x10 | 4907 | Net corrected volume flow trim offset         | Float         | Evalue | R/W(C2) |                                                                                                                                                                                                | [Net corrected volume flow unit] |
| Holding Register | 0x03 | 0x10 | 4909 | Net corrected volume flow trim gain           | Float         | Value  | R/W(C2) |                                                                                                                                                                                                |                                  |
| Holding Register | 0x03 | 0x10 | 4912 | Net corrected volume flow damping             | Float         | Value  | R/W(C2) |                                                                                                                                                                                                | s                                |

|                  |      |      |      |                                                       |               |       |         |                                                                                                                                                                                                                                                                                        |                                  |
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| Holding Register | 0x03 | 0x10 | 4914 | Net corrected volume flow damping pulse/total         | Float         | Value | R/W(C2) |                                                                                                                                                                                                                                                                                        | s                                |
| Holding Register | 0x03 | 0x10 | 4916 | Net corrected volume flow lowcut                      | Float         | Value | R/W(C2) |                                                                                                                                                                                                                                                                                        | [Net corrected volume flow unit] |
| Holding Register | 0x03 | 0x10 | 4919 | Net corrected volume flow low alarm                   | Float         | Value | R/W(C2) |                                                                                                                                                                                                                                                                                        | [Net corrected volume flow unit] |
| Holding Register | 0x03 | 0x10 | 4921 | Net corrected volume flow high alarm                  | Float         | Value | R/W(C2) |                                                                                                                                                                                                                                                                                        | [Net corrected volume flow unit] |
| Holding Register | 0x03 | 0x10 | 4923 | Net corrected volume flow low low alarm               | Float         | Value | R/W(C2) |                                                                                                                                                                                                                                                                                        | [Net corrected volume flow unit] |
| Holding Register | 0x03 | 0x10 | 4925 | Net corrected volume flow high high alarm             | Float         | Value | R/W(C2) |                                                                                                                                                                                                                                                                                        | [Net corrected volume flow unit] |
| Holding Register | 0x03 | 0x06 | 4928 | Net corrected volume flow bi-directional mode         | Un-signed8    | Enum  | R/W(C2) | 0:Not active<br>1:Active                                                                                                                                                                                                                                                               |                                  |
| Holding Register | 0x03 | 0x10 | 4929 | Net corrected volume flow user unit conversion factor | Float         | Value | R/W(C2) |                                                                                                                                                                                                                                                                                        | 1/(m3/h)                         |
| Holding Register | 0x03 | 0x10 | 4932 | Net corrected volume flow user unit                   | Un-signed8[8] | ASCII | R/W(C2) |                                                                                                                                                                                                                                                                                        |                                  |
| Holding Register | 0x03 | 0x06 | 4950 | Corrected volume flow unit                            | Un-signed8    | Enum  | R/W(C2) | 0:NL/s<br>1:NL/min<br>2:NL/h<br>3:NL/d<br>4:Nm3/s<br>5:Nm3/min<br>6:Nm3/h<br>7:Nm3/d<br>8:SL/s<br>9:SL/min<br>10:SL/h<br>11:SL/d<br>12:Sft3/s<br>13:Sft3/min<br>14:Sft3/h<br>15:Sft3/d<br>16:Sm3/s<br>17:Sm3/min<br>18:Sm3/h<br>19:Sm3/d<br>21:MMSft3/h<br>22:MMSft3/d<br>20:User unit |                                  |
| Holding Register | 0x03 | 0x10 | 4951 | Corrected volume flow LRV                             | Float         | Value | R/W(C2) |                                                                                                                                                                                                                                                                                        | [Corrected volume flow unit]     |
| Holding Register | 0x03 | 0x10 | 4953 | Corrected volume flow URV                             | Float         | Value | R/W(C2) |                                                                                                                                                                                                                                                                                        | [Corrected volume flow unit]     |

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| Holding Register | 0x03 | 0x06 | 4956 | Corrected volume flow trim select                 | Unsigned8    | Enum   | R/W(C2) | 0:Inhibit<br>1:Enable                                                 |                              |
| Holding Register | 0x03 | 0x10 | 4957 | Corrected volume flow trim offset                 | Float        | Evalue | R/W(C2) |                                                                       | [Corrected volume flow unit] |
| Holding Register | 0x03 | 0x10 | 4959 | Corrected volume flow trim gain                   | Float        | Value  | R/W(C2) |                                                                       |                              |
| Holding Register | 0x03 | 0x10 | 4962 | Corrected volume flow damping                     | Float        | Value  | R/W(C2) |                                                                       | s                            |
| Holding Register | 0x03 | 0x10 | 4964 | Corrected volume flow damping pulse/total         | Float        | Value  | R/W(C2) |                                                                       | s                            |
| Holding Register | 0x03 | 0x10 | 4966 | Corrected volume flow low-cut                     | Float        | Value  | R/W(C2) |                                                                       | [Corrected volume flow unit] |
| Holding Register | 0x03 | 0x10 | 4969 | Corrected volume flow low alarm                   | Float        | Value  | R/W(C2) |                                                                       | [Corrected volume flow unit] |
| Holding Register | 0x03 | 0x10 | 4971 | Corrected volume flow high alarm                  | Float        | Value  | R/W(C2) |                                                                       | [Corrected volume flow unit] |
| Holding Register | 0x03 | 0x10 | 4973 | Corrected volume flow low low alarm               | Float        | Value  | R/W(C2) |                                                                       | [Corrected volume flow unit] |
| Holding Register | 0x03 | 0x10 | 4975 | Corrected volume flow high high alarm             | Float        | Value  | R/W(C2) |                                                                       | [Corrected volume flow unit] |
| Holding Register | 0x03 | 0x06 | 4978 | Corrected volume flow bi-directional mode         | Unsigned8    | Enum   | R/W(C2) | 0:Not active<br>1:Active                                              |                              |
| Holding Register | 0x03 | 0x10 | 4979 | Corrected volume flow user unit conversion factor | Float        | Value  | R/W(C2) |                                                                       | 1/(Sm3/h)                    |
| Holding Register | 0x03 | 0x10 | 4982 | Corrected volume flow user unit                   | Unsigned8[8] | ASCII  | R/W(C2) |                                                                       |                              |
| Holding Register | 0x03 | 0x10 | 5000 | Calorific damping                                 | Float        | Value  | R/W(C2) |                                                                       | s                            |
| Holding Register | 0x03 | 0x06 | 5002 | Calorific unit                                    | Unsigned8    | Enum   | R/W(C2) | 0:MJ/kg<br>1:Btu/lb<br>2:MJ/m3<br>3:Btu/gal<br>4:MJ/Nm3<br>5:Btu/Sft3 |                              |
| Holding Register | 0x03 | 0x10 | 5003 | Calorific fixed value                             | Float        | Value  | R/W(C2) |                                                                       | [Calorific unit]             |
| Holding Register | 0x03 | 0x10 | 5016 | NOC density hysteresis                            | Float        | Evalue | R/W(C2) |                                                                       | [Density unit]               |
| Holding Register | 0x03 | 0x10 | 5018 | GVF density hysteresis                            | Float        | Evalue | R/W(C2) |                                                                       | [Density unit]               |



|                  |      |      |      |                                |            |       |         |                                                                                                  |                    |
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| Holding Register | 0x03 | 0x06 | 5020 | Concentration select           | Un-signed8 | Enum  | R/W(C2) | 0:Concentration(mass)<br>1:Concentration(volume)<br>2:Water cut                                  |                    |
| Holding Register | 0x03 | 0x06 | 5021 | GVF select                     | Un-signed8 | Enum  | R/W(C2) | 0:Disable<br>1:Enable                                                                            |                    |
| Holding Register | 0x03 | 0x10 | 5023 | NOC pressure fixed value       | Float      | Value | R/W(C2) |                                                                                                  | [Pressure unit]    |
| Holding Register | 0x03 | 0x10 | 5026 | Reference oil density set 1    | Float      | Value | R/W(C2) |                                                                                                  | [Density unit]     |
| Holding Register | 0x03 | 0x10 | 5028 | Reference water density set 1  | Float      | Value | R/W(C2) |                                                                                                  | [Density unit]     |
| Holding Register | 0x03 | 0x06 | 5030 | Oil density calculator set 1   | Un-signed8 | Enum  | R/W(C2) | 0:Off<br>1:Crude oil<br>2:Products<br>3:Lubricating oil<br>4:Fixed thermal exp factor<br>5:Other |                    |
| Holding Register | 0x03 | 0x10 | 5032 | Thermal expansion factor set 1 | Float      | Value | R/W(C2) |                                                                                                  |                    |
| Holding Register | 0x03 | 0x06 | 5034 | Water density calculator set 1 | Un-signed8 | Enum  | R/W(C2) | 0:SMOW<br>1:UNESCO1980<br>2:Fresh water<br>3:Produced water<br>4:Brine water<br>5:STD formula    |                    |
| Holding Register | 0x03 | 0x06 | 5035 | Water density UNESCO1980 set 1 | Un-signed8 | Enum  | R/W(C2) | 0:SMOW<br>1:VSMOW                                                                                |                    |
| Holding Register | 0x03 | 0x10 | 5037 | K0 coefficient set 1           | Float      | Value | R/W(C2) |                                                                                                  |                    |
| Holding Register | 0x03 | 0x10 | 5039 | K1 coefficient set 1           | Float      | Value | R/W(C2) |                                                                                                  |                    |
| Holding Register | 0x03 | 0x10 | 5041 | K2 coefficient set 1           | Float      | Value | R/W(C2) |                                                                                                  |                    |
| Holding Register | 0x03 | 0x10 | 5044 | Reference temperature set 1    | Float      | Value | R/W(C2) |                                                                                                  | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 5046 | Salinity ppt set 1             | Float      | Value | R/W(C2) |                                                                                                  | ppt                |
| Holding Register | 0x03 | 0x10 | 5048 | Salinity fixed value set 1     | Float      | Value | R/W(C2) |                                                                                                  | %                  |
| Holding Register | 0x03 | 0x10 | 5060 | Reference oil density set 2    | Float      | Value | R/W(C2) |                                                                                                  | [Density unit]     |
| Holding Register | 0x03 | 0x10 | 5062 | Reference water density set 2  | Float      | Value | R/W(C2) |                                                                                                  | [Density unit]     |
| Holding Register | 0x03 | 0x06 | 5064 | Oil density calculator set 2   | Un-signed8 | Enum  | R/W(C2) | 0:Off<br>1:Crude oil<br>2:Products<br>3:Lubricating oil<br>4:Fixed thermal exp factor<br>5:Other |                    |

|                  |      |      |      |                                |            |       |         |                                                                                                  |                    |
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| Holding Register | 0x03 | 0x10 | 5066 | Thermal expansion factor set 2 | Float      | Value | R/W(C2) |                                                                                                  |                    |
| Holding Register | 0x03 | 0x06 | 5068 | Water density calculator set 2 | Un-signed8 | Enum  | R/W(C2) | 0:SMOW<br>1:UNESCO1980<br>2:Fresh water<br>3:Produced water<br>4:Brine water<br>5:STD formula    |                    |
| Holding Register | 0x03 | 0x06 | 5069 | Water density UNESCO1980 set 2 | Un-signed8 | Enum  | R/W(C2) | 0:SMOW<br>1:VSMOW                                                                                |                    |
| Holding Register | 0x03 | 0x10 | 5071 | K0 coefficient set 2           | Float      | Value | R/W(C2) |                                                                                                  |                    |
| Holding Register | 0x03 | 0x10 | 5073 | K1 coefficient set 2           | Float      | Value | R/W(C2) |                                                                                                  |                    |
| Holding Register | 0x03 | 0x10 | 5075 | K2 coefficient set 2           | Float      | Value | R/W(C2) |                                                                                                  |                    |
| Holding Register | 0x03 | 0x10 | 5078 | Reference temperature set 2    | Float      | Value | R/W(C2) |                                                                                                  | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 5080 | Salinity ppt set 2             | Float      | Value | R/W(C2) |                                                                                                  | ppt                |
| Holding Register | 0x03 | 0x10 | 5082 | Salinity fixed value set 2     | Float      | Value | R/W(C2) |                                                                                                  | %                  |
| Holding Register | 0x03 | 0x10 | 5100 | Reference oil density set 3    | Float      | Value | R/W(C2) |                                                                                                  | [Density unit]     |
| Holding Register | 0x03 | 0x10 | 5102 | Reference water density set 3  | Float      | Value | R/W(C2) |                                                                                                  | [Density unit]     |
| Holding Register | 0x03 | 0x06 | 5104 | Oil density calculator set 3   | Un-signed8 | Enum  | R/W(C2) | 0:Off<br>1:Crude oil<br>2:Products<br>3:Lubricating oil<br>4:Fixed thermal exp factor<br>5:Other |                    |
| Holding Register | 0x03 | 0x10 | 5106 | Thermal expansion factor set 3 | Float      | Value | R/W(C2) |                                                                                                  |                    |
| Holding Register | 0x03 | 0x06 | 5108 | Water density calculator set 3 | Un-signed8 | Enum  | R/W(C2) | 0:SMOW<br>1:UNESCO1980<br>2:Fresh water<br>3:Produced water<br>4:Brine water<br>5:STD formula    |                    |
| Holding Register | 0x03 | 0x06 | 5109 | Water density UNESCO1980 set 3 | Un-signed8 | Enum  | R/W(C2) | 0:SMOW<br>1:VSMOW                                                                                |                    |
| Holding Register | 0x03 | 0x10 | 5111 | K0 coefficient set 3           | Float      | Value | R/W(C2) |                                                                                                  |                    |
| Holding Register | 0x03 | 0x10 | 5113 | K1 coefficient set 3           | Float      | Value | R/W(C2) |                                                                                                  |                    |
| Holding Register | 0x03 | 0x10 | 5115 | K2 coefficient set 3           | Float      | Value | R/W(C2) |                                                                                                  |                    |
| Holding Register | 0x03 | 0x10 | 5118 | Reference temperature set 3    | Float      | Value | R/W(C2) |                                                                                                  | [Temperature unit] |

|                  |      |      |      |                                        |            |       |         |                                                                                                  |                    |
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| Holding Register | 0x03 | 0x10 | 5120 | Salinity ppt set 3                     | Float      | Value | R/W(C2) |                                                                                                  | ppt                |
| Holding Register | 0x03 | 0x10 | 5122 | Salinity fixed value set 3             | Float      | Value | R/W(C2) |                                                                                                  | %                  |
| Holding Register | 0x03 | 0x10 | 5140 | Reference oil density set 4            | Float      | Value | R/W(C2) |                                                                                                  | [Density unit]     |
| Holding Register | 0x03 | 0x10 | 5142 | Reference water density set 4          | Float      | Value | R/W(C2) |                                                                                                  | [Density unit]     |
| Holding Register | 0x03 | 0x06 | 5144 | Oil density calculator set 4           | Unsigned8  | Enum  | R/W(C2) | 0:Off<br>1:Crude oil<br>2:Products<br>3:Lubricating oil<br>4:Fixed thermal exp factor<br>5:Other |                    |
| Holding Register | 0x03 | 0x10 | 5146 | Thermal expansion factor set 4         | Float      | Value | R/W(C2) |                                                                                                  |                    |
| Holding Register | 0x03 | 0x06 | 5148 | Water density calculator set 4         | Unsigned8  | Enum  | R/W(C2) | 0:SMOW<br>1:UNESCO1980<br>2:Fresh water<br>3:Produced water<br>4:Brine water<br>5:STD formula    |                    |
| Holding Register | 0x03 | 0x06 | 5149 | Water density UNESCO1980 set 4         | Unsigned8  | Enum  | R/W(C2) | 0:SMOW<br>1:VSMOW                                                                                |                    |
| Holding Register | 0x03 | 0x10 | 5151 | K0 coefficient set 4                   | Float      | Value | R/W(C2) |                                                                                                  |                    |
| Holding Register | 0x03 | 0x10 | 5153 | K1 coefficient set 4                   | Float      | Value | R/W(C2) |                                                                                                  |                    |
| Holding Register | 0x03 | 0x10 | 5155 | K2 coefficient set 4                   | Float      | Value | R/W(C2) |                                                                                                  |                    |
| Holding Register | 0x03 | 0x10 | 5158 | Reference temperature set 4            | Float      | Value | R/W(C2) |                                                                                                  | [Temperature unit] |
| Holding Register | 0x03 | 0x10 | 5160 | Salinity ppt set 4                     | Float      | Value | R/W(C2) |                                                                                                  | ppt                |
| Holding Register | 0x03 | 0x10 | 5162 | Salinity fixed value set 4             | Float      | Value | R/W(C2) |                                                                                                  | %                  |
| Holding Register | 0x03 | 0x10 | 5177 | Logging start date                     | Unsigned32 | Date  | R/W(C2) |                                                                                                  |                    |
| Holding Register | 0x03 | 0x06 | 5180 | Device behavior temperature alarm      | Unsigned8  | Enum  | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue                                              |                    |
| Holding Register | 0x03 | 0x06 | 5181 | Device behavior tube leakage detection | Unsigned8  | Enum  | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue                                              |                    |
| Holding Register | 0x03 | 0x06 | 5182 | Device behavior indicator alarm        | Unsigned8  | Enum  | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue                                              |                    |

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|------------------|------|------|------|-----------------------------------------------------|-----------|------|---------|-----------------------------------------------------|--|
| Holding Register | 0x03 | 0x06 | 5183 | Device behavior slug detection                      | Unsigned8 | Enum | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue |  |
| Holding Register | 0x03 | 0x06 | 5184 | Device behavior empty pipe detection                | Unsigned8 | Enum | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue |  |
| Holding Register | 0x03 | 0x06 | 5186 | Device behavior corrosion detection                 | Unsigned8 | Enum | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue |  |
| Holding Register | 0x03 | 0x06 | 5187 | Device behavior autozero alarm                      | Unsigned8 | Enum | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue |  |
| Holding Register | 0x03 | 0x06 | 5188 | Device behavior analog input alarm                  | Unsigned8 | Enum | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue |  |
| Holding Register | 0x03 | 0x06 | 5189 | Device behavior mass flow high high low low alarm   | Unsigned8 | Enum | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue |  |
| Holding Register | 0x03 | 0x06 | 5190 | Device behavior density high high low low alarm     | Unsigned8 | Enum | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue |  |
| Holding Register | 0x03 | 0x06 | 5192 | Device behavior temperature high high low low alarm | Unsigned8 | Enum | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue |  |
| Holding Register | 0x03 | 0x06 | 5193 | Device behavior pressure high high low low alarm    | Unsigned8 | Enum | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue |  |
| Holding Register | 0x03 | 0x06 | 5194 | Device behavior total 1 threshold exceed            | Unsigned8 | Enum | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue |  |
| Holding Register | 0x03 | 0x06 | 5195 | Device behavior mass flow configuration error       | Unsigned8 | Enum | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue |  |
| Holding Register | 0x03 | 0x06 | 5196 | Device behavior density configuration error         | Unsigned8 | Enum | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue |  |
| Holding Register | 0x03 | 0x06 | 5198 | Device behavior temperature configuration error     | Unsigned8 | Enum | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue |  |
| Holding Register | 0x03 | 0x06 | 5199 | Device behavior pressure configuration error        | Unsigned8 | Enum | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue |  |

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|------------------|------|------|------|---------------------------------------------------------------|-----------|------|---------|-----------------------------------------------------|--|
| Holding Register | 0x03 | 0x06 | 5200 | Device behavior volume flow configuration error               | Unsigned8 | Enum | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue |  |
| Holding Register | 0x03 | 0x06 | 5201 | Device behavior reference density configuration error         | Unsigned8 | Enum | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue |  |
| Holding Register | 0x03 | 0x06 | 5202 | Device behavior relative density configuration error          | Unsigned8 | Enum | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue |  |
| Holding Register | 0x03 | 0x06 | 5204 | Device behavior corrected volume flow configuration error     | Unsigned8 | Enum | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue |  |
| Holding Register | 0x03 | 0x06 | 5205 | Device behavior calorific value configuration error           | Unsigned8 | Enum | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue |  |
| Holding Register | 0x03 | 0x06 | 5206 | Device behavior concentration configuration error             | Unsigned8 | Enum | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue |  |
| Holding Register | 0x03 | 0x06 | 5207 | Device behavior net mass flow configuration error             | Unsigned8 | Enum | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue |  |
| Holding Register | 0x03 | 0x06 | 5208 | Device behavior net volume flow configuration error           | Unsigned8 | Enum | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue |  |
| Holding Register | 0x03 | 0x06 | 5210 | Device behavior net corrected volume flow configuration error | Unsigned8 | Enum | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue |  |
| Holding Register | 0x03 | 0x06 | 5211 | Device behavior analog output configuration error             | Unsigned8 | Enum | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue |  |
| Holding Register | 0x03 | 0x06 | 5212 | Device behavior pulse/status output 1 configuration error     | Unsigned8 | Enum | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue |  |
| Holding Register | 0x03 | 0x06 | 5213 | Device behavior pulse/status output 2 configuration error     | Unsigned8 | Enum | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue |  |
| Holding Register | 0x03 | 0x06 | 5214 | Device behavior double pulse configuration error              | Unsigned8 | Enum | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue |  |

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| Holding Register | 0x03 | 0x06 | 5216 | Device behavior status output 3 configuration error  | Unsigned8 | Enum | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue                                               |  |
| Holding Register | 0x03 | 0x06 | 5217 | Device behavior analog input configuration error     | Unsigned8 | Enum | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue                                               |  |
| Holding Register | 0x03 | 0x06 | 5218 | Device behavior total configuration error            | Unsigned8 | Enum | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue                                               |  |
| Holding Register | 0x03 | 0x06 | 5219 | Device behavior maintenance mode                     | Unsigned8 | Enum | R/W(C2) | 0:Hold<br>1:Continue                                                                              |  |
| Holding Register | 0x03 | 0x06 | 5221 | Acknowledge behavior slug detection                  | Unsigned8 | Enum | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue                                               |  |
| Holding Register | 0x03 | 0x06 | 5222 | Acknowledge behavior empty pipe detection            | Unsigned8 | Enum | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue                                               |  |
| Holding Register | 0x03 | 0x06 | 5223 | Acknowledge behavior corrosion detection             | Unsigned8 | Enum | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue                                               |  |
| Holding Register | 0x03 | 0x06 | 5224 | Acknowledge behavior analog output saturated         | Unsigned8 | Enum | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue                                               |  |
| Holding Register | 0x03 | 0x06 | 5225 | Acknowledge behavior pulse status output 1 saturated | Unsigned8 | Enum | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue                                               |  |
| Holding Register | 0x03 | 0x06 | 5227 | Acknowledge behavior pulse status output 2 saturated | Unsigned8 | Enum | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue                                               |  |
| Holding Register | 0x03 | 0x06 | 5228 | Acknowledge behavior double pulse out saturated      | Unsigned8 | Enum | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue                                               |  |
| Holding Register | 0x03 | 0x06 | 5230 | Event setting slug detection                         | Unsigned8 | Enum | R/W(C2) | 0:Ignore<br>1:History only<br>2:Generate<br>3:Acknowledge<br>4:Monitor<br>5:Monitor + Acknowledge |  |
| Holding Register | 0x03 | 0x06 | 5231 | Event setting empty pipe detection                   | Unsigned8 | Enum | R/W(C2) | 0:Ignore<br>1:History only<br>2:Generate<br>3:Acknowledge<br>4:Monitor<br>5:Monitor + Acknowledge |  |



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|------------------|------|------|------|---------------------------------------|-----------|------|---------|---------------------------------------------------------------------------------------------------|--|
| Holding Register | 0x03 | 0x06 | 5232 | Event setting corrosion detection     | Unsigned8 | Enum | R/W(C2) | 0:Ignore<br>1:History only<br>2:Generate<br>3:Acknowledge<br>4:Monitor<br>5:Monitor + Acknowledge |  |
| Holding Register | 0x03 | 0x06 | 5233 | Event setting density fixed           | Unsigned8 | Enum | R/W(C2) | 0:Ignore<br>1:History only<br>2:Generate<br>3:Acknowledge<br>4:Monitor<br>5:Monitor + Acknowledge |  |
| Holding Register | 0x03 | 0x06 | 5234 | Event setting temperature fixed       | Unsigned8 | Enum | R/W(C2) | 0:Ignore<br>1:History only<br>2:Generate<br>3:Acknowledge<br>4:Monitor<br>5:Monitor + Acknowledge |  |
| Holding Register | 0x03 | 0x06 | 5236 | Event setting pressure fixed          | Unsigned8 | Enum | R/W(C2) | 0:Ignore<br>1:History only<br>2:Generate<br>3:Acknowledge<br>4:Monitor<br>5:Monitor + Acknowledge |  |
| Holding Register | 0x03 | 0x06 | 5237 | Event setting reference density fixed | Unsigned8 | Enum | R/W(C2) | 0:Ignore<br>1:History only<br>2:Generate<br>3:Acknowledge<br>4:Monitor<br>5:Monitor + Acknowledge |  |
| Holding Register | 0x03 | 0x06 | 5238 | Event setting calorific value fixed   | Unsigned8 | Enum | R/W(C2) | 0:Ignore<br>1:History only<br>2:Generate<br>3:Acknowledge<br>4:Monitor<br>5:Monitor + Acknowledge |  |
| Holding Register | 0x03 | 0x06 | 5239 | Event setting process variables trim  | Unsigned8 | Enum | R/W(C2) | 0:Ignore<br>1:History only<br>2:Generate<br>3:Acknowledge<br>4:Monitor<br>5:Monitor + Acknowledge |  |
| Holding Register | 0x03 | 0x06 | 5240 | Event setting analog output saturated | Unsigned8 | Enum | R/W(C2) | 0:Ignore<br>1:History only<br>2:Generate<br>3:Acknowledge<br>4:Monitor<br>5:Monitor + Acknowledge |  |

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|------------------|------|------|------|-----------------------------------------------|------------|------|---------|---------------------------------------------------------------------------------------------------|--|
| Holding Register | 0x03 | 0x06 | 5242 | Event setting pulse status output 1 saturated | Un-signed8 | Enum | R/W(C2) | 0:Ignore<br>1:History only<br>2:Generate<br>3:Acknowledge<br>4:Monitor<br>5:Monitor + Acknowledge |  |
| Holding Register | 0x03 | 0x06 | 5243 | Event setting pulse status output 2 saturated | Un-signed8 | Enum | R/W(C2) | 0:Ignore<br>1:History only<br>2:Generate<br>3:Acknowledge<br>4:Monitor<br>5:Monitor + Acknowledge |  |
| Holding Register | 0x03 | 0x06 | 5244 | Event setting double pulse output saturated   | Un-signed8 | Enum | R/W(C2) | 0:Ignore<br>1:History only<br>2:Generate<br>3:Acknowledge<br>4:Monitor<br>5:Monitor + Acknowledge |  |
| Holding Register | 0x03 | 0x06 | 5245 | Event setting date/time not set               | Un-signed8 | Enum | R/W(C2) | 0:Ignore<br>1:History only<br>2:Generate<br>3:Acknowledge<br>4:Monitor<br>5:Monitor + Acknowledge |  |
| Holding Register | 0x03 | 0x06 | 5246 | Event setting device configuration locked     | Un-signed8 | Enum | R/W(C2) | 0:Ignore<br>1:History only<br>2:Generate<br>3:Acknowledge<br>4:Monitor<br>5:Monitor + Acknowledge |  |
| Holding Register | 0x03 | 0x06 | 5247 | Event setting device configuration not locked | Un-signed8 | Enum | R/W(C2) | 0:Ignore<br>1:History only<br>2:Generate<br>3:Acknowledge<br>4:Monitor<br>5:Monitor + Acknowledge |  |
| Holding Register | 0x03 | 0x06 | 5249 | Device behavior batch alarm                   | Un-signed8 | Enum | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue                                               |  |
| Holding Register | 0x03 | 0x06 | 5250 | Device behavior configuration error           | Un-signed8 | Enum | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue                                               |  |
| Holding Register | 0x03 | 0x06 | 5251 | Device behavior batch warning                 | Un-signed8 | Enum | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue                                               |  |
| Holding Register | 0x03 | 0x06 | 5252 | Acknowledge behavior batch alarm              | Un-signed8 | Enum | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue                                               |  |



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| Holding Register | 0x03 | 0x06 | 5253 | Event setting batch alarm                     | Un-signed8    | Enum  | R/W(C2) | 0:Ignore<br>1:History only<br>2:Generate<br>3:Acknowledge<br>4:Monitor<br>5:Monitor + Acknowledge |  |
| Holding Register | 0x03 | 0x06 | 5256 | Device behavior viscosity configuration error | Un-signed8    | Enum  | R/W(C2) | 0:Software burn out<br>1:Alarm output<br>2:Continue                                               |  |
| Holding Register | 0x03 | 0x10 | 5261 | Monitor file name                             | Un-signed8[8] | ASCII | R/W(C2) |                                                                                                   |  |
| Holding Register | 0x03 | 0x10 | 5266 | Logging file name                             | Un-signed8[8] | ASCII | R/W(C2) |                                                                                                   |  |
| Holding Register | 0x03 | 0x06 | 5271 | Event acknowledge                             | Un-signed8    | Enum  | R/W(C0) | 0: Unacknowledged<br>1: Acknowledged                                                              |  |
| Holding Register | 0x03 | 0x10 | 5272 | Event file name                               | Un-signed8[8] | ASCII | R/W(C2) |                                                                                                   |  |
| Holding Register | 0x03 | 0x06 | 5277 | Write lock setting                            | Un-signed8    | Enum  | R/W(C2) | 0:All locked<br>1:Display only<br>2:Autozero only<br>3:Display + Autozero                         |  |
| Holding Register | 0x03 | 0x06 | 5278 | Clear event history                           | Un-signed8    | Enum  | R/W(C2) | 0:Not execute<br>1:Execute                                                                        |  |
| Holding Register | 0x03 | 0x06 | 5279 | Logging interval time                         | Un-signed8    | Enum  | R/W(C2) | 0:1s<br>1:10s<br>2:30s<br>3:1min<br>4:5min<br>5:30min<br>6:60min                                  |  |
| Holding Register | 0x03 | 0x06 | 5280 | Logging execute                               | Un-signed8    | Enum  | R/W(C2) | 0: Not execute<br>1: Execute<br>2: Execute with monitor event                                     |  |
| Holding Register | 0x03 | 0x06 | 5282 | Process variables additional parameters       | Un-signed8    | Enum  | R/W(C0) | 0:Not apply<br>1:Apply                                                                            |  |
| Holding Register | 0x03 | 0x06 | 5283 | Totalizer additional parameters               | Un-signed8    | Enum  | R/W(C0) | 0:Not apply<br>1:Apply                                                                            |  |
| Holding Register | 0x03 | 0x06 | 5284 | Display additional parameters                 | Un-signed8    | Enum  | R/W(C0) | 0:Not apply<br>1:Apply                                                                            |  |
| Holding Register | 0x03 | 0x06 | 5285 | Alarm/Event additional parameters             | Un-signed8    | Enum  | R/W(C0) | 0:Not apply<br>1:Apply                                                                            |  |
| Holding Register | 0x03 | 0x06 | 5286 | Alarm/Event history additional parameters     | Un-signed8    | Enum  | R/W(C0) | 0:Not apply<br>1:Apply                                                                            |  |

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|------------------|------|------|------|--------------------------------------------|------------|------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Holding Register | 0x03 | 0x06 | 5288 | Double pulse additional parameters         | Un-signed8 | Enum | R/W(C0) | 0:Not apply<br>1:Apply                                                                                                                                                                                                                                                                                        |  |
| Holding Register | 0x03 | 0x06 | 5289 | Standard diagnostics additional parameters | Un-signed8 | Enum | R/W(C0) | 0:Not apply<br>1:Apply                                                                                                                                                                                                                                                                                        |  |
| Holding Register | 0x03 | 0x06 | 5290 | Tube health check additional parameters    | Un-signed8 | Enum | R/W(C0) | 0:Not apply<br>1:Apply                                                                                                                                                                                                                                                                                        |  |
| Holding Register | 0x03 | 0x06 | 5294 | Logging 1 select                           | Un-signed8 | Enum | R/W(C2) | 0:None<br>1:Mass flow<br>2:Density<br>3:Temperature<br>4:Volume flow<br>5:Pressure<br>6:Concentration<br>7:Net mass flow<br>1<br>8:Net volume flow 1<br>9:Phase difference<br>10:Resonance frequency<br>11:Drive gain<br>12:Drive current<br>13:S1 amplitude<br>14:S2 amplitude<br>15:Transmitter temperature |  |
| Holding Register | 0x03 | 0x06 | 5295 | Logging 2 select                           | Un-signed8 | Enum | R/W(C2) | 0:None<br>1:Mass flow<br>2:Density<br>3:Temperature<br>4:Volume flow<br>5:Pressure<br>6:Concentration<br>7:Net mass flow<br>1<br>8:Net volume flow 1<br>9:Phase difference<br>10:Resonance frequency<br>11:Drive gain<br>12:Drive current<br>13:S1 amplitude<br>14:S2 amplitude<br>15:Transmitter temperature |  |

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| Holding Register | 0x03 | 0x06 | 5296 | Logging 3 select                        | Unsigned8 | Enum | R/W(C2) | 0:None<br>1:Mass flow<br>2:Density<br>3:Temperature<br>4:Volume flow<br>5:Pressure<br>6:Concentration<br>7:Net mass flow 1<br>8:Net volume flow 1<br>9:Phase difference<br>10:Resonance frequency<br>11:Drive gain<br>12:Drive current<br>13:S1 amplitude<br>14:S2 amplitude<br>15:Transmitter temperature |  |
| Holding Register | 0x03 | 0x06 | 5297 | Logging 4 select                        | Unsigned8 | Enum | R/W(C2) | 0:None<br>1:Mass flow<br>2:Density<br>3:Temperature<br>4:Volume flow<br>5:Pressure<br>6:Concentration<br>7:Net mass flow 1<br>8:Net volume flow 1<br>9:Phase difference<br>10:Resonance frequency<br>11:Drive gain<br>12:Drive current<br>13:S1 amplitude<br>14:S2 amplitude<br>15:Transmitter temperature |  |
| Holding Register | 0x03 | 0x06 | 5298 | Logging end time                        | Unsigned8 | Enum | R/W(C2) | 0:10min<br>1:30min<br>2:60min<br>3:3hour<br>4:12hour<br>5:24hour<br>6:72hour<br>7:240hour                                                                                                                                                                                                                  |  |
| Holding Register | 0x03 | 0x06 | 5300 | [NE 107]101:Resonance frequency failure | Unsigned8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C)                                                                                                                                                                                           |  |

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| Holding Register | 0x03 | 0x06 | 5301 | [NE 107]102:Signal failure               | Unsigned8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5302 | [NE 107]103,4:Pick off 1 failure         | Unsigned8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5303 | [NE 107]105,6:Pick off 2 failure         | Unsigned8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5304 | [NE 107]107,8:Temperature failure        | Unsigned8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5306 | [NE 107]109:Tube leakage detection       | Unsigned8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5307 | [NE 107]121,22:Main board failure        | Unsigned8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5308 | [NE 107]123:Parameter restore incomplete | Unsigned8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |

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| Holding Register | 0x03 | 0x06 | 5309 | [NE 107]124,25:Sensor board failure       | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5310 | [NE 107]126:Sensor communication error    | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5312 | [NE 107]127-29:Option board failure       | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5313 | [NE 107]130-32:Indicator board failure    | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5314 | [NE 107]133:Indicator board mismatch      | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5315 | [NE 107]134:Indicator communication error | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5316 | [NE 107]135:microSD failure               | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |

|                  |      |      |      |                                               |            |      |         |                                                                                                                  |  |
|------------------|------|------|------|-----------------------------------------------|------------|------|---------|------------------------------------------------------------------------------------------------------------------|--|
| Holding Register | 0x03 | 0x06 | 5318 | [NE 107]201:Slug detection                    | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5319 | [NE 107]202:Empty pipe detection              | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5320 | [NE 107]203:Corrosion detection               | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5321 | [NE 107]204-06:Autozero failure               | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5322 | [NE 107]221:Analog input failure              | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5324 | [NE 107]222:Mass flow high high low low alarm | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5325 | [NE 107]223:Density high high low low alarm   | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |

|                  |      |      |      |                                                           |            |      |         |                                                                                                                  |  |
|------------------|------|------|------|-----------------------------------------------------------|------------|------|---------|------------------------------------------------------------------------------------------------------------------|--|
| Holding Register | 0x03 | 0x06 | 5326 | [NE 107]224:Temperature high high low low alarm           | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5327 | [NE 107]225:Pressure high high low low alarm              | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5328 | [NE 107]226:Volume flow high high low low alarm           | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5330 | [NE 107]227:Corrected volume flow high high low low alarm | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5331 | [NE 107]228:Concentration high high low low alarm         | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5332 | [NE 107]229:Net mass flow 1 high high low low alarm       | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5333 | [NE 107]230:Net mass flow 2 high high low low alarm       | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |

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| Holding Register | 0x03 | 0x06 | 5334 | [NE 107]231:Net volume flow 1 high high low low alarm         | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5336 | [NE 107]232:Net volume flow 2 high high low low alarm         | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5337 | [NE 107]233:Corrected net volume flow high high low low alarm | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5338 | [NE 107]234:Relative density high high low low alarm          | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5339 | [NE 107]235:Reference density high high low low alarm         | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5340 | [NE 107]241:Totalizer 1 threshold exceeded                    | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5342 | [NE 107]242:Totalizer 2 threshold exceeded                    | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |



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| Holding Register | 0x03 | 0x06 | 5343 | [NE 107]243:Totalizer 3 threshold exceeded               | Unsigned8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5344 | [NE 107]244:Totalizer 4 threshold exceeded               | Unsigned8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5345 | [NE 107]245:Totalizer 5 threshold exceeded               | Unsigned8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5346 | [NE 107]246:Totalizer 6 threshold exceeded               | Unsigned8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5348 | [NE 107]301-20:Process variable configuration error      | Unsigned8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5349 | [NE 107]322:Analog output configuration error            | Unsigned8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5350 | [NE 107]323-25:Pulse/Status output 1 configuration error | Unsigned8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |

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| Holding Register | 0x03 | 0x06 | 5351 | [NE 107]326-29:Pulse/Status output 2 configuration error | Unsigned8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5352 | [NE 107]330:Double pulse output configuration error      | Unsigned8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5354 | [NE 107]333:Analog input configuration error             | Unsigned8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5355 | [NE 107]335-40:Totalizer configuration error             | Unsigned8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5356 | [NE 107]342:Data logging not started                     | Unsigned8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5357 | [NE 107]343:Option function mismatch                     | Unsigned8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5358 | [NE 107]702:Analog output fixed                          | Unsigned8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |

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| Holding Register | 0x03 | 0x06 | 5360 | [NE 107]703:Density fixed               | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5361 | [NE 107]704:Temperature fixed           | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5362 | [NE 107]705:Pressure fixed              | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5363 | [NE 107]706:Reference density fixed     | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5364 | [NE 107]707:Caloric value fixed         | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5366 | [NE 107]708:Process variable simulation | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5367 | [NE 107]709:Analog output simulation    | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |

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| Holding Register | 0x03 | 0x06 | 5368 | [NE 107]710:Pulse output simulation       | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5369 | [NE 107]711:Status output simulation      | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5370 | [NE 107]715:Process variable trimming     | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5372 | [NE 107]717:Analog output saturated       | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5373 | [NE 107]718:Pulse output 1 saturated      | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5374 | [NE 107]719:Pulse output 2 saturated      | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5375 | [NE 107]720:Double pulse output saturated | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |

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| Holding Register | 0x03 | 0x06 | 5376 | [NE 107]721:Autozero running                     | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5378 | [NE 107]722:Tube Health Check execution error    | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5379 | [NE 107]723:Date/Time not set                    | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5380 | [NE 107]724:Display over warning                 | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5381 | [NE 107]725:microSD card size warning            | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5382 | [NE 107]726:microSD card mismatch                | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5384 | [NE 107]728:microSD card removal procedure error | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |

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| Holding Register | 0x03 | 0x06 | 5385 | [NE 107]729:Parameter backup incomplete     | Unsigned8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5386 | [NE 107]730:Parameter restore running       | Unsigned8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5387 | [NE 107]735:Autozero warning                | Unsigned8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5388 | [NE 107]901:Device configuration locked     | Unsigned8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5390 | [NE 107]902:Device configuration not locked | Unsigned8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5391 | [NE 107]903:Parameter backup running        | Unsigned8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5392 | [NE 107]904:Data logging running            | Unsigned8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |

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| Holding Register | 0x03 | 0x06 | 5393 | [NE 107]905:Tube Health Check running | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5394 | [NE 107]909:Maintenance mode running  | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5395 | Reset NE 107 map                      | Un-signed8 | Enum | R/W(C2) | 0:Not execute<br>1:Execute                                                                                       |  |
| Holding Register | 0x03 | 0x06 | 5397 | [NE 107]207-09:Batch failure          | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5398 | [NE 107]341:Batch configuration error | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5399 | [NE 107]732:Batch progress indication | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5400 | [NE 107]906:Batch running             | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |
| Holding Register | 0x03 | 0x06 | 5401 | [NE 107]907:Batch hold                | Un-signed8 | Enum | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C) |  |

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| Holding Register | 0x03 | 0x06 | 5405 | [NE 107]210-12:N OC failure                   | Un-signed8  | Enum     | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C)                                                                                                                                                                                                              |  |
| Holding Register | 0x03 | 0x06 | 5406 | [NE 107]236:Viscosity high high low low alarm | Un-signed8  | Enum     | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C)                                                                                                                                                                                                              |  |
| Holding Register | 0x03 | 0x06 | 5407 | [NE 107]733,34:Viscosity warning              | Un-signed8  | Enum     | R/W(C2) | 0:No Effect<br>1:Maintenance Required (M)<br>3:Failure (F)<br>4:Out of Specification (S)<br>5:Function Check (C)                                                                                                                                                                                                              |  |
| Holding Register | 0x03 | 0x06 | 5420 | Process variables simulation select 1         | Un-signed16 | Bit-Enum | R/W(C1) | bit0:Mass flow<br>bit1:Density<br>bit2:Temperature<br>bit3:Pressure<br>bit4:Calorific value<br>bit5:Volume flow<br>bit6:Reference density<br>bit7:Relative density<br>bit8:Corrected volume flow<br>bit9:Reserved<br>bit10:Reserved<br>bit11:Reserved<br>bit12:Reserved<br>bit13:Reserved<br>bit14:Reserved<br>bit15:Reserved |  |



|                  |      |      |      |                                        |             |          |         |                                                                                                                                                                                                                                                                                                                                           |                              |
|------------------|------|------|------|----------------------------------------|-------------|----------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| Holding Register | 0x03 | 0x06 | 5421 | Process variables simulation select 2  | Unsigned 16 | Bit-Enum | R/W(C1) | bit0:Concentration<br>bit1:Net mass flow 1<br>bit2:Net mass flow 2<br>bit3:Net volume flow 1<br>bit4:Net volume flow 2<br>bit5:Net corrected volume flow<br>bit6:Viscosity<br>bit7:Reserved<br>bit8:Reserved<br>bit9:Reserved<br>bit10:Reserved<br>bit11:Reserved<br>bit12:Reserved<br>bit13:Reserved<br>bit14:Reserved<br>bit15:Reserved |                              |
| Holding Register | 0x03 | 0x10 | 5423 | Mass flow simulation value             | Float       | Value    | R/W(C1) |                                                                                                                                                                                                                                                                                                                                           | [Mass flow unit]             |
| Holding Register | 0x03 | 0x10 | 5425 | Density simulation value               | Float       | Value    | R/W(C1) |                                                                                                                                                                                                                                                                                                                                           | [Density unit]               |
| Holding Register | 0x03 | 0x10 | 5427 | Temperature simulation value           | Float       | Value    | R/W(C1) |                                                                                                                                                                                                                                                                                                                                           | [Temperature unit]           |
| Holding Register | 0x03 | 0x10 | 5430 | Pressure simulation value              | Float       | Value    | R/W(C2) |                                                                                                                                                                                                                                                                                                                                           | [Pressure unit]              |
| Holding Register | 0x03 | 0x10 | 5432 | Calorific simulation value             | Float       | Value    | R/W(C2) |                                                                                                                                                                                                                                                                                                                                           | [Calorific unit]             |
| Holding Register | 0x03 | 0x10 | 5434 | Volume flow simulation value           | Float       | Value    | R/W(C1) |                                                                                                                                                                                                                                                                                                                                           | [Volume flow unit]           |
| Holding Register | 0x03 | 0x10 | 5437 | Reference density simulation value     | Float       | Value    | R/W(C2) |                                                                                                                                                                                                                                                                                                                                           | [Density unit]               |
| Holding Register | 0x03 | 0x10 | 5439 | Relative density simulation value      | Float       | Value    | R/W(C2) |                                                                                                                                                                                                                                                                                                                                           |                              |
| Holding Register | 0x03 | 0x10 | 5441 | Corrected volume flow simulation value | Float       | Value    | R/W(C2) |                                                                                                                                                                                                                                                                                                                                           | [Corrected volume flow unit] |

|                  |      |      |      |                                            |             |       |         |                                                                                                                                                                            |                                                                                                                                                                                                                                                                |
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| Holding Register | 0x03 | 0x10 | 5444 | Concentration simulation value             | Float       | Value | R/W(C2) |                                                                                                                                                                            | When Selected concentration set is 0:Set1<br>[Concentration measurement unit set 1]<br>When 1:Set2<br>[Concentration measurement unit set 2]<br>When 2:Set3<br>[Concentration measurement unit set 3]<br>When 3:Set4<br>[Concentration measurement unit set 4] |
| Holding Register | 0x03 | 0x10 | 5446 | Net mass flow 1 simulation value           | Float       | Value | R/W(C2) |                                                                                                                                                                            | [Net mass flow 1 unit]                                                                                                                                                                                                                                         |
| Holding Register | 0x03 | 0x10 | 5448 | Net mass flow 2 simulation value           | Float       | Value | R/W(C2) |                                                                                                                                                                            | [Net mass flow 2 unit]                                                                                                                                                                                                                                         |
| Holding Register | 0x03 | 0x10 | 5451 | Net volume flow 1 simulation value         | Float       | Value | R/W(C2) |                                                                                                                                                                            | [Net volume flow 1 unit]                                                                                                                                                                                                                                       |
| Holding Register | 0x03 | 0x10 | 5453 | Net volume flow 2 simulation value         | Float       | Value | R/W(C2) |                                                                                                                                                                            | [Net volume flow 2 unit]                                                                                                                                                                                                                                       |
| Holding Register | 0x03 | 0x10 | 5455 | Net corrected volume flow simulation value | Float       | Value | R/W(C2) |                                                                                                                                                                            | [Net corrected volume flow unit]                                                                                                                                                                                                                               |
| Holding Register | 0x03 | 0x10 | 5458 | Viscosity simulation value                 | Float       | Value | R/W(C2) |                                                                                                                                                                            | [Viscosity unit]                                                                                                                                                                                                                                               |
| Holding Register | 0x03 | 0x10 | 5479 | User configuration backup date 1           | Un-signed32 | Date  | R/W(C2) |                                                                                                                                                                            |                                                                                                                                                                                                                                                                |
| Holding Register | 0x03 | 0x10 | 5481 | User configuration backup date 2           | Un-signed32 | Date  | R/W(C2) |                                                                                                                                                                            |                                                                                                                                                                                                                                                                |
| Holding Register | 0x03 | 0x10 | 5483 | User configuration backup date 3           | Un-signed32 | Date  | R/W(C2) |                                                                                                                                                                            |                                                                                                                                                                                                                                                                |
| Holding Register | 0x03 | 0x06 | 5488 | User configuration backup                  | Un-signed8  | Enum  | R/W(C2) | 0:Not execute<br>1:Store to 1<br>2:Store to 2<br>3:Store to 3<br>4:Store to microSD<br>5:Store from 1 to microSD<br>6:Store from 2 to microSD<br>7:Store from 3 to microSD |                                                                                                                                                                                                                                                                |

|                  |      |      |      |                                  |                |         |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |
|------------------|------|------|------|----------------------------------|----------------|---------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Holding Register | 0x03 | 0x06 | 5489 | Restoration                      | Un-signed8     | Enum    | R/W(C2) | 0:Not execute<br>1:Duplicate user configuration 1<br>2:Duplicate user configuration 2<br>3:Duplicate user configuration 3<br>4:Duplicate from microSD<br>5:Restore user configuration 1<br>6:Restore user configuration 2<br>7:Restore user configuration 3<br>8:Restore from microSD<br>9:Restore factory default<br>10:Download sensor constant from user configuration 1<br>11:Download sensor constant from microSD<br>12:Disable compensation |  |
| Holding Register | 0x03 | 0x10 | 5491 | Backup file name                 | Un-signed8[8]  | ASCII   | R/W(C2) |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |
| Holding Register | 0x03 | 0x10 | 5496 | User configuration backup name 1 | Un-signed8[8]  | ASCII   | R/W(C2) |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |
| Holding Register | 0x03 | 0x10 | 5501 | User configuration backup name 2 | Un-signed8[8]  | ASCII   | R/W(C2) |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |
| Holding Register | 0x03 | 0x10 | 5506 | User configuration backup name 3 | Un-signed8[8]  | ASCII   | R/W(C2) |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |
| Holding Register | 0x03 | 0x10 | 5520 | MS code 1                        | Un-signed8[32] | ASCII   | R/W(C2) |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |
| Holding Register | 0x03 | 0x10 | 5537 | MS code 2                        | Un-signed8[32] | ASCII   | R/W(C2) |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |
| Holding Register | 0x03 | 0x10 | 5554 | MS code 3                        | Un-signed8[32] | ASCII   | R/W(C2) |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |
| Holding Register | 0x03 | 0x06 | 5573 | Liquid gas select                | Un-signed8     | Enum    | R/W(C2) | 0:Liquid<br>1:Gas                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Holding Register | 0x03 | 0x10 | 5578 | Option activation key            | Un-signed8[32] | Latin-1 | R/W(C2) |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |
| Holding Register | 0x03 | 0x10 | 5595 | Sensor serial number             | Un-signed8[16] | ASCII   | R/W(C2) |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |
| Holding Register | 0x03 | 0x10 | 5649 | Memo 1                           | Un-signed8[16] | ASCII   | R/W(C1) |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |

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| Holding Register | 0x03 | 0x10 | 5658 | Memo 2                         | Un-signed8[16] | ASCII | R/W(C1) |                                              |   |
| Holding Register | 0x03 | 0x10 | 5667 | Memo 3                         | Un-signed8[16] | ASCII | R/W(C1) |                                              |   |
| Holding Register | 0x03 | 0x10 | 5680 | Last calibration date 1        | Un-signed32    | Date  | R/W(C1) |                                              |   |
| Holding Register | 0x03 | 0x10 | 5682 | Last calibration date 2        | Un-signed32    | Date  | R/W(C1) |                                              |   |
| Holding Register | 0x03 | 0x10 | 5684 | Last calibration date 3        | Un-signed32    | Date  | R/W(C1) |                                              |   |
| Holding Register | 0x03 | 0x10 | 5687 | Last calibration date 4        | Un-signed32    | Date  | R/W(C1) |                                              |   |
| Holding Register | 0x03 | 0x10 | 5689 | Last calibration date 5        | Un-signed32    | Date  | R/W(C1) |                                              |   |
| Holding Register | 0x03 | 0x10 | 5691 | Next calibration date          | Un-signed32    | Date  | R/W(C1) |                                              |   |
| Holding Register | 0x03 | 0x06 | 5694 | Display installation           | Un-signed8     | Enum  | R/W(C2) | 0:No display<br>1:With display               |   |
| Holding Register | 0x03 | 0x10 | 5696 | Last calibration information 1 | Un-signed8[32] | ASCII | R/W(C1) |                                              |   |
| Holding Register | 0x03 | 0x10 | 5713 | Last calibration information 2 | Un-signed8[32] | ASCII | R/W(C1) |                                              |   |
| Holding Register | 0x03 | 0x10 | 5730 | Last calibration information 3 | Un-signed8[32] | ASCII | R/W(C1) |                                              |   |
| Holding Register | 0x03 | 0x10 | 5747 | Last calibration information 4 | Un-signed8[32] | ASCII | R/W(C1) |                                              |   |
| Holding Register | 0x03 | 0x10 | 5764 | Last calibration information 5 | Un-signed8[32] | ASCII | R/W(C1) |                                              |   |
| Holding Register | 0x03 | 0x10 | 5781 | Set current date               | Un-signed32    | Date  | R/W(C1) |                                              |   |
| Holding Register | 0x03 | 0x10 | 5783 | Set current time               | Un-signed32    | Time  | R/W(C1) |                                              |   |
| Holding Register | 0x03 | 0x06 | 5797 | Signal gain                    | Un-signed8     | Enum  | R/W(C2) | 0:Gain 1<br>1:Gain 2<br>2:Gain 3<br>3:Gain 4 |   |
| Holding Register | 0x03 | 0x06 | 5810 | Auto proving setting           | Un-signed8     | Enum  | R/W(C1) | 0:Not execute<br>1:Execute<br>2:Restore      |   |
| Holding Register | 0x03 | 0x06 | 5811 | Key code                       | Un-signed16    | Value | R/W(C0) |                                              |   |
| Holding Register | 0x03 | 0x10 | 5814 | Alarm hysteresis               | Float          | Value | R/W(C1) |                                              | % |
| Holding Register | 0x03 | 0x10 | 5816 | Total density hysteresis       | Float          | Value | R/W(C2) |                                              | % |
| Holding Register | 0x03 | 0x10 | 5818 | Total temperature hysteresis   | Float          | Value | R/W(C2) |                                              | % |

|                  |      |      |      |                                     |             |       |         |                                                                                                                                                                                                                                                                                                                                    |      |
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| Holding Register | 0x03 | 0x06 | 5850 | TuHC enable                         | Un-signed8  | Enum  | R/W(C2) | 0:Not running<br>1:Start Tube Health Check<br>2:Take Reference<br>3:AGC Test<br>4:Copy current result to reference<br>5:Copy reference from shipment to test<br>6:Initialize result and flags<br>7:Initialize counter<br>8:Initialize coeff for FDG<br>9:Clear reference<br>10:Clear all history<br>11:Start one TuHC as interrupt |      |
| Holding Register | 0x03 | 0x06 | 5851 | TuHC continue interval              | Un-signed16 | Value | R/W(C2) |                                                                                                                                                                                                                                                                                                                                    | min  |
| Holding Register | 0x03 | 0x06 | 5852 | TuHC continue number                | Un-signed16 | Value | R/W(C2) |                                                                                                                                                                                                                                                                                                                                    |      |
| Holding Register | 0x03 | 0x10 | 5853 | TuHC stiffness change limit         | Float       | Value | R/W(C2) |                                                                                                                                                                                                                                                                                                                                    | %    |
| Holding Register | 0x03 | 0x06 | 5856 | TuHC retry number                   | Un-signed8  | Value | R/W(C2) |                                                                                                                                                                                                                                                                                                                                    |      |
| Holding Register | 0x03 | 0x06 | 5857 | TuHC retry interval                 | Un-signed8  | Value | R/W(C2) |                                                                                                                                                                                                                                                                                                                                    | min  |
| Holding Register | 0x03 | 0x06 | 5858 | TuHC setting retry                  | Un-signed8  | Enum  | R/W(C2) | 0:No retry<br>1:Retry when skip test<br>2:Retry when suspicious test<br>3:Retry by force                                                                                                                                                                                                                                           |      |
| Holding Register | 0x03 | 0x06 | 5859 | TuHC reference number copy from     | Un-signed8  | Enum  | R/W(C2) | 0:Test<br>1:Air<br>2:Water                                                                                                                                                                                                                                                                                                         |      |
| Holding Register | 0x03 | 0x06 | 5860 | TuHC magnet temperature selection   | Un-signed8  | Enum  | R/W(C2) | 0:Use temperature on sensor<br>1:Compensate with fixed temperature<br>2:Compensate with indicator temperature<br>3:Compensate with transmitter temperature                                                                                                                                                                         |      |
| Holding Register | 0x03 | 0x10 | 5862 | TuHC fixed temperature              | Float       | Value | R/W(C2) |                                                                                                                                                                                                                                                                                                                                    | degC |
| Holding Register | 0x03 | 0x10 | 5864 | TuHC temperature ratio for magnet 1 | Float       | Value | R/W(C2) |                                                                                                                                                                                                                                                                                                                                    |      |

|                  |      |      |      |                                     |            |       |         |                                                                                                           |  |
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| Holding Register | 0x03 | 0x10 | 5866 | TuHC temperature ratio for magnet 2 | Float      | Value | R/W(C2) |                                                                                                           |  |
| Holding Register | 0x03 | 0x06 | 5900 | Batch mode                          | Un-signed8 | Enum  | R/W(C1) | 0:No<br>1:Yes                                                                                             |  |
| Holding Register | 0x03 | 0x06 | 5901 | Batch select                        | Un-signed8 | Enum  | R/W(C1) | 0:Batch 1<br>1:Batch 2<br>2:Batch 3<br>3:Batch 4<br>4:Batch 5                                             |  |
| Holding Register | 0x03 | 0x06 | 5902 | Batch start/stop                    | Un-signed8 | Enum  | R/W(C1) | 0:Start<br>1:Stop<br>2:Hold<br>3:Resume                                                                   |  |
| Holding Register | 0x03 | 0x06 | 5903 | Batch reset                         | Un-signed8 | Enum  | R/W(C1) | 0:No<br>1:Reset                                                                                           |  |
| Holding Register | 0x03 | 0x06 | 5904 | Batch sStatus input                 | Un-signed8 | Enum  | R/W(C2) | 0:No function<br>1:Batch start/stop<br>2:Batch hold/re-sume<br>3:Batch reset                              |  |
| Holding Register | 0x03 | 0x06 | 5906 | Batch status output 1               | Un-signed8 | Enum  | R/W(C2) | 0:No function<br>1:Primary valve control<br>2:Secondary valve control<br>3:Batch running<br>4:Batch ended |  |
| Holding Register | 0x03 | 0x06 | 5907 | Batch status output 2               | Un-signed8 | Enum  | R/W(C2) | 0:No function<br>1:Primary valve control<br>2:Secondary valve control<br>3:Batch running<br>4:Batch ended |  |
| Holding Register | 0x03 | 0x06 | 5908 | Batch status output 3               | Un-signed8 | Enum  | R/W(C2) | 0:No function<br>1:Primary valve control<br>2:Secondary valve control<br>3:Batch running<br>4:Batch ended |  |
| Holding Register | 0x03 | 0x06 | 5909 | Batch up down select                | Un-signed8 | Enum  | R/W(C2) | 0:Batch upwards value<br>1:Batch downwards value                                                          |  |
| Holding Register | 0x03 | 0x06 | 5911 | Batch type select 1                 | Un-signed8 | Enum  | R/W(C2) | 0:1 stage batch<br>1:2 stage batch                                                                        |  |

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| Holding Register | 0x03 | 0x06 | 5912 | Batch variable select 1       | Un-signed8 | Enum  | R/W(C1) | 0:Mass flow<br>1:Volume flow<br>2:Corrected volume flow<br>3:Net mass flow 1<br>4:Net mass flow 2<br>5:Net volume flow 1<br>6:Net volume flow 2<br>7:Net corrected volume flow                                                |                |
| Holding Register | 0x03 | 0x06 | 5913 | Batch unit 1                  | Un-signed8 | Enum  | R/W(C1) | 0:g<br>1:kg<br>2:t<br>20:ton(US)<br>21:ton(UK)<br>3:lb<br>4:cm3<br>5:L<br>6:m3<br>7:gal<br>8:kgal<br>9:ft3<br>10:bbl<br>11:Impgal<br>12:kImpgal<br>13:NL<br>14:Nm3<br>15:SL<br>16:Sft3<br>17:MMSft3<br>18:Sm3<br>19:User unit |                |
| Holding Register | 0x03 | 0x10 | 5914 | Batch quantity 1              | Float      | Value | R/W(C1) |                                                                                                                                                                                                                               | [Batch unit 1] |
| Holding Register | 0x03 | 0x10 | 5917 | Batch primary valve open 1    | Float      | Value | R/W(C2) |                                                                                                                                                                                                                               | [Batch unit 1] |
| Holding Register | 0x03 | 0x10 | 5919 | Batch secondary valve open 1  | Float      | Value | R/W(C2) |                                                                                                                                                                                                                               | [Batch unit 1] |
| Holding Register | 0x03 | 0x10 | 5921 | Batch secondary valve close 1 | Float      | Value | R/W(C2) |                                                                                                                                                                                                                               | [Batch unit 1] |
| Holding Register | 0x03 | 0x10 | 5924 | Max batch time 1              | Float      | Value | R/W(C2) |                                                                                                                                                                                                                               | s              |

|                  |      |      |      |                                     |       |       |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
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| Holding Register | 0x03 | 0x10 | 5926 | Max batch flow 1                    | Float | Value | R/<br>W(C2) | <p>If Batch variable select 1 is 0:Mass flow is then [Mass flow unit].</p> <p>If Batch variable select 1 is 1:Volume flow is then [Volume flow unit].</p> <p>If Batch variable select 1 is 2:Corrected volume flow is then [Corrected volume flow unit].</p> <p>If Batch variable select 1 is 3:Net mass flow 1 is then [Net mass flow 1 unit].</p> <p>If Batch variable select 1 is 4:Net mass flow 2 is then [Net mass flow 2 unit].</p> <p>If Batch variable select 1 is 5:Net volume flow 1 is then [Net volume flow 1 unit].</p> <p>If Batch variable select 1 is 6:Net volume flow 2 is then [Net volume flow 2 unit].</p> <p>If Batch variable select 1 is 7:Net corrected volume flow is then [Net corrected volume flow unit].</p> |
| Holding Register | 0x03 | 0x10 | 5928 | Batch user unit conversion factor 1 | Float | Value | R/<br>W(C2) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |



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| Holding Register | 0x03 | 0x10 | 5931 | Batch end judge value 1    | Float     | Value | R/W(C1) |                                           | <p>If Batch variable select 1 is 0:Mass flow is then [Mass flow unit].</p> <p>If Batch variable select 1 is 1:Volume flow is then [Volume flow unit].</p> <p>If Batch variable select 1 is 2:Corrected volume flow is then [Corrected volume flow unit].</p> <p>If Batch variable select 1 is 3:Net mass flow 1 is then [Net mass flow 1 unit].</p> <p>If Batch variable select 1 is 4:Net mass flow 2 is then [Net mass flow 2 unit].</p> <p>If Batch variable select 1 is 5:Net volume flow 1 is then [Net volume flow 1 unit].</p> <p>If Batch variable select 1 is 6:Net volume flow 2 is then [Net volume flow 2 unit].</p> <p>If Batch variable select 1 is 7:Net corrected volume flow is then [Net corrected volume flow unit].</p> |
| Holding Register | 0x03 | 0x10 | 5933 | Fixed compensation value 1 | Float     | Value | R/W(C1) |                                           | [Batch unit 1]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Holding Register | 0x03 | 0x06 | 5935 | Compensation mode select 1 | Unsigned8 | Enum  | R/W(C2) | 0:Off<br>1:Mode 1<br>2:Mode 2<br>3:Mode 3 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Holding Register | 0x03 | 0x06 | 5937 | Auto compensation 1        | Unsigned8 | Enum  | R/W(C2) | 0:No<br>1:Yes                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Holding Register | 0x03 | 0x10 | 5938 | Leakage hysteresis time 1  | Float     | Value | R/W(C2) |                                           | s                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Holding Register | 0x03 | 0x10 | 5940 | Min batch quantity 1       | Float     | Value | R/W(C2) |                                           | [Batch unit 1]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Holding Register | 0x03 | 0x10 | 5943 | Max batch quantity 1       | Float     | Value | R/W(C1) |                                           | [Batch unit 1]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

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| Holding Register | 0x03 | 0x10 | 5945 | Progress indication 1         | Float        | Value | R/W(C2) |                                                                                                                                                                                                                               | [Batch unit 1] |
| Holding Register | 0x03 | 0x10 | 5947 | Max leakage time 1            | Float        | Value | R/W(C2) |                                                                                                                                                                                                                               | s              |
| Holding Register | 0x03 | 0x10 | 5950 | Batch user unit 1             | Unsigned8[8] | ASCII | R/W(C2) |                                                                                                                                                                                                                               |                |
| Holding Register | 0x03 | 0x06 | 5955 | Batch type select 1           | Unsigned8    | Enum  | R/W(C2) | 0:1 stage batch<br>1:2 batch stage                                                                                                                                                                                            |                |
| Holding Register | 0x03 | 0x06 | 5956 | Batch variable select 2       | Unsigned8    | Enum  | R/W(C1) | 0:Mass flow<br>1:Volume flow<br>2:Corrected volume flow<br>3:Net mass flow 1<br>4:Net mass flow 2<br>5:Net volume flow 1<br>6:Net volume flow 2<br>7:Net corrected volume flow                                                |                |
| Holding Register | 0x03 | 0x06 | 5957 | Batch unit 2                  | Unsigned8    | Enum  | R/W(C1) | 0:g<br>1:kg<br>2:t<br>20:ton(US)<br>21:ton(UK)<br>3:lb<br>4:cm3<br>5:L<br>6:m3<br>7:gal<br>8:kgal<br>9:ft3<br>10:bb1<br>11:Impgal<br>12:kImpgal<br>13:NL<br>14:Nm3<br>15:SL<br>16:Sft3<br>17:MMSft3<br>18:Sm3<br>19:User unit |                |
| Holding Register | 0x03 | 0x10 | 5958 | Batch quantity 2              | Float        | Value | R/W(C1) |                                                                                                                                                                                                                               | [Batch unit 2] |
| Holding Register | 0x03 | 0x10 | 5961 | Batch primary valve open 2    | Float        | Value | R/W(C2) |                                                                                                                                                                                                                               | [Batch unit 2] |
| Holding Register | 0x03 | 0x10 | 5963 | Batch secondary valve open 2  | Float        | Value | R/W(C2) |                                                                                                                                                                                                                               | [Batch unit 2] |
| Holding Register | 0x03 | 0x10 | 5965 | Batch secondary valve close 2 | Float        | Value | R/W(C2) |                                                                                                                                                                                                                               | [Batch unit 2] |
| Holding Register | 0x03 | 0x10 | 5968 | Max batch time 2              | Float        | Value | R/W(C2) |                                                                                                                                                                                                                               | s              |

|                  |      |      |      |                                     |       |       |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
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| Holding Register | 0x03 | 0x10 | 5970 | Max batch flow 2                    | Float | Value | R/W(C2) | <p>If Batch variable select 2 is 0:Mass flow is then [Mass flow unit].</p> <p>If Batch variable select 2 is 1:Volume flow is then [Volume flow unit].</p> <p>If Batch variable select 2 is 2:Corrected volume flow is then [Corrected volume flow unit].</p> <p>If Batch variable select 2 is 3:Net mass flow 1 is then [Net mass flow 1 unit].</p> <p>If Batch variable select 2 is 4:Net mass flow 2 is then [Net mass flow 2 unit].</p> <p>If Batch variable select 2 is 5:Net volume flow 1 is then [Net volume flow 1 unit].</p> <p>If Batch variable select 2 is 6:Net volume flow 2 is then [Net volume flow 2 unit].</p> <p>If Batch variable select 2 is 7:Net corrected volume flow is then [Net corrected volume flow unit].</p> |
| Holding Register | 0x03 | 0x10 | 5972 | Batch user unit conversion factor 2 | Float | Value | R/W(C2) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

|                  |      |      |      |                            |           |       |         |                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
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| Holding Register | 0x03 | 0x10 | 5975 | Batch end judge value 2    | Float     | Value | R/W(C1) |                                           | <p>If Batch variable select 2 is 0:Mass flow is then [Mass flow unit].</p> <p>If Batch variable select 2 is 1:Volume flow is then [Volume flow unit].</p> <p>If Batch variable select 2 is 2:Corrected volume flow is then [Corrected volume flow unit].</p> <p>If Batch variable select 2 is 3:Net mass flow 1 is then [Net mass flow 1 unit].</p> <p>If Batch variable select 2 is 4:Net mass flow 2 is then [Net mass flow 2 unit].</p> <p>If Batch variable select 2 is 5:Net volume flow 1 is then [Net volume flow 1 unit].</p> <p>If Batch variable select 2 is 6:Net volume flow 2 is then [Net volume flow 2 unit].</p> <p>If Batch variable select 2 is 7:Net corrected volume flow is then [Net corrected volume flow unit].</p> |
| Holding Register | 0x03 | 0x10 | 5977 | Fixed compensation value 2 | Float     | Value | R/W(C1) |                                           | [Batch unit 2]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Holding Register | 0x03 | 0x06 | 5979 | Compensation mode select 2 | Unsigned8 | Enum  | R/W(C2) | 0:Off<br>1:Mode 1<br>2:Mode 2<br>3:Mode 3 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Holding Register | 0x03 | 0x06 | 5981 | Auto compensation 2        | Unsigned8 | Enum  | R/W(C2) | 0:No<br>1:Yes                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Holding Register | 0x03 | 0x10 | 5982 | Leakage hysteresis time 2  | Float     | Value | R/W(C2) |                                           | s                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Holding Register | 0x03 | 0x10 | 5984 | Min batch quantity 2       | Float     | Value | R/W(C2) |                                           | [Batch unit 2]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Holding Register | 0x03 | 0x10 | 5987 | Max batch quantity 2       | Float     | Value | R/W(C1) |                                           | [Batch unit 2]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

|                  |      |      |      |                               |              |       |         |                                                                                                                                                                                                                               |                |
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| Holding Register | 0x03 | 0x10 | 5989 | Progress indication 2         | Float        | Value | R/W(C2) |                                                                                                                                                                                                                               | [Batch unit 2] |
| Holding Register | 0x03 | 0x10 | 5991 | Max leakage time 2            | Float        | Value | R/W(C2) |                                                                                                                                                                                                                               | s              |
| Holding Register | 0x03 | 0x10 | 5994 | Batch user unit 2             | Unsigned8[8] | ASCII | R/W(C2) |                                                                                                                                                                                                                               |                |
| Holding Register | 0x03 | 0x06 | 5999 | Batch type select 2           | Unsigned8    | Enum  | R/W(C2) | 0:1 stage batch<br>1:2 batch stage                                                                                                                                                                                            |                |
| Holding Register | 0x03 | 0x06 | 6000 | Batch variable select 2       | Unsigned8    | Enum  | R/W(C1) | 0:Mass flow<br>1:Volume flow<br>2:Corrected volume flow<br>3:Net mass flow 1<br>4:Net mass flow 2<br>5:Net volume flow 1<br>6:Net volume flow 2<br>7:Net corrected volume flow                                                |                |
| Holding Register | 0x03 | 0x06 | 6001 | Batch unit 3                  | Unsigned8    | Enum  | R/W(C1) | 0:g<br>1:kg<br>2:t<br>20:ton(US)<br>21:ton(UK)<br>3:lb<br>4:cm3<br>5:L<br>6:m3<br>7:gal<br>8:kgal<br>9:ft3<br>10:bbl<br>11:Impgal<br>12:kImpgal<br>13:NL<br>14:Nm3<br>15:SL<br>16:Sft3<br>17:MMSft3<br>18:Sm3<br>19:User unit |                |
| Holding Register | 0x03 | 0x10 | 6002 | Batch quantity 3              | Float        | Value | R/W(C1) |                                                                                                                                                                                                                               | [Batch unit 3] |
| Holding Register | 0x03 | 0x10 | 6005 | Batch primary valve open 3    | Float        | Value | R/W(C2) |                                                                                                                                                                                                                               | [Batch unit 3] |
| Holding Register | 0x03 | 0x10 | 6007 | Batch secondary valve open 3  | Float        | Value | R/W(C2) |                                                                                                                                                                                                                               | [Batch unit 3] |
| Holding Register | 0x03 | 0x10 | 6009 | Batch secondary valve close 3 | Float        | Value | R/W(C2) |                                                                                                                                                                                                                               | [Batch unit 3] |
| Holding Register | 0x03 | 0x10 | 6012 | Max batch time 3              | Float        | Value | R/W(C2) |                                                                                                                                                                                                                               | s              |

|                  |      |      |      |                                     |       |       |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
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| Holding Register | 0x03 | 0x10 | 6014 | Max batch flow 3                    | Float | Value | R/<br>W(C2) | <p>If Batch variable select 3 is 0:Mass flow is then [Mass flow unit].</p> <p>If Batch variable select 3 is 1:Volume flow is then [Volume flow unit].</p> <p>If Batch variable select 3 is 2:Corrected volume flow is then [Corrected volume flow unit].</p> <p>If Batch variable select 3 is 3:Net mass flow 1 is then [Net mass flow 1 unit].</p> <p>If Batch variable select 3 is 4:Net mass flow 2 is then [Net mass flow 2 unit].</p> <p>If Batch variable select 3 is 5:Net volume flow 1 is then [Net volume flow 1 unit].</p> <p>If Batch variable select 3 is 6:Net volume flow 2 is then [Net volume flow 2 unit].</p> <p>If Batch variable select 3 is 7:Net corrected volume flow is then [Net corrected volume flow unit].</p> |
| Holding Register | 0x03 | 0x10 | 6016 | Batch user unit conversion factor 3 | Float | Value | R/<br>W(C2) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

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| Holding Register | 0x03 | 0x10 | 6019 | Batch end judge value 3    | Float     | Value | R/W(C1) |                                           | <p>If Batch variable select 3 is 0:Mass flow is then [Mass flow unit].</p> <p>If Batch variable select 3 is 1:Volume flow is then [Volume flow unit].</p> <p>If Batch variable select 3 is 2:Corrected volume flow is then [Corrected volume flow unit].</p> <p>If Batch variable select 3 is 3:Net mass flow 1 is then [Net mass flow 1 unit].</p> <p>If Batch variable select 3 is 4:Net mass flow 2 is then [Net mass flow 2 unit].</p> <p>If Batch variable select 3 is 5:Net volume flow 1 is then [Net volume flow 1 unit].</p> <p>If Batch variable select 3 is 6:Net volume flow 2 is then [Net volume flow 2 unit].</p> <p>If Batch variable select 3 is 7:Net corrected volume flow is then [Net corrected volume flow unit].</p> |
| Holding Register | 0x03 | 0x10 | 6021 | Fixed compensation value 3 | Float     | Value | R/W(C1) |                                           | [Batch unit 3]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Holding Register | 0x03 | 0x06 | 6023 | Compensation mode select 3 | Unsigned8 | Enum  | R/W(C2) | 0:Off<br>1:Mode 1<br>2:Mode 2<br>3:Mode 3 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Holding Register | 0x03 | 0x06 | 6025 | Auto compensation 3        | Unsigned8 | Enum  | R/W(C2) | 0:No<br>1:Yes                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Holding Register | 0x03 | 0x10 | 6026 | Leakage hysteresis time 3  | Float     | Value | R/W(C2) |                                           | s                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Holding Register | 0x03 | 0x10 | 6028 | Min batch quantity 3       | Float     | Value | R/W(C2) |                                           | [Batch unit 3]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Holding Register | 0x03 | 0x10 | 6031 | Max batch quantity 3       | Float     | Value | R/W(C1) |                                           | [Batch unit 3]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

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| Holding Register | 0x03 | 0x10 | 6033 | Progress indication 3         | Float        | Value | R/W(C2) |                                                                                                                                                                                                                                | [Batch unit 3] |
| Holding Register | 0x03 | 0x10 | 6035 | Max leakage time 3            | Float        | Value | R/W(C2) |                                                                                                                                                                                                                                | s              |
| Holding Register | 0x03 | 0x10 | 6038 | Batch user unit 3             | Unsigned8[8] | ASCII | R/W(C2) |                                                                                                                                                                                                                                |                |
| Holding Register | 0x03 | 0x06 | 6043 | Batch type select 4           | Unsigned8    | Enum  | R/W(C2) | 0:1 stage batch<br>1:2 batch stage                                                                                                                                                                                             |                |
| Holding Register | 0x03 | 0x06 | 6044 | Batch variable select 4       | Unsigned8    | Enum  | R/W(C1) | 0:Mass flow<br>1:Volume flow<br>2:Corrected volume flow<br>3:Net mass flow 1<br>4:Net mass flow 2<br>5:Net volume flow 1<br>6:Net volume flow 2<br>7:Net corrected volume flow                                                 |                |
| Holding Register | 0x03 | 0x06 | 6045 | Batch unit 4                  | Unsigned8    | Enum  | R/W(C1) | 0:g<br>1:kg<br>2:t<br>20:ton(US)<br>21:ton(UK)<br>3:lb<br>4:cm3<br>5:L<br>6:m3<br>7:gal<br>8:kgal<br>9:ft3<br>10:bbbl<br>11:Impgal<br>12:kImpgal<br>13:NL<br>14:Nm3<br>15:SL<br>16:Sft3<br>17:MMSft3<br>18:Sm3<br>19:User unit |                |
| Holding Register | 0x03 | 0x10 | 6046 | Batch quantity 4              | Float        | Value | R/W(C1) |                                                                                                                                                                                                                                | [Batch unit 4] |
| Holding Register | 0x03 | 0x10 | 6049 | Batch primary valve open 4    | Float        | Value | R/W(C2) |                                                                                                                                                                                                                                | [Batch unit 4] |
| Holding Register | 0x03 | 0x10 | 6051 | Batch secondary valve open 4  | Float        | Value | R/W(C2) |                                                                                                                                                                                                                                | [Batch unit 4] |
| Holding Register | 0x03 | 0x10 | 6053 | Batch secondary valve close 4 | Float        | Value | R/W(C2) |                                                                                                                                                                                                                                | [Batch unit 4] |
| Holding Register | 0x03 | 0x10 | 6056 | Max batch time 4              | Float        | Value | R/W(C2) |                                                                                                                                                                                                                                | s              |



|                  |      |      |      |                                     |       |       |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
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| Holding Register | 0x03 | 0x10 | 6058 | Max batch flow 4                    | Float | Value | R/W(C2) | <p>If Batch variable select 4 is 0:Mass flow is then [Mass flow unit].</p> <p>If Batch variable select 4 is 1:Volume flow is then [Volume flow unit].</p> <p>If Batch variable select 4 is 2:Corrected volume flow is then [Corrected volume flow unit].</p> <p>If Batch variable select 4 is 3:Net mass flow 1 is then [Net mass flow 1 unit].</p> <p>If Batch variable select 4 is 4:Net mass flow 2 is then [Net mass flow 2 unit].</p> <p>If Batch variable select 4 is 5:Net volume flow 1 is then [Net volume flow 1 unit].</p> <p>If Batch variable select 4 is 6:Net volume flow 2 is then [Net volume flow 2 unit].</p> <p>If Batch variable select 4 is 7:Net corrected volume flow is then [Net corrected volume flow unit].</p> |
| Holding Register | 0x03 | 0x10 | 6061 | Batch user unit conversion factor 4 | Float | Value | R/W(C2) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

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| Holding Register | 0x03 | 0x10 | 6063 | Batch end judge value 4    | Float     | Value | R/W(C1) |                                           | <p>If Batch variable select 4 is 0:Mass flow is then [Mass flow unit].</p> <p>If Batch variable select 4 is 1:Volume flow is then [Volume flow unit].</p> <p>If Batch variable select 4 is 2:Corrected volume flow is then [Corrected volume flow unit].</p> <p>If Batch variable select 4 is 3:Net mass flow 1 is then [Net mass flow 1 unit].</p> <p>If Batch variable select 4 is 4:Net mass flow 2 is then [Net mass flow 2 unit].</p> <p>If Batch variable select 4 is 5:Net volume flow 1 is then [Net volume flow 1 unit].</p> <p>If Batch variable select 4 is 6:Net volume flow 2 is then [Net volume flow 2 unit].</p> <p>If Batch variable select 4 is 7:Net corrected volume flow is then [Net corrected volume flow unit].</p> |
| Holding Register | 0x03 | 0x10 | 6065 | Fixed compensation value 4 | Float     | Value | R/W(C1) |                                           | [Batch unit 4]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Holding Register | 0x03 | 0x06 | 6068 | Compensation mode select 4 | Unsigned8 | Enum  | R/W(C2) | 0:Off<br>1:Mode 1<br>2:Mode 2<br>3:Mode 3 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Holding Register | 0x03 | 0x06 | 6069 | Auto compensation 4        | Unsigned8 | Enum  | R/W(C2) | 0:No<br>1:Yes                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Holding Register | 0x03 | 0x10 | 6070 | Leakage hysteresis time 4  | Float     | Value | R/W(C2) |                                           | s                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Holding Register | 0x03 | 0x10 | 6072 | Min batch quantity 4       | Float     | Value | R/W(C2) |                                           | [Batch unit 4]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Holding Register | 0x03 | 0x10 | 6075 | Max batch quantity 4       | Float     | Value | R/W(C1) |                                           | [Batch unit 4]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

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| Holding Register | 0x03 | 0x10 | 6077 | Progress indication 4         | Float        | Value | R/W(C2) |                                                                                                                                                                                                                               | [Batch unit 4] |
| Holding Register | 0x03 | 0x10 | 6080 | Max leakage time 4            | Float        | Value | R/W(C2) |                                                                                                                                                                                                                               | s              |
| Holding Register | 0x03 | 0x10 | 6082 | Batch user unit 4             | Unsigned8[8] | ASCII | R/W(C2) |                                                                                                                                                                                                                               |                |
| Holding Register | 0x03 | 0x06 | 6087 | Batch type select 5           | Unsigned8    | Enum  | R/W(C2) | 0:1 stage batch<br>1:2 batch stage                                                                                                                                                                                            |                |
| Holding Register | 0x03 | 0x06 | 6088 | Batch variable select 5       | Unsigned8    | Enum  | R/W(C1) | 0:Mass flow<br>1:Volume flow<br>2:Corrected volume flow<br>3:Net mass flow 1<br>4:Net mass flow 2<br>5:Net volume flow 1<br>6:Net volume flow 2<br>7:Net corrected volume flow                                                |                |
| Holding Register | 0x03 | 0x06 | 6089 | Batch unit 5                  | Unsigned8    | Enum  | R/W(C1) | 0:g<br>1:kg<br>2:t<br>20:ton(US)<br>21:ton(UK)<br>3:lb<br>4:cm3<br>5:L<br>6:m3<br>7:gal<br>8:kgal<br>9:ft3<br>10:bbl<br>11:Impgal<br>12:kImpgal<br>13:NL<br>14:Nm3<br>15:SL<br>16:Sft3<br>17:MMSft3<br>18:Sm3<br>19:User unit |                |
| Holding Register | 0x03 | 0x10 | 6090 | Batch quantity 5              | Float        | Value | R/W(C1) |                                                                                                                                                                                                                               | [Batch unit 5] |
| Holding Register | 0x03 | 0x10 | 6093 | Batch primary valve open 5    | Float        | Value | R/W(C2) |                                                                                                                                                                                                                               | [Batch unit 5] |
| Holding Register | 0x03 | 0x10 | 6095 | Batch secondary valve open 5  | Float        | Value | R/W(C2) |                                                                                                                                                                                                                               | [Batch unit 5] |
| Holding Register | 0x03 | 0x10 | 6097 | Batch secondary valve close 5 | Float        | Value | R/W(C2) |                                                                                                                                                                                                                               | [Batch unit 5] |
| Holding Register | 0x03 | 0x10 | 6100 | Max batch time 5              | Float        | Value | R/W(C2) |                                                                                                                                                                                                                               | s              |

|                  |      |      |      |                                     |       |       |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
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| Holding Register | 0x03 | 0x10 | 6102 | Max batch flow 5                    | Float | Value | R/<br>W(C2) | <p>If Batch variable select 5 is 0:Mass flow is then [Mass flow unit].</p> <p>If Batch variable select 5 is 1:Volume flow is then [Volume flow unit].</p> <p>If Batch variable select 5 is 2:Corrected volume flow is then [Corrected volume flow unit].</p> <p>If Batch variable select 5 is 3:Net mass flow 1 is then [Net mass flow 1 unit].</p> <p>If Batch variable select 5 is 4:Net mass flow 2 is then [Net mass flow 2 unit].</p> <p>If Batch variable select 5 is 5:Net volume flow 1 is then [Net volume flow 1 unit].</p> <p>If Batch variable select 5 is 6:Net volume flow 2 is then [Net volume flow 2 unit].</p> <p>If Batch variable select 5 is 7:Net corrected volume flow is then [Net corrected volume flow unit].</p> |
| Holding Register | 0x03 | 0x10 | 6104 | Batch user unit conversion factor 5 | Float | Value | R/<br>W(C2) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

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| Holding Register | 0x03 | 0x10 | 6107 | Batch end judge value 5    | Float     | Value | R/W(C1) |                                           | <p>If Batch variable select 5 is 0:Mass flow is then [Mass flow unit].</p> <p>If Batch variable select 5 is 1:Volume flow is then [Volume flow unit].</p> <p>If Batch variable select 5 is 2:Corrected volume flow is then [Corrected volume flow unit].</p> <p>If Batch variable select 5 is 3:Net mass flow 1 is then [Net mass flow 1 unit].</p> <p>If Batch variable select 5 is 4:Net mass flow 2 is then [Net mass flow 2 unit].</p> <p>If Batch variable select 5 is 5:Net volume flow 1 is then [Net volume flow 1 unit].</p> <p>If Batch variable select 5 is 6:Net volume flow 2 is then [Net volume flow 2 unit].</p> <p>If Batch variable select 5 is 7:Net corrected volume flow is then [Net corrected volume flow unit].</p> |
| Holding Register | 0x03 | 0x10 | 6109 | Fixed compensation value 5 | Float     | Value | R/W(C1) |                                           | [Batch unit 5]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Holding Register | 0x03 | 0x06 | 6111 | Compensation mode select 5 | Unsigned8 | Enum  | R/W(C2) | 0:Off<br>1:Mode 1<br>2:Mode 2<br>3:Mode 3 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Holding Register | 0x03 | 0x06 | 6113 | Auto compensation 5        | Unsigned8 | Enum  | R/W(C2) | 0:No<br>1:Yes                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Holding Register | 0x03 | 0x10 | 6114 | Leakage hysteresis time 5  | Float     | Value | R/W(C2) |                                           | s                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Holding Register | 0x03 | 0x10 | 6116 | Min batch quantity 5       | Float     | Value | R/W(C2) |                                           | [Batch unit 5]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Holding Register | 0x03 | 0x10 | 6119 | Max batch quantity 5       | Float     | Value | R/W(C1) |                                           | [Batch unit 5]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

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| Holding Register | 0x03 | 0x10 | 6121 | Progress indication 5   | Float        | Value  | R/W(C2)  |                       | [Batch unit 5]   |
| Holding Register | 0x03 | 0x10 | 6123 | Max leakage time 5      | Float        | Value  | R/W(C2)  |                       | s                |
| Holding Register | 0x03 | 0x10 | 6126 | Batch user unit 5       | Unsigned8[8] | ASCII  | R/W(C2)  |                       |                  |
| Holding Register | 0x03 | 0x06 | 6131 | Calculation mode sel 1  | Unsigned8    | Enum   | R/W(C0)a | 0:All<br>1:Select     |                  |
| Holding Register | 0x03 | 0x06 | 6132 | Averaging data number 1 | Unsigned8    | Value  | R/W(C0)a |                       |                  |
| Holding Register | 0x03 | 0x06 | 6133 | Calculation mode sel 2  | Unsigned8    | Enum   | R/W(C0)a | 0:All<br>1:Select     |                  |
| Holding Register | 0x03 | 0x06 | 6134 | Averaging data number 2 | Unsigned8    | Value  | R/W(C0)a |                       |                  |
| Holding Register | 0x03 | 0x06 | 6135 | Calculation mode sel 3  | Unsigned8    | Enum   | R/W(C0)a | 0:All<br>1:Select     |                  |
| Holding Register | 0x03 | 0x06 | 6136 | Calculation mode sel 4  | Unsigned8    | Enum   | R/W(C0)a | 0:All<br>1:Select     |                  |
| Holding Register | 0x03 | 0x06 | 6137 | Averaging data number 3 | Unsigned8    | Value  | R/W(C0)a |                       |                  |
| Holding Register | 0x03 | 0x06 | 6138 | Averaging data number 4 | Unsigned8    | Value  | R/W(C0)a |                       |                  |
| Holding Register | 0x03 | 0x06 | 6139 | Calculation mode sel 5  | Unsigned8    | Enum   | R/W(C0)a | 0:All<br>1:Select     |                  |
| Holding Register | 0x03 | 0x06 | 6140 | Averaging data number 5 | Unsigned8    | Value  | R/W(C0)a |                       |                  |
| Holding Register | 0x03 | 0x06 | 6200 | Viscosity trim select   | Unsigned8    | Enum   | R/W(C2)  | 0:Inhibit<br>1:Enable |                  |
| Holding Register | 0x03 | 0x10 | 6201 | Viscosity trim offset   | Float        | Evalue | R/W(C2)  |                       | [Viscosity unit] |
| Holding Register | 0x03 | 0x10 | 6203 | Viscosity trim gain     | Float        | Value  | R/W(C2)  |                       |                  |
| Holding Register | 0x03 | 0x10 | 6206 | Viscosity damping       | Float        | Value  | R/W(C2)  |                       | s                |

|                  |      |      |      |                                                 |               |       |          |                                                                                                                                                                  |                                  |
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| Holding Register | 0x03 | 0x06 | 6208 | Viscosity unit                                  | Un-signed8    | Enum  | R/W(C2)  | 0:mPas<br>1:Pas<br>2:cP<br>3:Ns/m2<br>4:kg/ms<br>5:User unit (dynamic)<br>8:cSt<br>6:St<br>9:mm2/s<br>7:cm2/s<br>10:dm2/s<br>11:m2/s<br>12:User unit (kinematic) |                                  |
| Holding Register | 0x03 | 0x10 | 6209 | Viscosity URV                                   | Float         | Value | R/W(C2)  |                                                                                                                                                                  | [Viscosity unit]                 |
| Holding Register | 0x03 | 0x10 | 6212 | Viscosity low alarm                             | Float         | Value | R/W(C2)  |                                                                                                                                                                  | [Viscosity unit]                 |
| Holding Register | 0x03 | 0x10 | 6214 | Viscosity high alarm                            | Float         | Value | R/W(C2)  |                                                                                                                                                                  | [Viscosity unit]                 |
| Holding Register | 0x03 | 0x10 | 6216 | Viscosity low low alarm                         | Float         | Value | R/W(C2)  |                                                                                                                                                                  | [Viscosity unit]                 |
| Holding Register | 0x03 | 0x10 | 6219 | Viscosity high high alarm                       | Float         | Value | R/W(C2)  |                                                                                                                                                                  | [Viscosity unit]                 |
| Holding Register | 0x03 | 0x06 | 6221 | Viscosity unit dynamic                          | Un-signed8[8] | ASCII | R/W(C0)a |                                                                                                                                                                  |                                  |
| Holding Register | 0x03 | 0x06 | 6225 | Viscosity user unit kinematic                   | Un-signed8[8] | ASCII | R/W(C0)a |                                                                                                                                                                  |                                  |
| Holding Register | 0x03 | 0x10 | 6229 | Viscosity user unit dynamic conversion factor   | Float         | Value | R/W(C0)a |                                                                                                                                                                  | 1/mPas                           |
| Holding Register | 0x03 | 0x10 | 6231 | Viscosity user unit kinematic conversion factor | Float         | Value | R/W(C0)a |                                                                                                                                                                  | 1/cSt                            |
| Holding Register | 0x03 | 0x10 | 6233 | Viscosity fixed value                           | Float         | Value | R/W(C0)a |                                                                                                                                                                  | [Re compensation viscosity unit] |
| Holding Register | 0x03 | 0x06 | 6235 | Viscosity value select                          | Un-signed8    | Enum  | R/W(C0)a | 0:Fixed value<br>1:Calculated value (ASTM)<br>2:Measured value                                                                                                   |                                  |

|                                  |      |      |      |                                     |            |       |              |                                                                                                                                      |                  |
|----------------------------------|------|------|------|-------------------------------------|------------|-------|--------------|--------------------------------------------------------------------------------------------------------------------------------------|------------------|
| Holding Register                 | 0x03 | 0x06 | 6236 | Re compensation viscosity unit      | Unsigned8  | Enum  | R/W(C0)<br>a | 0:mPas<br>1:Pas<br>2:cP<br>3:Ns/m2<br>4:kg/ms<br>5:User unit (dynamic)<br>8:cSt<br>6:St<br>9:mm2/s<br>7:cm2/s<br>10:dm2/s<br>11:m2/s |                  |
| Holding Register                 | 0x03 | 0x10 | 6237 | Viscosity LRV                       | Float      | Value | R/W(C2)      |                                                                                                                                      | [Viscosity unit] |
| Holding Register                 | 0x03 | 0x06 | 6272 | Modbus data format(32bit-integer)   | Unsigned8  | Enum  | R/W(C1)      | 0:ABCD<br>1:CDAB<br>2:BADC<br>3:DCBA                                                                                                 |                  |
| Holding Register                 | 0x03 | 0x06 | 6273 | Modbus data format(8,16bit-integer) | Unsigned8  | Enum  | R/W(C1)      | 0:AB<br>1:BA                                                                                                                         |                  |
| Holding Register                 | 0x03 | 0x06 | 6288 | Modbus data format(Floating-point)  | Unsigned8  | Enum  | R/W(C1)      | 0:ABCD<br>1:CDAB<br>2:BADC<br>3:DCBA                                                                                                 |                  |
| Holding Register                 | 0x03 | 0x06 | 6304 | Modbus data format(String)          | Unsigned8  | Enum  | R/W(C1)      | 0:AB<br>1:BA                                                                                                                         |                  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 6912 | Flex input register select 01       | Unsigned16 | Value | R/W(C0)      |                                                                                                                                      |                  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 6920 | Flex input register select 11       | Unsigned16 | Value | R/W(C0)      |                                                                                                                                      |                  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 6928 | Flex input register select 02       | Unsigned16 | Value | R/W(C0)      |                                                                                                                                      |                  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 6936 | Flex input register select 12       | Unsigned16 | Value | R/W(C0)      |                                                                                                                                      |                  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 6944 | Flex input register select 03       | Unsigned16 | Value | R/W(C0)      |                                                                                                                                      |                  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 6952 | Flex input register select 13       | Unsigned16 | Value | R/W(C0)      |                                                                                                                                      |                  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 6960 | Flex input register select 04       | Unsigned16 | Value | R/W(C0)      |                                                                                                                                      |                  |



|                                  |      |      |      |                                 |             |       |         |  |  |
|----------------------------------|------|------|------|---------------------------------|-------------|-------|---------|--|--|
| Holding Register (Flexible area) | 0x03 | 0x06 | 6968 | Flex input register select 14   | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 6976 | Flex input register select 05   | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 6984 | Flex input register select 15   | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 6992 | Flex input register select 06   | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 7000 | Flex input register select 16   | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 7008 | Flex input register select 07   | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 7016 | Flex input register select 17   | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 7024 | Flex input register select 08   | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 7032 | Flex input register select 18   | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 7040 | Flex input register select 09   | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 7048 | Flex input register select 19   | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 7056 | Flex input register select 10   | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 7064 | Flex input register select 20   | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 7072 | Flex holding register select 01 | Un-signed16 | Value | R/W(C0) |  |  |

|                                  |      |      |      |                                 |             |       |         |  |  |
|----------------------------------|------|------|------|---------------------------------|-------------|-------|---------|--|--|
| Holding Register (Flexible area) | 0x03 | 0x06 | 7080 | Flex holding register select 11 | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 7088 | Flex holding register select 02 | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 7096 | Flex holding register select 12 | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 7104 | Flex holding register select 03 | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 7112 | Flex holding register select 13 | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 7120 | Flex holding register select 04 | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 7128 | Flex holding register select 14 | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 7136 | Flex holding register select 05 | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 7144 | Flex holding register select 15 | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 7152 | Flex holding register select 06 | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 7160 | Flex holding register select 16 | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 7168 | Flex holding register select 07 | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 7176 | Flex holding register select 17 | Un-signed16 | Value | R/W(C0) |  |  |
| Holding Register (Flexible area) | 0x03 | 0x06 | 7184 | Flex holding register select 08 | Un-signed16 | Value | R/W(C0) |  |  |

|                                  |      |      |      |                                 |                |       |         |                                                                                                                                                                                                                                         |                    |
|----------------------------------|------|------|------|---------------------------------|----------------|-------|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| Holding Register (Flexible area) | 0x03 | 0x06 | 7192 | Flex holding register select 18 | Un-signed16    | Value | R/W(C0) |                                                                                                                                                                                                                                         |                    |
| Holding Register (Flexible area) | 0x03 | 0x06 | 7200 | Flex holding register select 09 | Un-signed16    | Value | R/W(C0) |                                                                                                                                                                                                                                         |                    |
| Holding Register (Flexible area) | 0x03 | 0x06 | 7208 | Flex holding register select 19 | Un-signed16    | Value | R/W(C0) |                                                                                                                                                                                                                                         |                    |
| Holding Register (Flexible area) | 0x03 | 0x06 | 7216 | Flex holding register select 10 | Un-signed16    | Value | R/W(C0) |                                                                                                                                                                                                                                         |                    |
| Holding Register (Flexible area) | 0x03 | 0x06 | 7224 | Flex holding register select 20 | Un-signed16    | Value | R/W(C0) |                                                                                                                                                                                                                                         |                    |
| Holding Register                 | 0x03 | 0x10 | 8084 | Qmax                            | Float          | Value | R       |                                                                                                                                                                                                                                         | [Mass flow unit]   |
| Holding Register                 | 0x03 | 0x10 | 8086 | Qnom                            | Float          | Value | R       |                                                                                                                                                                                                                                         | [Mass flow unit]   |
| Holding Register                 | 0x03 | 0x10 | 8320 | Sensor spare serial number      | Un-signed8[16] | ASCII | R       |                                                                                                                                                                                                                                         |                    |
| Holding Register                 | 0x03 | 0x10 | 8329 | Temperature lower limit         | Float          | Value | R       |                                                                                                                                                                                                                                         | [Temperature unit] |
| Holding Register                 | 0x03 | 0x10 | 8331 | Temperature upper limit         | Float          | Value | R       |                                                                                                                                                                                                                                         | [Temperature unit] |
| Holding Register                 | 0x03 | 0x06 | 9200 | Transmitter type                | Un-signed8     | Enum  | R       | 0:Essential<br>1:Ultimate                                                                                                                                                                                                               |                    |
| Holding Register                 | 0x03 | 0x06 | 9202 | IO type                         | Un-signed8     | Enum  | R       | 0:None<br>1:JA<br>2:JB<br>3:JC<br>4:JD<br>5:JE<br>6:JF<br>7:JG<br>8:JH<br>9:JJ<br>10:JK<br>11:JL<br>12:JM<br>13:JN<br>14:JP<br>15:JQ<br>16:JR<br>17:JS<br>18:JT<br>19:JU<br>20:M0<br>21:M2<br>22:M3<br>23:M4<br>24:M5<br>25:M6<br>26:M7 |                    |

|                  |      |      |      |                                  |                |          |   |                                                                                                                                                                                                                                                                                                                                      |      |
|------------------|------|------|------|----------------------------------|----------------|----------|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| Holding Register | 0x03 | 0x06 | 9203 | Concentration measurement select | Un-signed8     | Enum     | R | 0:Inhibit<br>1:Standard<br>2:Advanced<br>3:Net oil computing API<br>4:Net oil computing API and GVF                                                                                                                                                                                                                                  |      |
| Holding Register | 0x03 | 0x06 | 9204 | Function option code             | Un-signed16    | Bit-Enum | R | bit0:Tube Health Check<br>bit1:Batch function<br>bit2:Tube leakage detection<br>bit3:Analog input calorific value<br>bit4:Viscosity<br>bit5:Reserved<br>bit6:Reserved<br>bit7:Reserved<br>bit8:Reserved<br>bit9:Reserved<br>bit10:Reserved<br>bit11:Reserved<br>bit12:Reserved<br>bit13:Reserved<br>bit14:Reserved<br>bit15:Reserved |      |
| Holding Register | 0x03 | 0x10 | 9206 | Complete device serial number    | Un-signed8[16] | ASCII    | R |                                                                                                                                                                                                                                                                                                                                      |      |
| Holding Register | 0x03 | 0x10 | 9215 | Transmitter spare serial number  | Un-signed8[16] | ASCII    | R |                                                                                                                                                                                                                                                                                                                                      |      |
| Holding Register | 0x03 | 0x10 | 9224 | Extra number 1                   | Un-signed8[16] | ASCII    | R |                                                                                                                                                                                                                                                                                                                                      |      |
| Holding Register | 0x03 | 0x10 | 9233 | Hardware revision                | Un-signed8[16] | ASCII    | R |                                                                                                                                                                                                                                                                                                                                      |      |
| Holding Register | 0x03 | 0x10 | 9242 | Max permissible temperature      | Float          | Value    | R |                                                                                                                                                                                                                                                                                                                                      | degC |
| Holding Register | 0x03 | 0x10 | 9244 | Max permissible pressure         | Float          | Value    | R |                                                                                                                                                                                                                                                                                                                                      | bar  |
| Holding Register | 0x03 | 0x10 | 9247 | Factory backup name              | Un-signed8[16] | ASCII    | R |                                                                                                                                                                                                                                                                                                                                      |      |
| Holding Register | 0x03 | 0x10 | 9256 | Factory backup date              | Un-signed32    | Date     | R |                                                                                                                                                                                                                                                                                                                                      |      |
| Holding Register | 0x03 | 0x06 | 9258 | SI option                        | Un-signed8     | Enum     | R | 0:Off<br>1:On                                                                                                                                                                                                                                                                                                                        |      |
| Holding Register | 0x03 | 0x10 | 9259 | Release date                     | Un-signed32    | Date     | R |                                                                                                                                                                                                                                                                                                                                      |      |
| Holding Register | 0x03 | 0x10 | 9262 | Extra number 2                   | Un-signed8[16] | ASCII    | R |                                                                                                                                                                                                                                                                                                                                      |      |
| Holding Register | 0x03 | 0x10 | 9271 | TuHC date at reference 1         | Un-signed32    | Date     | R |                                                                                                                                                                                                                                                                                                                                      |      |

|                  |      |      |      |                                    |             |       |   |  |      |
|------------------|------|------|------|------------------------------------|-------------|-------|---|--|------|
| Holding Register | 0x03 | 0x10 | 9273 | TuHC time at reference 1           | Un-signed32 | Time  | R |  |      |
| Holding Register | 0x03 | 0x10 | 9275 | TuHC operation time at reference 1 | Un-signed32 | Value | R |  | min  |
| Holding Register | 0x03 | 0x10 | 9278 | TuHC temperature at reference 1    | Float       | Value | R |  | degC |
| Holding Register | 0x03 | 0x10 | 9280 | TuHC mass flow at reference 1      | Float       | Value | R |  | kg/h |
| Holding Register | 0x03 | 0x10 | 9282 | TuHC density at reference 1        | Float       | Value | R |  | kg/L |

## 7.4 Modbus response codes

The following response codes are supported for the transmitter:

| Error code | Name                 | Detail                                     | Occurrence error details                                                                          |
|------------|----------------------|--------------------------------------------|---------------------------------------------------------------------------------------------------|
| 00         | SUCCESS              | Success                                    |                                                                                                   |
| 01         | ILLEGAL FUNCTION     | Function code does not exist               | Wrong function code access                                                                        |
| 02         | ILLEGAL ADDRESS      | Specified address is out of range          | Wrong address access<br>In write protect mode<br>Illegal access level                             |
| 03         | ILLEGAL DATA VALUE   | Specified data is out of quantity          | Value is out of range<br>Device condition doesn't match<br>(ex) Difference between Liquid and Gas |
| 04         | SLAVE DEVICE FAILURE | Failure during response process            | Main board CPU failure<br>Main board EEPROM failure                                               |
| 06         | SLAVE DEVICE BUSY    | Cannot respond because of under processing | In device busy                                                                                    |

## 7.5 Units of the parameters

The following tables show the available units sorted by parameters. The available units depend on the value chosen under Display unit selection. If the option PJ is specified, the display unit selection is fixed to Japan and cannot be changed.

### Mass flow unit

| Display of unit |           | Liquid gas select |     | Display unit selection |        |        |          |        |
|-----------------|-----------|-------------------|-----|------------------------|--------|--------|----------|--------|
| FieldMate       | Indicator | Liquid            | Gas | Metric                 | US     | UK     | Russia   | Japan  |
| g/s             | g/s       | ✓                 | ✓   | g/s                    | g/s    | g/s    | г/с      | g/s    |
| g/min           | g/min     | ✓                 | ✓   | g/min                  | g/min  | g/min  | г/мин    | g/min  |
| g/h             | g/h       | ✓                 | ✓   | g/h                    | g/h    | g/h    | г/ч      | g/h    |
| kg/s            | kg/s      | ✓                 | ✓   | kg/s                   | kg/s   | kg/s   | кг/с     | kg/s   |
| kg/min          | kg/min    | ✓                 | ✓   | kg/min                 | kg/min | kg/min | кг/мин   | kg/min |
| kg/h            | kg/h      | ✓                 | ✓   | kg/h                   | kg/h   | kg/h   | кг/ч     | kg/h   |
| kg/d            | kg/d      | ✓                 | ✓   | kg/d                   | kg/d   | kg/d   | кг/сут   |        |
| t/min           | t/min     | ✓                 | ✓   | t/min                  |        | t/min  | т/мин    | t/min  |
| t/h             | t/h       | ✓                 | ✓   | t/h                    |        | t/h    | т/ч      | t/h    |
| t/d             | t/d       | ✓                 | ✓   | t/d                    |        | t/d    | т/сут    |        |
| ton(US)/min     | t/min     | ✓                 | ✓   |                        | t/min  |        |          |        |
| ton(US)/h       | t/h       | ✓                 | ✓   |                        | t/h    |        |          |        |
| ton(US)/d       | t/d       | ✓                 | ✓   |                        | t/d    |        |          |        |
| ton(UK)/min     | t/min     | ✓                 | ✓   |                        |        | t/min  |          |        |
| ton(UK)/h       | t/h       | ✓                 | ✓   |                        |        | t/h    |          |        |
| ton(UK)/d       | t/d       | ✓                 | ✓   |                        |        | t/d    |          |        |
| lb/s            | lb/s      | ✓                 | ✓   |                        | lb/s   | lb/s   | фунт/с   |        |
| lb/min          | lb/min    | ✓                 | ✓   |                        | lb/min | lb/min | фунт/мин |        |
| lb/h            | lb/h      | ✓                 | ✓   |                        | lb/h   | lb/h   | фунт/ч   |        |
| lb/d            | lb/d      | ✓                 | ✓   |                        | lb/d   | lb/d   | фунт/сут |        |

### Net mass flow 1 – 2 unit

| Display of unit |           | Liquid gas select |     | Display unit selection |        |        |        |        |
|-----------------|-----------|-------------------|-----|------------------------|--------|--------|--------|--------|
| FieldMate       | Indicator | Liquid            | Gas | Metric                 | US     | UK     | Russia | Japan  |
| g/s             | g/s       | ✓                 | N/A | g/s                    | g/s    | g/s    | г/с    | g/s    |
| g/min           | g/min     | ✓                 | N/A | g/min                  | g/min  | g/min  | г/мин  | g/min  |
| g/h             | g/h       | ✓                 | N/A | g/h                    | g/h    | g/h    | г/ч    | g/h    |
| kg/s            | kg/s      | ✓                 | N/A | kg/s                   | kg/s   | kg/s   | кг/с   | kg/s   |
| kg/min          | kg/min    | ✓                 | N/A | kg/min                 | kg/min | kg/min | кг/мин | kg/min |
| kg/h            | kg/h      | ✓                 | N/A | kg/h                   | kg/h   | kg/h   | кг/ч   | kg/h   |
| kg/d            | kg/d      | ✓                 | N/A | kg/d                   | kg/d   | kg/d   | кг/сут |        |
| t/min           | t/min     | ✓                 | N/A | t/min                  |        | t/min  | т/мин  | t/min  |
| t/h             | t/h       | ✓                 | N/A | t/h                    |        | t/h    | т/ч    | t/h    |
| t/d             | t/d       | ✓                 | N/A | t/d                    |        | t/d    | т/сут  |        |
| ton(US)/min     | t/min     | ✓                 | ✓   |                        | t/min  |        |        |        |
| ton(US)/h       | t/h       | ✓                 | ✓   |                        | t/h    |        |        |        |
| ton(US)/d       | t/d       | ✓                 | ✓   |                        | t/d    |        |        |        |
| ton(UK)/min     | t/min     | ✓                 | ✓   |                        |        | t/min  |        |        |

| Display of unit |           | Liquid gas select |     | Display unit selection |        |        |          |       |
|-----------------|-----------|-------------------|-----|------------------------|--------|--------|----------|-------|
| FieldMate       | Indicator | Liquid            | Gas | Metric                 | US     | UK     | Russia   | Japan |
| ton(UK)/h       | t/h       | ✓                 | ✓   |                        |        | t/h    |          |       |
| ton(UK)/d       | t/d       | ✓                 | ✓   |                        |        | t/d    |          |       |
| lb/s            | lb/s      | ✓                 | N/A |                        | lb/s   | lb/s   | фунт/с   |       |
| lb/min          | lb/min    | ✓                 | N/A |                        | lb/min | lb/min | фунт/мин |       |
| lb/h            | lb/h      | ✓                 | N/A |                        | lb/h   | lb/h   | фунт/ч   |       |
| lb/d            | lb/d      | ✓                 | N/A |                        | lb/d   | lb/d   | фунт/сут |       |

**Density unit**

| Display of unit    |                    | Liquid gas select |     | Display unit selection |                    |                    |                       |                    |
|--------------------|--------------------|-------------------|-----|------------------------|--------------------|--------------------|-----------------------|--------------------|
| FieldMate          | Indicator          | Liquid            | Gas | Metric                 | US                 | UK                 | Russia                | Japan              |
| g/mL               | g/mL               | ✓                 | ✓   | g/mL                   | g/mL               | g/mL               | г/мл                  | g/mL               |
| kg/L               | kg/L               | ✓                 | ✓   | kg/L                   | kg/L               | kg/L               | кг/л                  | kg/L               |
| kg/cm <sup>3</sup> | kg/cm <sup>3</sup> | ✓                 | ✓   | kg/cm <sup>3</sup>     | kg/cm <sup>3</sup> | kg/cm <sup>3</sup> | кг/см <sup>3</sup>    | kg/cm <sup>3</sup> |
| kg/dm <sup>3</sup> | kg/dm <sup>3</sup> | ✓                 | ✓   | kg/dm <sup>3</sup>     | kg/dm <sup>3</sup> | kg/dm <sup>3</sup> | кг/дм <sup>3</sup>    | kg/dm <sup>3</sup> |
| kg/m <sup>3</sup>  | kg/m <sup>3</sup>  | ✓                 | ✓   | kg/m <sup>3</sup>      | kg/m <sup>3</sup>  | kg/m <sup>3</sup>  | кг/м <sup>3</sup>     | kg/m <sup>3</sup>  |
| lb/gal             | lb/gal             | ✓                 | ✓   |                        | lb/gal             | lb/gal             | фунт/гал              |                    |
| lb/ft <sup>3</sup> | lb/ft <sup>3</sup> | ✓                 | ✓   |                        | lb/Cuft            | lb/ft <sup>3</sup> | фунт/фут <sup>3</sup> |                    |
| g/cm <sup>3</sup>  | g/cm <sup>3</sup>  | ✓                 | ✓   | g/cm <sup>3</sup>      | g/cm <sup>3</sup>  | g/cm <sup>3</sup>  | г/см <sup>3</sup>     | g/cm <sup>3</sup>  |
| g/cc               | g/cc               | ✓                 | ✓   |                        | g/cc               |                    |                       |                    |
| g/L                | g/L                | ✓                 | ✓   | g/L                    | g/l                | g/l                | г/л                   | g/L                |

**Temperature unit**

| Display of unit |           | Liquid gas select |     | Display unit selection |    |    |        |       |
|-----------------|-----------|-------------------|-----|------------------------|----|----|--------|-------|
| FieldMate       | Indicator | Liquid            | Gas | Metric                 | US | UK | Russia | Japan |
| degC            | °C        | ✓                 | ✓   | °C                     | °C | °C | °C     | °C    |
| degF            | °F        | ✓                 | ✓   |                        | °F | °F | °F     |       |
| degR            | °R        | ✓                 | ✓   |                        | °R | °R | °R     |       |
| K               | K         | ✓                 | ✓   | K                      | K  | K  | K      | K     |

**Analog input pressure unit**

| Display of unit    |                    | Liquid gas select |     | Display unit selection |                    |                    |                    |       |
|--------------------|--------------------|-------------------|-----|------------------------|--------------------|--------------------|--------------------|-------|
| FieldMate          | Indicator          | Liquid            | Gas | Metric                 | US                 | UK                 | Russia             | Japan |
| inH2O @68degF      | inH2O              | ✓                 | ✓   |                        | inH2O              | inH2O              | дюйм вод.ст.       |       |
| inHg               | inHg               | ✓                 | ✓   |                        | inHg               | inHg               | дюйм рт.ст.        |       |
| ftH2O @68degF      | ftH2O              | ✓                 | ✓   |                        | ftH2O              | ftH2O              | фут вод.ст.        |       |
| mmH2O @68degF      | mmH2O              | ✓                 | ✓   |                        | mmH2O              | mmH2O              | мм вод.ст.         |       |
| mmHg               | mmHg               | ✓                 | ✓   | mmHg                   | mmHg               | mmHg               | мм рт.ст.          |       |
| psi                | psi                | ✓                 | ✓   |                        | psi                | psi                | psi                |       |
| bar                | bar                | ✓                 | ✓   | bar                    | bar                | bar                | бар                | bar   |
| mbar               | mbar               | ✓                 | ✓   | mbar                   | mbar               | mbar               | мбар               | mbar  |
| g/cm <sup>2</sup>  | g/cm <sup>2</sup>  | ✓                 | ✓   | g/cm <sup>2</sup>      | g/cm <sup>2</sup>  | g/cm <sup>2</sup>  | г/см <sup>2</sup>  |       |
| kg/cm <sup>2</sup> | kg/cm <sup>2</sup> | ✓                 | ✓   | kg/cm <sup>2</sup>     | kg/cm <sup>2</sup> | kg/cm <sup>2</sup> | кг/см <sup>2</sup> |       |
| Pa                 | Pa                 | ✓                 | ✓   | Pa                     | Pa                 | Pa                 | Па                 | Pa    |



| Display of unit    |                    | Liquid gas select |     | Display unit selection |                    |                    |              |       |
|--------------------|--------------------|-------------------|-----|------------------------|--------------------|--------------------|--------------|-------|
| FieldMate          | Indicator          | Liquid            | Gas | Metric                 | US                 | UK                 | Russia       | Japan |
| kPa                | kPa                | ✓                 | ✓   | kPa                    | kPa                | kPa                | кПа          | kPa   |
| torr               | torr               | ✓                 | ✓   |                        | torr               | torr               | торр         |       |
| atm                | atm                | ✓                 | ✓   |                        | atm                | atm                | атм          | atm   |
| MPa                | MPa                | ✓                 | ✓   | MPa                    | MPa                | MPa                | МПа          | MPa   |
| InH <sub>2</sub> O | inH <sub>2</sub> O | ✓                 | ✓   |                        | inH <sub>2</sub> O | inH <sub>2</sub> O | дюйм вод.ст. |       |
| mmH <sub>2</sub> O | mmH <sub>2</sub> O | ✓                 | ✓   |                        | mmH <sub>2</sub> O | mmH <sub>2</sub> O | мм вод.ст.   |       |
| ftH <sub>2</sub> O | ftH <sub>2</sub> O | ✓                 | ✓   |                        | ftH <sub>2</sub> O | ftH <sub>2</sub> O | фут вод.ст.  |       |
| hPa                | hPa                | ✓                 | ✓   | hPa                    | hPa                | hPa                | ГПа          | hPa   |

## Volume flow unit

| Display of unit      |                      | Liquid gas select |     | Display unit selection |                     |                      |                       |                      |
|----------------------|----------------------|-------------------|-----|------------------------|---------------------|----------------------|-----------------------|----------------------|
| FieldMate            | Indicator            | Liquid            | Gas | Metric                 | US                  | UK                   | Russia                | Japan                |
| cm <sup>3</sup> /s   | cm <sup>3</sup> /s   | ✓                 | ✓   | cm <sup>3</sup> /s     | cc/s                | cm <sup>3</sup> /s   | см <sup>3</sup> /с    | cm <sup>3</sup> /s   |
| cm <sup>3</sup> /min | cm <sup>3</sup> /min | ✓                 | ✓   | cm <sup>3</sup> /min   | cc/min              | cm <sup>3</sup> /min | см <sup>3</sup> /мин  | cm <sup>3</sup> /min |
| cm <sup>3</sup> /h   | cm <sup>3</sup> /h   | ✓                 | ✓   | cm <sup>3</sup> /h     | cc/h                | cm <sup>3</sup> /h   | см <sup>3</sup> /ч    | cm <sup>3</sup> /h   |
| L/s                  | L/s                  | ✓                 | ✓   | L/s                    | l/s                 | l/s                  | л/с                   | L/s                  |
| L/min                | L/min                | ✓                 | ✓   | L/min                  | l/min               | l/min                | л/мин                 | L/min                |
| L/h                  | L/h                  | ✓                 | ✓   | L/h                    | l/h                 | l/h                  | л/ч                   | L/h                  |
| L/d                  | L/d                  | ✓                 | ✓   | L/d                    | l/d                 | l/d                  | л/сут                 |                      |
| m <sup>3</sup> /s    | m <sup>3</sup> /s    | ✓                 | ✓   | m <sup>3</sup> /s      | m <sup>3</sup> /s   | m <sup>3</sup> /s    | м <sup>3</sup> /с     | m <sup>3</sup> /s    |
| m <sup>3</sup> /min  | m <sup>3</sup> /min  | ✓                 | ✓   | m <sup>3</sup> /min    | m <sup>3</sup> /min | m <sup>3</sup> /min  | м <sup>3</sup> /мин   | m <sup>3</sup> /min  |
| m <sup>3</sup> /h    | m <sup>3</sup> /h    | ✓                 | ✓   | m <sup>3</sup> /h      | m <sup>3</sup> /h   | m <sup>3</sup> /h    | м <sup>3</sup> /ч     | m <sup>3</sup> /h    |
| m <sup>3</sup> /d    | m <sup>3</sup> /d    | ✓                 | ✓   | m <sup>3</sup> /d      | m <sup>3</sup> /d   | m <sup>3</sup> /d    | м <sup>3</sup> /сут   |                      |
| gal/s                | gal/s                | ✓                 | ✓   |                        | gal/s               | gal/s                | гал/с                 |                      |
| gal/min              | gal/min              | ✓                 | ✓   |                        | gal/min             | gal/min              | гал/мин               |                      |
| gal/h                | gal/h                | ✓                 | ✓   |                        | gal/h               | gal/h                | гал/ч                 |                      |
| gal/d                | gal/d                | ✓                 | ✓   |                        | gal/d               | gal/d                | гал/сут               |                      |
| ft <sup>3</sup> /s   | ft <sup>3</sup> /s   | ✓                 | ✓   |                        | Cuft/s              | ft <sup>3</sup> /s   | фут <sup>3</sup> /с   |                      |
| ft <sup>3</sup> /min | ft <sup>3</sup> /min | ✓                 | ✓   |                        | Cuft/min            | ft <sup>3</sup> /min | фут <sup>3</sup> /мин |                      |
| ft <sup>3</sup> /h   | ft <sup>3</sup> /h   | ✓                 | ✓   |                        | Cuft/h              | ft <sup>3</sup> /h   | фут <sup>3</sup> /ч   |                      |
| ft <sup>3</sup> /d   | ft <sup>3</sup> /d   | ✓                 | ✓   |                        | Cuft/d              | ft <sup>3</sup> /d   | фут <sup>3</sup> /сут |                      |
| bbl/s                | bbl/s                | ✓                 | ✓   |                        | bbl/s               |                      | bbl/с                 |                      |
| bbl/min              | bbl/min              | ✓                 | ✓   |                        | bbl/min             |                      | bbl/мин               |                      |
| bbl/h                | bbl/h                | ✓                 | ✓   |                        | bbl/h               |                      | bbl/ч                 |                      |
| bbl/d                | bbl/d                | ✓                 | ✓   |                        | bbl/d               |                      | bbl/сут               |                      |
| Impgal/s             | Impgal/s             | ✓                 | ✓   |                        | Impgal/s            | Impgal/s             | Impgal/с              |                      |
| Impgal/min           | Impgal/min           | ✓                 | ✓   |                        | Impgal/mi           | Impgal/mi            | Impgal/ми             |                      |
| Impgal/h             | Impgal/h             | ✓                 | ✓   |                        | Impgal/h            | Impgal/h             | Impgal/ч              |                      |
| Impgal/d             | Impgal/d             | ✓                 | ✓   |                        | Impgal/d            | Impgal/d             | Impgal/сут            |                      |

Net volume flow  
1 – 2 unit

| Display of unit    |                    | Liquid gas select |     | Display unit selection |      |                    |                    |                    |
|--------------------|--------------------|-------------------|-----|------------------------|------|--------------------|--------------------|--------------------|
| FieldMate          | Indicator          | Liquid            | Gas | Metric                 | US   | UK                 | Russia             | Japan              |
| cm <sup>3</sup> /s | cm <sup>3</sup> /s | ✓                 | N/A | cm <sup>3</sup> /s     | cc/s | cm <sup>3</sup> /s | см <sup>3</sup> /с | cm <sup>3</sup> /s |

| Display of unit      |                      | Liquid gas select |     | Display unit selection |                     |                      |                       |                      |
|----------------------|----------------------|-------------------|-----|------------------------|---------------------|----------------------|-----------------------|----------------------|
| FieldMate            | Indicator            | Liquid            | Gas | Metric                 | US                  | UK                   | Russia                | Japan                |
| cm <sup>3</sup> /min | cm <sup>3</sup> /min | ✓                 | N/A | cm <sup>3</sup> /min   | cc/min              | cm <sup>3</sup> /min | см <sup>3</sup> /мин  | cm <sup>3</sup> /min |
| cm <sup>3</sup> /h   | cm <sup>3</sup> /h   | ✓                 | N/A | cm <sup>3</sup> /h     | cc/h                | cm <sup>3</sup> /h   | см <sup>3</sup> /ч    | cm <sup>3</sup> /h   |
| L/s                  | L/s                  | ✓                 | N/A | L/s                    | l/s                 | l/s                  | л/с                   | L/s                  |
| L/min                | L/min                | ✓                 | N/A | L/min                  | l/min               | l/min                | л/мин                 | L/min                |
| L/h                  | L/h                  | ✓                 | N/A | L/h                    | l/h                 | l/h                  | л/ч                   | L/h                  |
| L/d                  | L/d                  | ✓                 | N/A | L/d                    | l/d                 | l/d                  | л/сут                 |                      |
| m <sup>3</sup> /s    | m <sup>3</sup> /s    | ✓                 | N/A | m <sup>3</sup> /s      | m <sup>3</sup> /s   | m <sup>3</sup> /s    | м <sup>3</sup> /с     | m <sup>3</sup> /s    |
| m <sup>3</sup> /min  | m <sup>3</sup> /min  | ✓                 | N/A | m <sup>3</sup> /min    | m <sup>3</sup> /min | m <sup>3</sup> /min  | м <sup>3</sup> /мин   | m <sup>3</sup> /min  |
| m <sup>3</sup> /h    | m <sup>3</sup> /h    | ✓                 | N/A | m <sup>3</sup> /h      | m <sup>3</sup> /h   | m <sup>3</sup> /h    | м <sup>3</sup> /ч     | m <sup>3</sup> /h    |
| m <sup>3</sup> /d    | m <sup>3</sup> /d    | ✓                 | N/A | m <sup>3</sup> /d      | m <sup>3</sup> /d   | m <sup>3</sup> /d    | м <sup>3</sup> /сут   |                      |
| gal/s                | gal/s                | ✓                 | N/A |                        | gal/s               | gal/s                | гал/с                 |                      |
| gal/min              | gal/min              | ✓                 | N/A |                        | gal/min             | gal/min              | гал/мин               |                      |
| gal/h                | gal/h                | ✓                 | N/A |                        | gal/h               | gal/h                | гал/ч                 |                      |
| gal/d                | gal/d                | ✓                 | N/A |                        | gal/d               | gal/d                | гал/сут               |                      |
| ft <sup>3</sup> /s   | ft <sup>3</sup> /s   | ✓                 | N/A |                        | Cuft/s              | ft <sup>3</sup> /s   | фут <sup>3</sup> /с   |                      |
| ft <sup>3</sup> /min | ft <sup>3</sup> /min | ✓                 | N/A |                        | Cuft/min            | ft <sup>3</sup> /min | фут <sup>3</sup> /мин |                      |
| ft <sup>3</sup> /h   | ft <sup>3</sup> /h   | ✓                 | N/A |                        | Cuft/h              | ft <sup>3</sup> /h   | фут <sup>3</sup> /ч   |                      |
| ft <sup>3</sup> /d   | ft <sup>3</sup> /d   | ✓                 | N/A |                        | Cuft/d              | ft <sup>3</sup> /d   | фут <sup>3</sup> /сут |                      |
| bbl/s                | bbl/s                | ✓                 | N/A |                        | bbl/s               |                      | bbl/с                 |                      |
| bbl/min              | bbl/min              | ✓                 | N/A |                        | bbl/min             |                      | bbl/мин               |                      |
| bbl/h                | bbl/h                | ✓                 | N/A |                        | bbl/h               |                      | bbl/ч                 |                      |
| bbl/d                | bbl/d                | ✓                 | N/A |                        | bbl/d               |                      | bbl/сут               |                      |
| Impgal/s             | Impgal/s             | ✓                 | N/A |                        | Impgal/s            | Impgal/s             | Impgal/с              |                      |
| Impgal/min           | Impgal/min           | ✓                 | N/A |                        | Impgal/mi           | Impgal/mi            | Impgal/ми             |                      |
| Impgal/h             | Impgal/h             | ✓                 | N/A |                        | Impgal/h            | Impgal/h             | Impgal/ч              |                      |
| Impgal/d             | Impgal/d             | ✓                 | N/A |                        | Impgal/d            | Impgal/d             | Impgal/сут            |                      |

### Relative density indication / equation select

| Display of unit |           | Liquid gas select |     | Display unit selection |         |         |         |         |
|-----------------|-----------|-------------------|-----|------------------------|---------|---------|---------|---------|
| FieldMate       | Indicator | Liquid            | Gas | Metric                 | US      | UK      | Russia  | Japan   |
| SG 4degC        | (no unit) | ✓                 | N/A | SG 4°C                 | SG 4°C  | SG 4°C  | SG 4°C  | SG 4°C  |
| SG 15degC       | (no unit) | ✓                 | N/A | SG 15°C                | SG 15°C | SG 15°C | SG 15°C | SG 15°C |
| SG 20degC       | (no unit) | ✓                 | N/A | SG 20°C                | SG 20°C | SG 20°C | SG 20°C | SG 20°C |
| SG 60degF       | (no unit) | ✓                 | N/A |                        | SG 60°F | SG 60°F | SG 60°F |         |
| degAPI          | °API      | ✓                 | N/A | °API                   | °API    | °API    | °API    | °API    |
| degBaum hv      | °Bé hv    | ✓                 | N/A | °Bé hv                 | °Bé hv  | °Bé hv  | °Bé >   | °Bé hv  |
| degBaum lt      | °Bé lt    | ✓                 | N/A | °Bé lt                 | °Bé lt  | °Bé lt  | °Bé <   | °Bé lt  |
| Bh              | Bh        | ✓                 | N/A | Bh                     | Bh      | Bh      | Bh      | Bh      |
| Bl              | Bl        | ✓                 | N/A | Bl                     | Bl      | Bl      | Bl      | Bl      |
| °Sake           | °Sake     | ✓                 | N/A |                        |         |         |         | 日本酒度    |

**Corrected volume flow unit**

| Display of unit                |                       | Liquid gas select |     | Display unit selection |                      |                       |                          |                        |
|--------------------------------|-----------------------|-------------------|-----|------------------------|----------------------|-----------------------|--------------------------|------------------------|
| FieldMate                      | Indicator             | Liquid            | Gas | Metric                 | US                   | UK                    | Russia                   | Japan                  |
| L/s(normal)                    | NL/s                  | N/A               | ✓   | NL/s                   | NI/s                 | NI/s                  | Н.л/с                    | L/s(N)                 |
| L/min(normal)                  | NL/min                | N/A               | ✓   | NL/min                 | NI/min               | NI/min                | Н.л/мин                  | L/min(N)               |
| L/h(normal)                    | NL/h                  | N/A               | ✓   | NL/h                   | NI/h                 | NI/h                  | Н.л/ч                    | L/h(N)                 |
| L/d(normal)                    | NL/d                  | N/A               | ✓   | NL/d                   | NI/d                 | NI/d                  | Н.л/сут                  |                        |
| m <sup>3</sup> /s(normal)      | Nm <sup>3</sup> /s    | N/A               | ✓   | Nm <sup>3</sup> /s     | Nm <sup>3</sup> /s   | Nm <sup>3</sup> /s    | Н.м <sup>3</sup> /с      | m <sup>3</sup> /s(N)   |
| m <sup>3</sup> /min(normal)    | Nm <sup>3</sup> /min  | N/A               | ✓   | Nm <sup>3</sup> /min   | Nm <sup>3</sup> /min | Nm <sup>3</sup> /min  | Н.м <sup>3</sup> /мин    | m <sup>3</sup> /min(N) |
| m <sup>3</sup> /h(normal)      | Nm <sup>3</sup> /h    | N/A               | ✓   | Nm <sup>3</sup> /h     | Nm <sup>3</sup> /h   | Nm <sup>3</sup> /h    | Н.м <sup>3</sup> /ч      | m <sup>3</sup> /h(N)   |
| m <sup>3</sup> /d(normal)      | Nm <sup>3</sup> /d    | N/A               | ✓   | Nm <sup>3</sup> /d     | Nm <sup>3</sup> /d   | Nm <sup>3</sup> /d    | Н.м <sup>3</sup> /сут    |                        |
| L/s(standard)                  | SL/s                  | ✓                 | ✓   | SL/s                   | SI/s                 | SI/s                  | Ст.л/с                   | L/s(S)                 |
| L/min(standard)                | SL/min                | ✓                 | ✓   | SL/min                 | SI/min               | SI/min                | Ст.л/мин                 | L/min(S)               |
| L/h(standard)                  | SL/h                  | ✓                 | ✓   | SL/h                   | SI/h                 | SI/h                  | Ст.л/ч                   | L/h(S)                 |
| L/d(standard)                  | SL/d                  | ✓                 | ✓   | SL/d                   | SI/d                 | SI/d                  | Ст.л/сут                 |                        |
| ft <sup>3</sup> /s(standard)   | Sft <sup>3</sup> /s   | ✓                 | ✓   |                        | SCFS                 | Sft <sup>3</sup> /s   | Ст.фут <sup>3</sup> /с   |                        |
| ft <sup>3</sup> /min(standard) | Sft <sup>3</sup> /min | ✓                 | ✓   |                        | SCFM                 | Sft <sup>3</sup> /min | Ст.фут <sup>3</sup> /мин |                        |
| ft <sup>3</sup> /h(standard)   | Sft <sup>3</sup> /h   | ✓                 | ✓   |                        | SCFH                 | Sft <sup>3</sup> /h   | Ст.фут <sup>3</sup> /ч   |                        |
| ft <sup>3</sup> /d(standard)   | Sft <sup>3</sup> /d   | ✓                 | ✓   |                        | SCFD                 | Sft <sup>3</sup> /d   | Ст.фут <sup>3</sup> /сут |                        |
| m <sup>3</sup> /s(standard)    | Sm <sup>3</sup> /s    | ✓                 | ✓   | Sm <sup>3</sup> /s     | Sm <sup>3</sup> /s   | Sm <sup>3</sup> /s    | Ст.м <sup>3</sup> /с     | m <sup>3</sup> /s(S)   |
| m <sup>3</sup> /min(standard)  | Sm <sup>3</sup> /min  | ✓                 | ✓   | Sm <sup>3</sup> /min   | Sm <sup>3</sup> /min | Sm <sup>3</sup> /min  | Ст.м <sup>3</sup> /мин   | m <sup>3</sup> /min(S) |
| m <sup>3</sup> /h(standard)    | Sm <sup>3</sup> /h    | ✓                 | ✓   | Sm <sup>3</sup> /h     | Sm <sup>3</sup> /h   | Sm <sup>3</sup> /h    | Ст.м <sup>3</sup> /ч     | m <sup>3</sup> /h(S)   |
| m <sup>3</sup> /d(standard)    | Sm <sup>3</sup> /d    | ✓                 | ✓   | Sm <sup>3</sup> /d     | Sm <sup>3</sup> /d   | Sm <sup>3</sup> /d    | Ст.м <sup>3</sup> /сут   |                        |
| MMSft <sup>3</sup> /h          | MMSft <sup>3</sup> /h | ✓                 | ✓   |                        | mmscft               | MMSft <sup>3</sup> /h |                          |                        |
| MMSft <sup>3</sup> /d          | MMSft <sup>3</sup> /d | ✓                 | ✓   |                        | mmscfd               | MMSft <sup>3</sup> /h |                          |                        |

**Net corrected volume flow unit**

| Display of unit |           | Liquid gas select |     | Display unit selection |      |      |        |        |
|-----------------|-----------|-------------------|-----|------------------------|------|------|--------|--------|
| FieldMate       | Indicator | Liquid            | Gas | Metric                 | US   | UK   | Russia | Japan  |
| L/s(standard)   | SL/s      | ✓                 | N/A | SL/s                   | SI/s | SI/s | Ст.л/с | L/s(S) |

| Display of unit                |                       | Liquid gas select |     | Display unit selection |                      |                       |                          |                        |
|--------------------------------|-----------------------|-------------------|-----|------------------------|----------------------|-----------------------|--------------------------|------------------------|
| FieldMate                      | Indicator             | Liquid            | Gas | Metric                 | US                   | UK                    | Russia                   | Japan                  |
| L/min(standard)                | SL/min                | ✓                 | N/A | SL/min                 | SI/min               | SI/min                | Ст.л/мин                 | L/min(S)               |
| L/h(standard)                  | SL/h                  | ✓                 | N/A | SL/h                   | SIL/h                | SIL/h                 | Ст.л/ч                   | L/h(S)                 |
| L/d(standard)                  | SL/d                  | ✓                 | N/A | SL/d                   | SI/d                 | SI/d                  | Ст.л/сут                 |                        |
| ft <sup>3</sup> /s(standard)   | Sft <sup>3</sup> /s   | ✓                 | N/A |                        | SCFS                 | Sft <sup>3</sup> /s   | Ст.фут <sup>3</sup> /с   |                        |
| ft <sup>3</sup> /min(standard) | Sft <sup>3</sup> /min | ✓                 | N/A |                        | SCFM                 | Sft <sup>3</sup> /min | Ст.фут <sup>3</sup> /мин |                        |
| ft <sup>3</sup> /h(standard)   | Sft <sup>3</sup> /h   | ✓                 | N/A |                        | SCFH                 | Sft <sup>3</sup> /h   | Ст.фут <sup>3</sup> /ч   |                        |
| ft <sup>3</sup> /d(standard)   | Sft <sup>3</sup> /d   | ✓                 | N/A |                        | SCFD                 | Sft <sup>3</sup> /d   | Ст.фут <sup>3</sup> /сут |                        |
| m <sup>3</sup> /s(standard)    | Sm <sup>3</sup> /s    | ✓                 | N/A | Sm <sup>3</sup> /s     | Sm <sup>3</sup> /s   | Sm <sup>3</sup> /s    | Ст.м <sup>3</sup> /с     | m <sup>3</sup> /s(S)   |
| m <sup>3</sup> /min(standard)  | Sm <sup>3</sup> /min  | ✓                 | N/A | Sm <sup>3</sup> /min   | Sm <sup>3</sup> /min | Sm <sup>3</sup> /min  | Ст.м <sup>3</sup> /мин   | m <sup>3</sup> /min(S) |
| m <sup>3</sup> /h(standard)    | Sm <sup>3</sup> /h    | ✓                 | N/A | Sm <sup>3</sup> /h     | Sm <sup>3</sup> /h   | Sm <sup>3</sup> /h    | Ст.м <sup>3</sup> /ч     | m <sup>3</sup> /h(S)   |
| m <sup>3</sup> /d(standard)    | Sm <sup>3</sup> /d    | ✓                 | N/A | Sm <sup>3</sup> /d     | Sm <sup>3</sup> /d   | Sm <sup>3</sup> /d    | Ст.м <sup>3</sup> /сут   |                        |
| MMSft <sup>3</sup> /h          | MMSft <sup>3</sup> /h | ✓                 | ✓   |                        | mmscfh               | MMSft <sup>3</sup> /h |                          |                        |
| MMSft <sup>3</sup> /d          | MMSft <sup>3</sup> /d | ✓                 | ✓   |                        | mmscfd               | MMSft <sup>3</sup> /h |                          |                        |

### Concentration measurement unit set 1 – 4

| Display of unit |           | Liquid gas select |     | Display unit selection |          |          |              |         |
|-----------------|-----------|-------------------|-----|------------------------|----------|----------|--------------|---------|
| FieldMate       | Indicator | Liquid            | Gas | Metric                 | US       | UK       | Russia       | Japan   |
| degBrix         | °Brix     | ✓                 | N/A | °Brix                  | °Brix    | °Brix    | °Brix        | %[Brix] |
| % sol-wt        | Wt% sol   | ✓                 | N/A |                        | Wt% sol  | Wt% sol  | Масса-% раст |         |
| % sol-vol       | Vol% sol  | ✓                 | N/A |                        | Vol% sol | Vol% sol | Объем-% раст |         |
| %               | Wt%       | ✓                 | N/A | Wt%                    | Wt%      | Wt%      | Масса-%      | %       |
| Vol%            | Vol%      | ✓                 | N/A | Vol%                   | Vol%     | Vol%     | Объем-%      | Vol%    |

### Calorific unit

| Display of unit |                      | Liquid gas select |     | Display unit selection |                      |                      |                         |                       |
|-----------------|----------------------|-------------------|-----|------------------------|----------------------|----------------------|-------------------------|-----------------------|
| FieldMate       | Indicator            | Liquid            | Gas | Metric                 | US                   | UK                   | Russia                  | Japan                 |
| MJ/kg           | MJ/kg                | ✓                 | ✓   | MJ/kg                  | MJ/kg                | MJ/kg                | МДж/кг                  | MJ/kg                 |
| Btu/lb          | Btu/lb               | ✓                 | ✓   |                        | Btu/lb               | Btu/lb               | БТЕ/фунт                |                       |
| MJ/Cum          | MJ/m <sup>3</sup>    | ✓                 | ✓   | MJ/m <sup>3</sup>      | MJ/m <sup>3</sup>    | MJ/m <sup>3</sup>    | МДж/м <sup>3</sup>      | MJ/m <sup>3</sup>     |
| Btu/gal         | Btu/gal              | ✓                 | ✓   |                        | Btu/gal              | Btu/gal              | БТЕ/гал                 |                       |
| MJ/Nml-Cum      | MJ/Nm <sup>3</sup>   | N/A               | ✓   | MJ/Nm <sup>3</sup>     | MJ/Nm <sup>3</sup>   | MJ/Nm <sup>3</sup>   | МДж/Норм.м <sup>3</sup> | MJ/m <sup>3</sup> (N) |
| Btu/Std-cuft    | Btu/Sft <sup>3</sup> | ✓                 | ✓   |                        | Btu/Sft <sup>3</sup> | Btu/Sft <sup>3</sup> | БТЕ/ст.фут <sup>3</sup> |                       |

**Total 1 – 6 unit**

| Display of unit            |                   | Liquid gas select |     | Display unit selection |                 |                   |                         |                    |
|----------------------------|-------------------|-------------------|-----|------------------------|-----------------|-------------------|-------------------------|--------------------|
| FieldMate                  | Indicator         | Liquid            | Gas | Metric                 | US              | UK                | Russia                  | Japan              |
| g                          | g                 | ✓                 | ✓   | g                      | g               | g                 | г                       | g                  |
| kg                         | kg                | ✓                 | ✓   | kg                     | kg              | kg                | кг                      | kg                 |
| t                          | t                 | ✓                 | ✓   | t                      | t               | t                 | т                       | t                  |
| ton(US)                    | t                 | ✓                 | ✓   |                        | t               |                   |                         |                    |
| ton(UK)                    | t                 | ✓                 | ✓   |                        |                 | t                 |                         |                    |
| lb                         | lb                | ✓                 | ✓   |                        | lb              | lb                | фунт                    |                    |
| cm <sup>3</sup>            | cm <sup>3</sup>   | ✓                 | ✓   | cm <sup>3</sup>        | cm <sup>3</sup> | cm <sup>3</sup>   | см <sup>3</sup>         | cm <sup>3</sup>    |
| L                          | L                 | ✓                 | ✓   | L                      | l               | l                 | л                       | L                  |
| m <sup>3</sup>             | m <sup>3</sup>    | ✓                 | ✓   | m <sup>3</sup>         | m <sup>3</sup>  | m <sup>3</sup>    | м <sup>3</sup>          | m <sup>3</sup>     |
| gal                        | gal               | ✓                 | ✓   |                        | gal             | gal               | гал                     |                    |
| kgal                       | kgal              | ✓                 | ✓   |                        | kgal            | kgal              | кгал                    |                    |
| ft <sup>3</sup>            | ft <sup>3</sup>   | ✓                 | ✓   |                        | Cuft            | ft <sup>3</sup>   | фут <sup>3</sup>        |                    |
| bbl                        | bbl               | ✓                 | ✓   |                        | bbl             |                   | bbl                     |                    |
| Impgal                     | Impgal            | ✓                 | ✓   |                        | Impgal          | Impgal            | Impgal                  |                    |
| klmpgal                    | klmpgal           | ✓                 | ✓   |                        | klmpgal         | klmpgal           | klmpgal                 |                    |
| L(normal)                  | NL                | N/A               | ✓   | NL                     | NI              | NI                | Норм.л                  | L(N)               |
| m <sup>3</sup> (normal)    | Nm <sup>3</sup>   | N/A               | ✓   | Nm <sup>3</sup>        | Nm <sup>3</sup> | Nm <sup>3</sup>   | Норм.м <sup>3</sup>     | m <sup>3</sup> (N) |
| L(standard)                | SL                | ✓                 | ✓   | SL                     | SI              | SI                | Ст.л                    | L(S)               |
| ft <sup>3</sup> (standard) | Sft <sup>3</sup>  | ✓                 | ✓   |                        | Scuft           | Sft <sup>3</sup>  | Ст.фут <sup>3</sup>     |                    |
| MMscuft                    | MSft <sup>3</sup> | ✓                 | ✓   |                        | MMscuft         | MSft <sup>3</sup> | Млн.Ст.фут <sup>3</sup> |                    |
| m <sup>3</sup> (standard)  | Sm <sup>3</sup>   | ✓                 | ✓   | Sm <sup>3</sup>        | Sm <sup>3</sup> | Sm <sup>3</sup>   | Ст.м <sup>3</sup>       | m <sup>3</sup> (S) |
| MJ                         | MJ                | ✓                 | ✓   | MJ                     | MJ              | MJ                | МДж                     | MJ                 |
| Btu                        | Btu               | ✓                 | ✓   |                        | Btu             | Btu               | БТЕ                     |                    |

**Pulse output 1 – 2 unit select**

| Display of unit    |                    | Liquid gas select |     | Display unit selection |                    |                    |                       |                    |
|--------------------|--------------------|-------------------|-----|------------------------|--------------------|--------------------|-----------------------|--------------------|
| FieldMate          | Indicator          | Liquid            | Gas | Metric                 | US                 | UK                 | Russia                | Japan              |
| g/P                | g/P                | ✓                 | ✓   | g/P                    | g/P                | g/P                | г/имп.                | g/P                |
| kg/P               | kg/P               | ✓                 | ✓   | kg/P                   | kg/P               | kg/P               | кг/имп.               | kg/P               |
| MetTon/P           | t/P                | ✓                 | ✓   | t/P                    | t/P                | t/P                | т/имп.                | t/P                |
| ton(US)/P          | t/P                | ✓                 | ✓   |                        | t/P                |                    |                       |                    |
| ton(UK)/P          | t/P                | ✓                 | ✓   |                        |                    | t/P                |                       |                    |
| lb/P               | lb/P               | ✓                 | ✓   |                        | lb/P               | lb/P               | фунт/имп.             |                    |
| P/g                | P/g                | ✓                 | ✓   | P/g                    | P/g                | P/g                | имп./г                | P/g                |
| P/kg               | P/kg               | ✓                 | ✓   | P/kg                   | P/kg               | P/kg               | имп./кг               | P/kg               |
| P/MetTon           | P/t                | ✓                 | ✓   | P/t                    | P/t                | P/t                | имп./т                | P/t                |
| P/ton(US)          | P/t                | ✓                 | ✓   |                        | P/t                |                    |                       |                    |
| P/ton(UK)          | P/t                | ✓                 | ✓   |                        |                    | P/t                |                       |                    |
| P/lb               | P/lb               | ✓                 | ✓   |                        | P/lb               | P/lb               | имп./фунт             |                    |
| cm <sup>3</sup> /P | cm <sup>3</sup> /P | ✓                 | ✓   | cm <sup>3</sup> /P     | cm <sup>3</sup> /P | cm <sup>3</sup> /P | см <sup>3</sup> /имп. | cm <sup>3</sup> /P |
| L/P                | L/P                | ✓                 | ✓   | L/P                    | l/P                | l/P                | л/имп.                | L/P                |
| m <sup>3</sup> /P  | m <sup>3</sup> /P  | ✓                 | ✓   | m <sup>3</sup> /P      | m <sup>3</sup> /P  | m <sup>3</sup> /P  | м <sup>3</sup> /имп.  | m <sup>3</sup> /P  |

| Display of unit |           | Liquid gas select |     | Display unit selection |           |           |              |         |
|-----------------|-----------|-------------------|-----|------------------------|-----------|-----------|--------------|---------|
| FieldMate       | Indicator | Liquid            | Gas | Metric                 | US        | UK        | Russia       | Japan   |
| gal/P           | gal/P     | ✓                 | ✓   |                        | gal/P     | gal/P     | гал/имп.     |         |
| kgal/P          | kgal/P    | ✓                 | ✓   |                        | kgal/P    | kgal/P    | кгал/имп.    |         |
| ft³/P           | ft³/P     | ✓                 | ✓   |                        | Cuft/P    | ft³/P     | фут³/имп.    |         |
| bbl/P           | bbl/P     | ✓                 | ✓   |                        | bbl/P     |           | bbl/имп.     |         |
| Impgal/P        | Impgal/P  | ✓                 | ✓   |                        | Impgal/P  | Impgal/P  | Impgal/имп.  |         |
| klmpgal/P       | klmpgal/P | ✓                 | ✓   |                        | klmpgal/P | klmpgal/P | klmpgal/имп. |         |
| P/Cucm          | P/cm³     | ✓                 | ✓   |                        | P/cm³     | P/cm³     | имп./см³     | P/cm³   |
| P/L             | P/L       | ✓                 | ✓   |                        | P/l       | P/l       | имп./л       | P/L     |
| P/Cum           | P/m³      | ✓                 | ✓   |                        | P/m³      | P/m³      | имп./м³      | P/m³    |
| P/gal           | P/gal     | ✓                 | ✓   |                        | P/gal     | P/gal     | имп./гал     |         |
| P/kgal          | P/kgal    | ✓                 | ✓   |                        | P/kgal    | P/kgal    | имп./кгал    |         |
| P/Cuft          | P/ft³     | ✓                 | ✓   |                        | P/Cuft    | P/ft³     | имп./фут³    |         |
| P/bbl           | P/bbl     | ✓                 | ✓   |                        | P/bbl     |           | имп./bbl     |         |
| P/Impgal        | P/Impgal  | ✓                 | ✓   |                        | P/Impgal  | P/Impgal  | имп./Impgal  |         |
| P/klmpgal       | P/klmpgal | ✓                 | ✓   |                        | P/klmpgal | P/klmpgal | имп./klmpgal |         |
| Nml L/P         | NL/P      | N/A               | ✓   | NL/P                   | NI/P      | NI/P      | Норм.л/имп.  | L/P(N)  |
| NmlCum/P        | Nm³/P     | N/A               | ✓   | Nm³/P                  | Nm³/P     | Nm³/P     | Норм.м³/имп. | m³/P(N) |
| Std L/P         | SL/P      | ✓                 | ✓   | SL/P                   | SI/P      | SI/P      | Ст.л/имп.    | L/P(S)  |
| StdCuft/P       | Sft³/P    | ✓                 | ✓   |                        | Scuft/P   | Sft³/P    | Ст.фут³/имп. |         |
| StdCum/P        | Sm³/P     | ✓                 | ✓   | Sm³/P                  | Sm³/P     | Sm³/P     | Ст.м³/имп.   | m³/P(S) |
| P/Nml L         | P/NL      | N/A               | ✓   | P/NL                   | P/NI      | P/NI      | имп./Норм.л  | P/L(N)  |
| P/NmlCum        | P/Nm³     | N/A               | ✓   | P/Nm³                  | P/Nm³     | P/Nm³     | имп./Норм.м³ | P/m³(N) |
| P/Std L         | P/SL      | ✓                 | ✓   | P/SL                   | P/SI      | P/SI      | имп./Ст.л    | P/L(S)  |
| P/StdCuft       | P/Sft³    | ✓                 | ✓   |                        | P/Scuft   | P/Sft³    | имп./Ст.фут³ |         |
| P/StdCum        | P/Sm³     | ✓                 | ✓   | P/Sm³                  | P/Sm³     | P/Sm³     | имп./Ст.м³   | P/m³(S) |
| MJ/P            | MJ/P      | ✓                 | ✓   | MJ/P                   | MJ/P      | MJ/P      | МДж/имп.     | MJ/P    |
| Btu/P           | Btu/P     | ✓                 | ✓   |                        | Btu/P     | Btu/P     | БТЕ/имп.     |         |
| P/MJ            | P/MJ      | ✓                 | ✓   | P/MJ                   | P/MJ      | P/MJ      | имп./МДж     | P/MJ    |
| P/Btu           | P/Btu     | ✓                 | ✓   |                        | P/Btu     | P/Btu     | имп./БТЕ     |         |

## Velocity unit

| Display of unit |           | Liquid gas select |     | Display unit selection |      |      |        |       |
|-----------------|-----------|-------------------|-----|------------------------|------|------|--------|-------|
| FieldMate       | Indicator | Liquid            | Gas | Metric                 | US   | UK   | Russia | Japan |
| m/s             | m/s       | ✓                 | ✓   | m/s                    | m/s  | m/s  | м/с    | m/s   |
| ft/s            | ft/s      | ✓                 | ✓   |                        | ft/s | ft/s | фут/с  |       |

**Batch unit**

| Display of unit            |                   | Liquid gas select |     | Display unit selection |                 |                   |                         |                    |
|----------------------------|-------------------|-------------------|-----|------------------------|-----------------|-------------------|-------------------------|--------------------|
| FieldMate                  | Indicator         | Liquid            | Gas | Metric                 | US              | UK                | Russia                  | Japan              |
| g                          | g                 | ✓                 | ✓   | g                      | g               | g                 | г                       | g                  |
| kg                         | kg                | ✓                 | ✓   | kg                     | kg              | kg                | кг                      | kg                 |
| t                          | t                 | ✓                 | ✓   | t                      | t               | t                 | т                       | t                  |
| ton(US)                    | t                 | ✓                 | ✓   |                        | t               |                   |                         |                    |
| ton(UK)                    | t                 | ✓                 | ✓   |                        |                 | t                 |                         |                    |
| lb                         | lb                | ✓                 | ✓   |                        | lb              | lb                | фунт                    |                    |
| cm <sup>3</sup>            | cm <sup>3</sup>   | ✓                 | ✓   | cm <sup>3</sup>        | cm <sup>3</sup> | cm <sup>3</sup>   | см <sup>3</sup>         | cm <sup>3</sup>    |
| L                          | L                 | ✓                 | ✓   | L                      | l               | l                 | л                       | L                  |
| m <sup>3</sup>             | m <sup>3</sup>    | ✓                 | ✓   | m <sup>3</sup>         | m <sup>3</sup>  | m <sup>3</sup>    | м <sup>3</sup>          | m <sup>3</sup>     |
| gal                        | gal               | ✓                 | ✓   |                        | gal             | gal               | гал                     |                    |
| kgal                       | kgal              | ✓                 | ✓   |                        | kgal            | kgal              | кгал                    |                    |
| ft <sup>3</sup>            | ft <sup>3</sup>   | ✓                 | ✓   |                        | Cuft            | ft <sup>3</sup>   | фут <sup>3</sup>        |                    |
| bbl                        | bbl               | ✓                 | ✓   |                        | bbl             |                   | bbl                     |                    |
| Impgal                     | Impgal            | ✓                 | ✓   |                        | Impgal          | Impgal            | Impgal                  |                    |
| klmpgal                    | klmpgal           | ✓                 | ✓   |                        | klmpgal         | klmpgal           | klmpgal                 |                    |
| L(normal)                  | NL                | N/A               | ✓   | NL                     | NI              | NI                | Норм.л                  | L(N)               |
| m <sup>3</sup> (normal)    | Nm <sup>3</sup>   | N/A               | ✓   | Nm <sup>3</sup>        | Nm <sup>3</sup> | Nm <sup>3</sup>   | Норм.м <sup>3</sup>     | m <sup>3</sup> (N) |
| L(standard)                | SL                | ✓                 | ✓   | SL                     | SI              | SI                | Ст.л                    | L(S)               |
| ft <sup>3</sup> (standard) | Sft <sup>3</sup>  | ✓                 | ✓   |                        | Scuft           | Sft <sup>3</sup>  | Ст.фут <sup>3</sup>     |                    |
| MMscuft                    | MSft <sup>3</sup> | ✓                 | ✓   |                        | MMscuft         | MSft <sup>3</sup> | Млн.Ст.фут <sup>3</sup> |                    |
| m <sup>3</sup> (standard)  | Sm <sup>3</sup>   | ✓                 | ✓   | Sm <sup>3</sup>        | Sm <sup>3</sup> | Sm <sup>3</sup>   | Ст.м <sup>3</sup>       | m <sup>3</sup> (S) |

**Viscosity unit**

| Display of unit    |                    | Liquid gas select |     | Display unit selection |                    |                    |                    |                    |
|--------------------|--------------------|-------------------|-----|------------------------|--------------------|--------------------|--------------------|--------------------|
| FieldMate          | Indicator          | Liquid            | Gas | Metric                 | US                 | UK                 | Russia             | Japan              |
| mPas               | mPas               | ✓                 | N/A | mPas                   | mPas               | mPas               | mPas               | mPas               |
| Pas                | Pas                | ✓                 | N/A | Pas                    | Pas                | Pas                | Pas                | Pas                |
| cP                 | cP                 | ✓                 | N/A | cP                     | cP                 | cP                 |                    |                    |
| Ns/m <sup>2</sup>  | Ns/m <sup>2</sup>  | ✓                 | N/A | Ns/m <sup>2</sup>      | Ns/m <sup>2</sup>  | Ns/m <sup>2</sup>  | Ns/m <sup>2</sup>  | Ns/m <sup>2</sup>  |
| kg/ms              | kg/ms              | ✓                 | N/A | kg/ms                  | kg/ms              | kg/ms              |                    |                    |
| cSt                | cSt                | ✓                 | N/A | cSt                    | cSt                | cSt                |                    |                    |
| St                 | St                 | ✓                 | N/A | St                     | St                 | St                 | St                 | St                 |
| mm <sup>2</sup> /s | mm <sup>2</sup> /s | ✓                 | N/A | mm <sup>2</sup> /s     | mm <sup>2</sup> /s | mm <sup>2</sup> /s | мм <sup>2</sup>    | mm <sup>2</sup> /s |
| cm <sup>2</sup> /s | cm <sup>2</sup> /s | ✓                 | N/A | cm <sup>2</sup> /s     | cm <sup>2</sup> /s | cm <sup>2</sup> /s | см <sup>2</sup>    | cm <sup>2</sup> /s |
| dm <sup>2</sup> /s | dm <sup>2</sup> /s | ✓                 | N/A | dm <sup>2</sup> /s     | dm <sup>2</sup> /s | dm <sup>2</sup> /s | dm <sup>2</sup> /s | dm <sup>2</sup> /s |
| m <sup>2</sup> /s  | m <sup>2</sup> /s  | ✓                 | N/A | m <sup>2</sup> /s      | m <sup>2</sup> /s  | m <sup>2</sup> /s  | м <sup>2</sup>     | m <sup>2</sup> /s  |

## 7.6 Units description

The following table shows the available units with their description in alphabetical order:

| Value                  | Name / Description                                                                                                                                             |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| °API                   | °API units are used for quantifying the mass densities of mineral oils.<br>°API = $141.5 / \text{SG} (60/60 \text{ } ^\circ\text{F}) - 131.5$<br>Dimensionless |
| atm                    | Atmospheres                                                                                                                                                    |
| bar                    | Bars                                                                                                                                                           |
| bbl/d                  | Barrels per day                                                                                                                                                |
| bbl/h                  | Barrels per hour                                                                                                                                               |
| bbl/min                | Barrels per minute                                                                                                                                             |
| bbl/pulse              | Barrels per pulse                                                                                                                                              |
| bbl/s                  | Barrels per second                                                                                                                                             |
| Bé hv                  | °Baumé heavy is used for liquids heavier than water<br>°Bé hv = $145 - 145 / (\text{SG} (60/60 \text{ } ^\circ\text{F}))$<br>Dimensionless                     |
| Bh                     | °Baumé heavy for JIS Z 8804:2012<br>Bh = $144.3 - 144.3 / (\text{SG} (15 / 4 \text{ } ^\circ\text{C}))$<br>Dimensionless                                       |
| Bé lt                  | °Baumé light<br>°Bé lt = $140 / (\text{SG} (60 / 60 \text{ } ^\circ\text{F})) - 130$<br>Dimensionless                                                          |
| Bl                     | °Baumé light for JIS Z 8804:2012<br>Bl = $144.3 / (\text{SG} (15 / 4 \text{ } ^\circ\text{C})) - 134.3$                                                        |
| bbl                    | Barrels                                                                                                                                                        |
| bbl/d                  | Barrels per day                                                                                                                                                |
| bbl/h                  | Barrels per hour                                                                                                                                               |
| bbl/min                | Barrels per minute                                                                                                                                             |
| bbl/s                  | Barrels per second                                                                                                                                             |
| °Brix                  | Degree brix                                                                                                                                                    |
| Btu                    | British thermal unit                                                                                                                                           |
| Btu/d                  | British thermal unit per day                                                                                                                                   |
| Btu/h                  | British thermal unit per hour                                                                                                                                  |
| Btu/min                | British thermal unit per minute                                                                                                                                |
| Btu/pulse              | British thermal unit per pulse                                                                                                                                 |
| Btu/s                  | British thermal unit per second                                                                                                                                |
| BTU/scuft              | British thermal unit per standard cubic foot                                                                                                                   |
| cm <sup>2</sup> /s     | Square centimeter per second                                                                                                                                   |
| cm <sup>3</sup>        | Cubic centimeters                                                                                                                                              |
| cm <sup>3</sup> /h     | Cubic centimeters per hour                                                                                                                                     |
| cm <sup>3</sup> /min   | Cubic centimeters per minute                                                                                                                                   |
| cm <sup>3</sup> /pulse | Cubic centimeters per pulse                                                                                                                                    |
| cm <sup>3</sup> /s     | Cubic centimeters per second                                                                                                                                   |
| cP                     | Centipoise                                                                                                                                                     |
| cSt                    | Centistokes                                                                                                                                                    |
| dm <sup>2</sup> /s     | Square decimeter per second                                                                                                                                    |



| Value                     | Name / Description                       |
|---------------------------|------------------------------------------|
| degC                      | Degrees Celsius                          |
| degF                      | Degrees Fahrenheit                       |
| degR                      | Degrees Rankine                          |
| ft <sup>3</sup>           | Cubic feet                               |
| ft <sup>3</sup> /d        | Cubic feet per day                       |
| ft <sup>3</sup> /h        | Cubic feet per hour                      |
| ft <sup>3</sup> /min      | Cubic feet per minute                    |
| ft <sup>3</sup> /pulse    | Cubic feet per pulse                     |
| ft <sup>3</sup> /s        | Cubic feet per second                    |
| ftH <sub>2</sub> O@4degC  | Feet of water at 4 degrees Celsius       |
| ftH <sub>2</sub> O@68degF | Feet of water at 68 degrees Fahrenheit   |
| ft/s                      | Feet per second                          |
| g                         | Grams                                    |
| gal                       | Gallons                                  |
| gal/d                     | Gallons per day                          |
| gal/h                     | Gallons per hour                         |
| gal/min                   | Gallons per minute                       |
| gal/pulse                 | Gallons per pulse                        |
| gal/s                     | Gallons per second                       |
| g/cc                      | Gram per cc                              |
| g/cm <sup>2</sup>         | Grams per square centimeter              |
| g/cm <sup>3</sup>         | Grams per cubic centimeter               |
| g/h                       | Grams per hour                           |
| g/L                       | Grams per liter                          |
| g/min                     | Grams per minute                         |
| g/mL                      | Grams per milliliter                     |
| g/s                       | Grams per second                         |
| hPa                       | Hectopascals                             |
| Impgal                    | Imperial gallons                         |
| Impgal/d                  | Imperial gallons per day                 |
| Impgal/h                  | Imperial gallons per hour                |
| Impgal/min                | Imperial gallons per minute              |
| Impgal/s                  | Imperial gallons per second              |
| Impgal/pulse              | Imperial gallons per pulse               |
| inH <sub>2</sub> O@4degC  | Inches of water at 4 degrees Celsius     |
| inH <sub>2</sub> O@68degF | Inches of water at 68 degrees Fahrenheit |
| inHg                      | Inches of mercury at 0 degrees Celsius   |
| K                         | Kelvin                                   |
| kg                        | Kilograms                                |
| kgal                      | Kilo gallons                             |
| kgal/pulse                | Kilo gallons per pulse                   |
| kg/cm <sup>2</sup>        | Kilograms per square centimeter          |
| kg/cm <sup>3</sup>        | Kilogram per cubic centimeters           |
| kg/d                      | Kilograms per day                        |
| kg/dm <sup>3</sup>        | Kilogram per cubic decimeters            |
| kg/h                      | Kilograms per hour                       |
| kg/L                      | Kilograms per liter                      |
| kg/m <sup>3</sup>         | Kilograms per cubic meter                |

| Value                     | Name / Description                                          |
|---------------------------|-------------------------------------------------------------|
| kg/min                    | Kilograms per minute                                        |
| Kg/ms                     | Kilograms per meter second                                  |
| kg/s                      | Kilograms per second                                        |
| klmpgal                   | Kilo imperial gallons                                       |
| klmpgal/pulse             | Kilo imperial gallons per pulse                             |
| kPa                       | Kilo pascals                                                |
| L                         | Liters                                                      |
| lb                        | Pounds                                                      |
| lb/gal                    | Pounds per gallon                                           |
| lb/ft <sup>3</sup>        | Pounds per cubic foot                                       |
| L/d                       | Liters per day                                              |
| L/h                       | Liters per hour                                             |
| L/min                     | Liters per minute                                           |
| L/pulse                   | Liters per pulse                                            |
| L/s                       | Liters per second                                           |
| lb/d                      | Pounds per day                                              |
| lb/h                      | Pounds per hour                                             |
| lb/min                    | Pounds per minute                                           |
| lb/s                      | Pounds per second                                           |
| l/s                       | Liters per second                                           |
| m <sup>2</sup> /s         | Square meter per second                                     |
| m <sup>3</sup>            | Cubic meters                                                |
| m <sup>3</sup> /d         | Cubic meters per day                                        |
| m <sup>3</sup> /h         | Cubic meters per hour                                       |
| m <sup>3</sup> /min       | Cubic meters per minute                                     |
| m <sup>3</sup> /s         | Cubic meters per second                                     |
| m <sup>3</sup> /pulse     | Cubic meters per pulse                                      |
| mbar                      | Millibars                                                   |
| MetTon                    | Metric tons                                                 |
| MetTon/d                  | Metric tons per day                                         |
| MetTon/h                  | Metric tons per hour                                        |
| MetTon/min                | Metric tons per minute                                      |
| MJ                        | Mega joules                                                 |
| MJ/d                      | Mega joules per day                                         |
| MJ/h                      | Mega joules per hour                                        |
| MJ/kg                     | Mega joules per kilogram                                    |
| MJ/m <sup>3</sup>         | Mega joules per normal cubic meter<br>MJ/m <sup>3</sup> ≡ N |
| MJ/min                    | Mega joules per minute                                      |
| MJ/pulse                  | Mega joules per pulse                                       |
| MJ/s                      | Mega joules per second                                      |
| mmH <sub>2</sub> O@4degC  | Millimeters of water at 4 degrees Celsius                   |
| mmH <sub>2</sub> O@68degF | Millimeters of water at 68 degrees Fahrenheit               |
| mmHg                      | Millimeters of mercury at 0 degrees Fahrenheit              |
| MMsft <sup>3</sup>        | Million standard cubic feet                                 |
| mm <sup>2</sup> /s        | Square millimeter per second                                |
| MPa                       | Megapascals                                                 |
| m/s                       | Meters per second                                           |

| Value                    | Name / Description                                                                                                          |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| NmIL                     | Normal liters                                                                                                               |
| NmIL/d                   | Normal liters per day                                                                                                       |
| NmIL/h                   | Normal liters per hour                                                                                                      |
| NmIL/min                 | Normal liters per minute                                                                                                    |
| NmIL/pulse               | Normal liters per pulse                                                                                                     |
| NmIL/s                   | Normal liters per second                                                                                                    |
| NmIm <sup>3</sup>        | Normal cubic meters                                                                                                         |
| NmIm <sup>3</sup> /d     | Normal cubic meters per day                                                                                                 |
| NmIm <sup>3</sup> /h     | Normal cubic meters per hour                                                                                                |
| NmIm <sup>3</sup> /min   | Normal cubic meters per minute                                                                                              |
| NmIm <sup>3</sup> /pulse | Normal cubic meters per pulse                                                                                               |
| NmIm <sup>3</sup> /s     | Normal cubic meters per second                                                                                              |
| NS/m <sup>2</sup>        | Newton second per square meter                                                                                              |
| Pa                       | Pascals                                                                                                                     |
| Pas                      | Pascal                                                                                                                      |
| Pa-s                     | Pascal second                                                                                                               |
| psi                      | Pounds per square inch                                                                                                      |
| pulse/bbl                | Pulse per barrel                                                                                                            |
| pulse/Btu                | Pulse per British thermal unit                                                                                              |
| pulse/cm <sup>3</sup>    | Pulse per cubic centimeter                                                                                                  |
| pulse/ft <sup>3</sup>    | Pulse per cubic foot                                                                                                        |
| pulse/gal                | Pulse per gallon                                                                                                            |
| pulse/kgal               | Pulse per kilo gallon                                                                                                       |
| pulse/klmpgal            | Pulse per kilo imperial gallon                                                                                              |
| pulse/L                  | Pulse per liter                                                                                                             |
| pulse/m <sup>3</sup>     | Pulse per cubic meter                                                                                                       |
| pulse/MJ                 | Pulse per mega joule                                                                                                        |
| pulse/NmIL               | Pulse per normal liter                                                                                                      |
| pulse/NmIm <sup>3</sup>  | Pulse per normal meter                                                                                                      |
| pulse/Sft <sup>3</sup>   | Pulse per standard cubic foot                                                                                               |
| pulse/StdL               | Pulse per standard liter                                                                                                    |
| pulse/Stdm <sup>3</sup>  | Pulse per standard cubic meter                                                                                              |
| pulse/Impgal             | Pulse per imperial gallon                                                                                                   |
| °Sake                    | °Sake units are used for quantifying the mass densities of sake.<br>°Sake = 1443 / (SG (15 / 4 °C)) - 1443<br>Dimensionless |
| SG 4 °C                  | SG 4 °C Specific gravity<br>Specific gravity relative to 4 °C water.<br>Dimensionless                                       |
| SG 15 °C                 | SG 15 °C Specific gravity<br>Specific gravity relative to 15 °C water.<br>Dimensionless                                     |
| SG 20 °C                 | SG 20 °C Specific gravity<br>Specific gravity relative to 20 °C water.<br>Dimensionless                                     |

| Value                    | Name / Description                                                                                                         |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------|
| SG 60 °F                 | SG 60 °F Specific gravity<br>Specific gravity relative to 60 °F (15.56 °C) water.<br>Dimensionless                         |
| Stdft <sup>3</sup>       | Standard cubic feet                                                                                                        |
| Stdft <sup>3</sup> /d    | Standard cubic feet per day                                                                                                |
| Stdft <sup>3</sup> /h    | Standard cubic feet per hour                                                                                               |
| Stdft <sup>3</sup> /min  | Standard cubic feet per minute                                                                                             |
| Sft <sup>3</sup> /pulse  | Standard cubic feet per pulse                                                                                              |
| St                       | Stokes                                                                                                                     |
| Stdft <sup>3</sup> /s    | Standard cubic feet per second                                                                                             |
| StdL                     | Standard liters                                                                                                            |
| StdL/d                   | Standard liters per day                                                                                                    |
| StdL/h                   | Standard liters per hour                                                                                                   |
| StdL/min                 | Standard liters per minute                                                                                                 |
| StdL/pulse               | Standard liters per pulse                                                                                                  |
| StdL/s                   | Standard liters per second                                                                                                 |
| Stdm <sup>3</sup>        | Standard cubic meters                                                                                                      |
| Stdm <sup>3</sup> /d     | Standard cubic meters per day                                                                                              |
| Stdm <sup>3</sup> /h     | Standard cubic meters per hour                                                                                             |
| Stdm <sup>3</sup> /min   | Standard cubic meters per minute                                                                                           |
| Stdm <sup>3</sup> /pulse | Standard cubic meters per pulse                                                                                            |
| Stdm <sup>3</sup> /s     | Standard cubic meters per second                                                                                           |
| t                        | Tons                                                                                                                       |
| ton(US)                  | Tons for US                                                                                                                |
| ton(UK)                  | Tons for UK                                                                                                                |
| torr                     | Torrs                                                                                                                      |
| User-defined unit        | Rotamass Total Insight allows the display of values in custom user-defined units.<br>Maximum length is 8 ASCII characters. |
| Vol %                    | Volume percent                                                                                                             |
| Vol % sol                | Percent solids per volume                                                                                                  |
| % (Wt-%)                 | Weight percent                                                                                                             |
| Wt -% sol                | Percent solids per weight                                                                                                  |



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Manufacturer:

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For the actual manufacturing location of your device refer to the model code and/or serial number.

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