
User's Manual

ROTAMASS Total Insight Coriolis Mass Flow and Density Meter Software Instruction Manual PROFINET over APL



IM 01U10S05-00EN-R

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1 Introduction

1.1 Scope of application

- 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

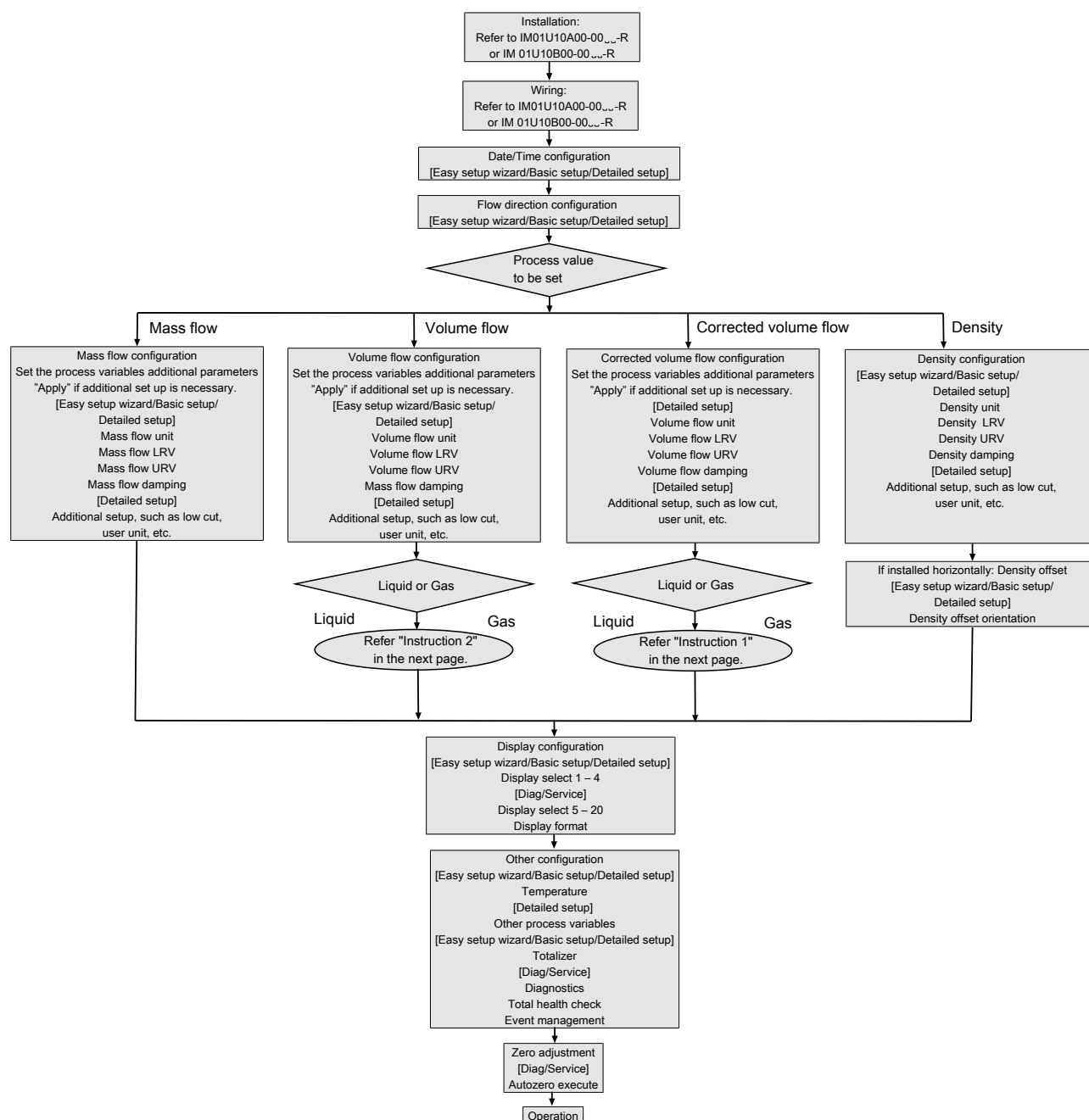
Before starting to use the device, it has to be installed appropriately and all other configurations, such as wiring, have to be configured appropriately.
For more information about general recommendations for installations and configurations refer to the instruction manual.

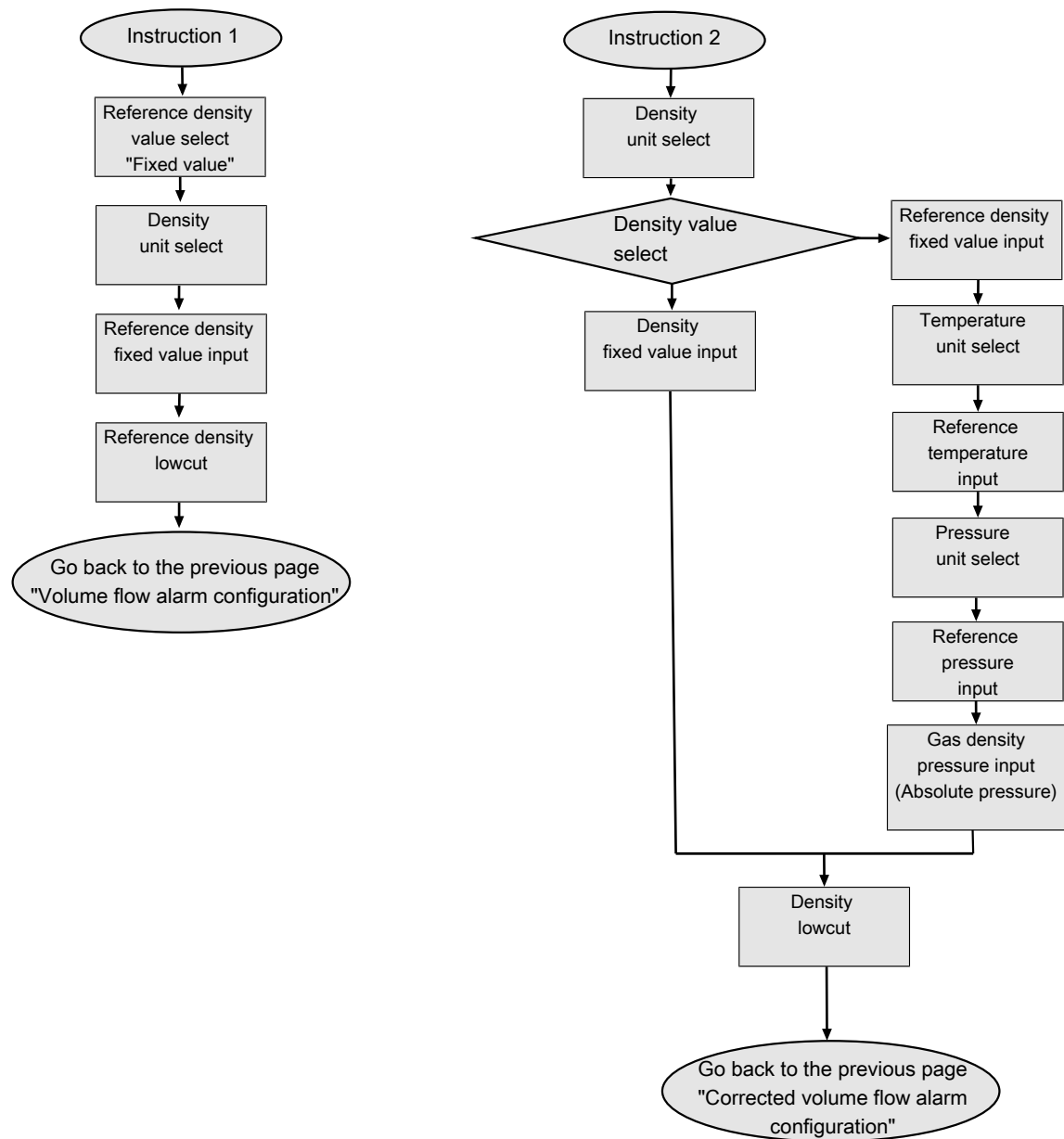
Operation level for operation and configuration

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* [▶ 28].

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 and Target mode in PB has to set to O/S in many parameters.





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* [▶ 29].

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* [▶ 12].

2.1.3 Signal IO function

To output the value of process variables, the device has a Pulse/Frequency output to output a pulse or frequency signal. 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
Pulse/Frequency output	Pulse/Frequency signal output [▶ 34]	Pulse/Frequency output [▶ 292]

2.1.4 Totalizer

A maximum of three totalizers can be used on the device to total flow process variables. For more detailed information see *Totalizer* [▶ 302].

2.1.5 Event management

Event management is a function for managing how events, such as alarm, warning in terms of categorization, indication, action and behavior, are handled. The user can define the following actions of the device when an event occurs. For more detailed information see *Event management* [▶ 49].



Do not use this function for critical or important events.

	Configurable options
Action and Behavior	▪ Ignore it ▪ Record it as an event ▪ Start data logging

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* [▶ 62].

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* [▶ 76].

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. PROFINET)

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]	▪ Apply setting ▪ Enter data ▪ Apply parameter
[SHIFT]	[SFT]	▪ Move cursor right or to the next position ▪ Change function and display of [SET] and [▼]
[▼]	[INC]	▪ Increment parameter or value ▪ Change position of decimal point ▪ Select next menu item

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

Key combina- tions	Display	Function
[SHIFT] + [SET]	[ESC]	▪ Cancel and switch to previous menu
[SHIFT] + ▼	[DEC]	▪ Decrement parameter or number ▪ Select previous menu item

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 (only indicated when display total health result is active)		Total health result: warning (only indicated when display total health result is active)
	Total health result: bad state (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

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
PRS	Pressure
TT1 – TT3	Totalizer 1 – 3
TAG	Customer-specific identification like HART
LTG	Customer-specific identification, long version
VEL	Velocity

Abbreviation	Measured quantity
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* [▶ 136].

Tab. 2: Trend display

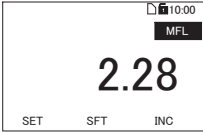
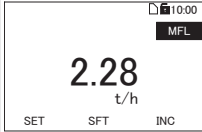
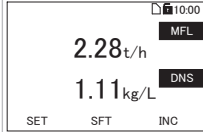
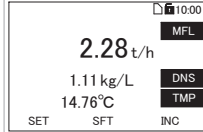
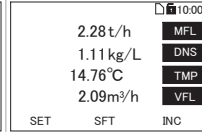
Abbreviation	Measured quantity
MFL	Mass flow
DNS	Density
TMP	Temperature
VFL	Volume flow
PRS	Pressure
CNC	Concentration
NM1	Net mass flow rate 1
NV1	Net volume flow rate 1
PHS	Phase shift
FRQ	Resonant frequency
DRG	Drive gain
DRC	Driving current
MBT	Transmitter temperature

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* [▶ 311].

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* [▶ 332].

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
				

3.2 PROFINET over APL

WARNING

- ▶ Ethernet connection with the device must be separated from external network, and the device must be installed only by control network is separated by firewall.
- ▶ Remote access from PC on IT network to another PC on control network that is connected to the device is not allowed.
- ▶ PC that is connected to the device must be performed the security measure in advance.
- ▶ Wireless function that is connected by IT network needs to be disabled when the device is connected by Ethernet.

3.2.1 Connection of PROFINET over APL

PROFINET over APL interface

PROFINET interface of Rotamass Total Insight is based on PA Profile Revision 4.02 and standard of Ethernet-APL Port Profile Specification V1.2.

Output signals PROFINET

PROFINET over APL

Electrical specification comply to port profile class SLAA. Port profile SLAA can be connected either to a field switch port with classification SPAA or SPCC.

	Value
Power supply voltage	9 to 15 VDC on Ethernet-APL line
Current draw	20 to 55.56 mA
Power load (max)	0.5W

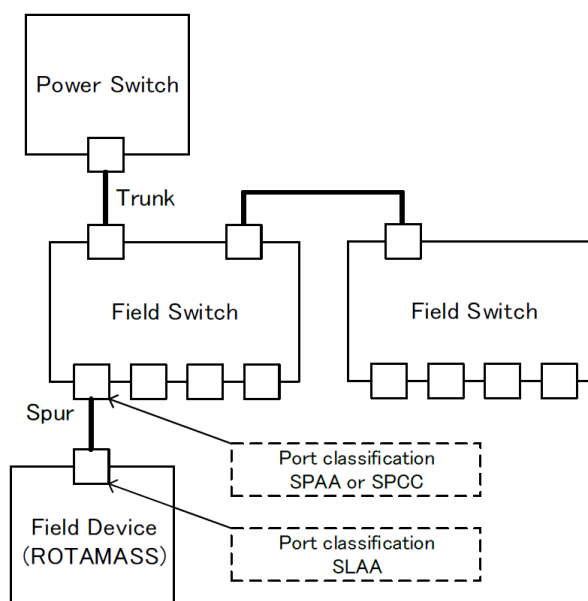
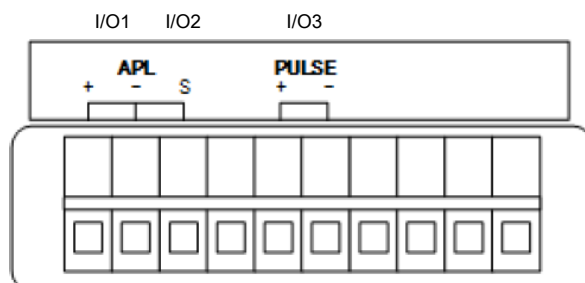


Fig. 1: Spur cable and transmissible length cable

Type of cable	Cable specifications	Max. length of cable (reference value)
Fieldbus Type A: Individually shielded twisted pair cable	#18AWG (0.82 mm ²)	200 m

For the PROFINET version, there is only one configuration of the connection terminal. Following is the configuration of the connection terminal (value T3 on model code position 13, see Inputs and outputs for details):

Connection terminal



I/O1(+): APL(+)

I/O2(+): APL(shield)

I/O3(+): PULSE

PROFINET communication

PROFINET communication

Pulse / Frequency output

3.2.2 PROFINET communication

Outline

PROFINET is a widely used bi-directional digital communication protocol that enables the implementation of technologically advanced process control systems. The Rotamass TI Series PROFINET communication type meets the specifications of PROFIBUS Nutzerorganisation e.V. and is interoperable with devices from Yokogawa and other manufacturers.

Internal structure of Rotamass TI: Function block

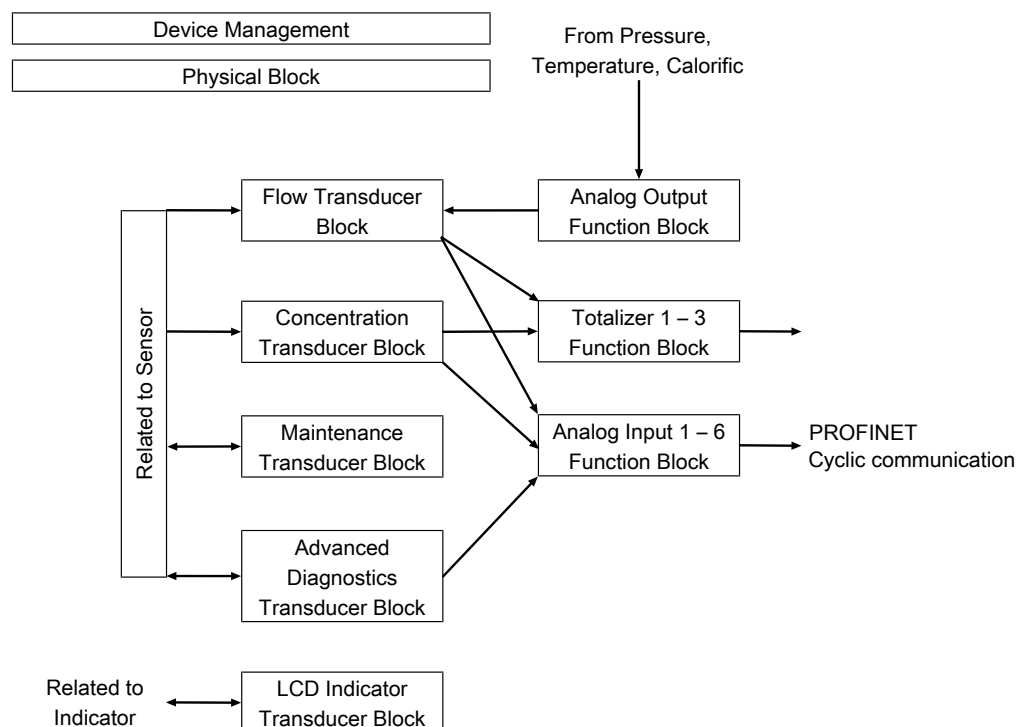
The transmitter contains nine function blocks which share the following functions:

- Physical block (PB)
 - Manages the status of transmitter.
- Flow Transducer block (FTB)
 - Converts sensor output to mass flow, density, temperature, volume flow etc. signals, and transfers to the AI function blocks.
 - Receives external pressure, temperature or calorific value form AO function block.
 - Performs Zero adjustment.
 - Performs Standard diagnostics (Slug/Empty/Corosion detection)
- LCD Indicator Transducer block (LTB)
 - Controls the display of the intergral indicator.
- Concentration Transducer block (CTB)
 - Calculates process values to concentration (Standard, Advanced or Net Oil Computing), net mass / volume flow etc. signals, and transfers to the AI function blocks.
 - Stores concentration setting up to 4 sets.

- Maintenance Transducer block (MTB)
 - Controls Pulse/Frequency output for local calibration.
 - Performs data logging, backup/restore.
 - Displays device information.
- Advanced Diagnostic Transducer block (ADTB)
 - Performs Tube Health Check.
- Analog Input (AI) function block
 - Conditions raw data from the Transducer block.
 - Outputs mass flow, density, temperature, volume flow etc. signals setting via the channel.
 - Carries out scaling and damping.
- Totalizer (TOT) function block
 - Executes totalizer management of signal from Transducer block.
 - Outputs totalized signal.
 - Outputs totalized signal with 24hours, and based on density.
- Analog Output (AO) function block
 - Receives raw pressure, temperature or calorific value from external connected device.
 - Transfers the value to FTB.

Logical structure of each block

Setting of various parameters, Bus addresses and TAG is required before starting the operation.



Wiring system configuration

The number of devices that can be connected to a single bus and the cable length vary depending on system design. When constructing the systems, both the basic and overall design must be carefully considered to achieve optimal performance.

Confirmation of device information and Tag setting

Software Revision, Device Revision and Ident Number can be confirmed by following procedures:

- Software Revision
 - Software Revision can be confirmed from Physical Block parameter Software Revision (SOFTWARE_REVISION).

Tab. 3: Procedure to call up the web page

Device ► Query device ► Physical Block ► PB profile parameters ► Software revision

- Device Revision
 - Device Revision can be confirmed from parameter Device Revision Compatibility or Device Revision (DEV_REV_COMP, DEV_REV).

Tab. 4: Procedure to call up the web page

Device ► Query Device ► Physical Block ► PB profile parameters ► Device Revision or Device Revision Compatibility

- Device type
 - Device type can be confirmed from Physical Block parameter DeviceType.

Tab. 5: Procedure to call up the web page

Device ► Query Device ► Physical Block ► PB profile parameters ► Device type

- Tag setting
 - Tag description on Physical Block is used for Tag setting on PROFINET. Maximum 32 characters are available to change the Tag setting.

Tab. 6: Procedure to call up the web page

Device ► Detailed Setup ► Device information ► Order information ► Tag

Network settings

- IP address, Subnet mask, Default gateway
 - These parameters can be changed by Discovery and Configuration Protocol (DCP) command on PROFINET functionality or Display.

Device ► Detailed Setup ► Network ► Communication setting

Parameter	Description
IP address	Sets fixed IP address.
Subnet mask	Sets Subnet mask.
Default gateway	Sets Default gateway

- Station name
 - This parameter can be changed by Discovery and Configuration Protocol (DCP) command on PROFINET functionality.
Default of value is PN370300 + Serial number if no delivery setting is specified.

**Typical settings of IP address, subnet mask and default gateway**

IP address: 192.168.1.xxx (xxx is 1...254)

Example setting

- ▶ IP address: 192.168.1.207
- ▶ Subnet mask: 255.255.255.0
- ▶ Default gateway: empty

⇒ Default IP address of the device is 192.168.1.210 if no delivery setting is specified.



Network parameter settings like IP address, Subnet mask and Default gateway are reflected after restarting the device when these parameters are configured from Display.

Integration of GSDML file

The following GSDML file is used for PROFINET communication. Before starting communication, the device must be specified by the GSDML file in the host system.

Model Name	Device ID	Device specific GSDML file
Rotamass TI	0x0300	GSDML-Vx.xx-YOKOGAWA-Rotamass TI- yyyymmdd.xml (x.xx is version number, yyyymmdd is date)

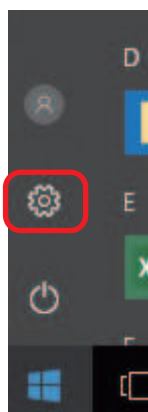
Web page**Supported software**

Operation systems	Microsoft Windows 10 or higher
Web browser	Google Chrome Microsoft Edge

Network configuration and web page access procedure

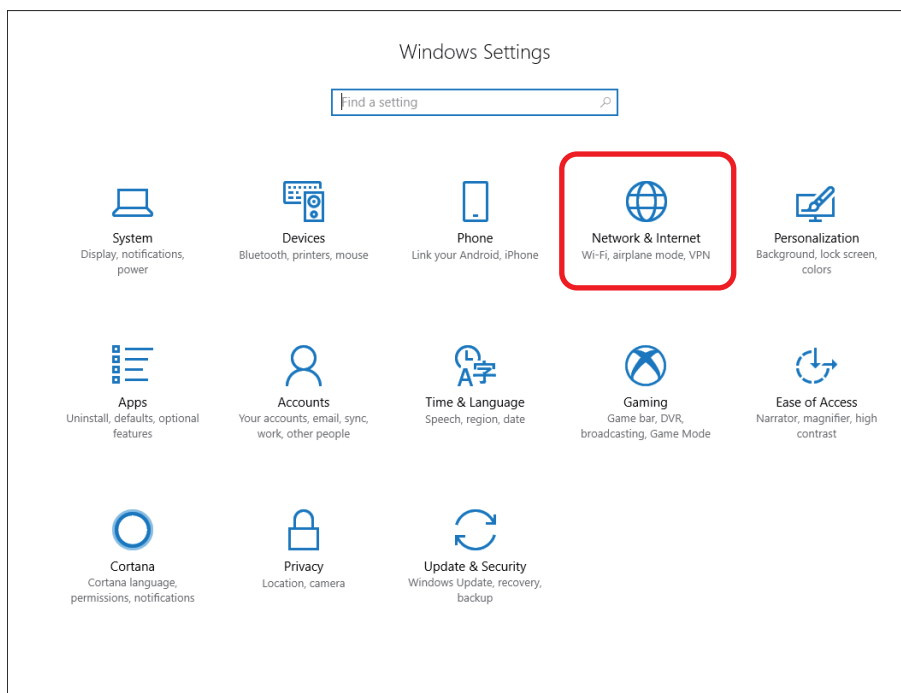
To configure network setting on computer, appropriate access rights are required. (e.g. Administrator).

1. Click "Start" menu and select "Settings" icon.



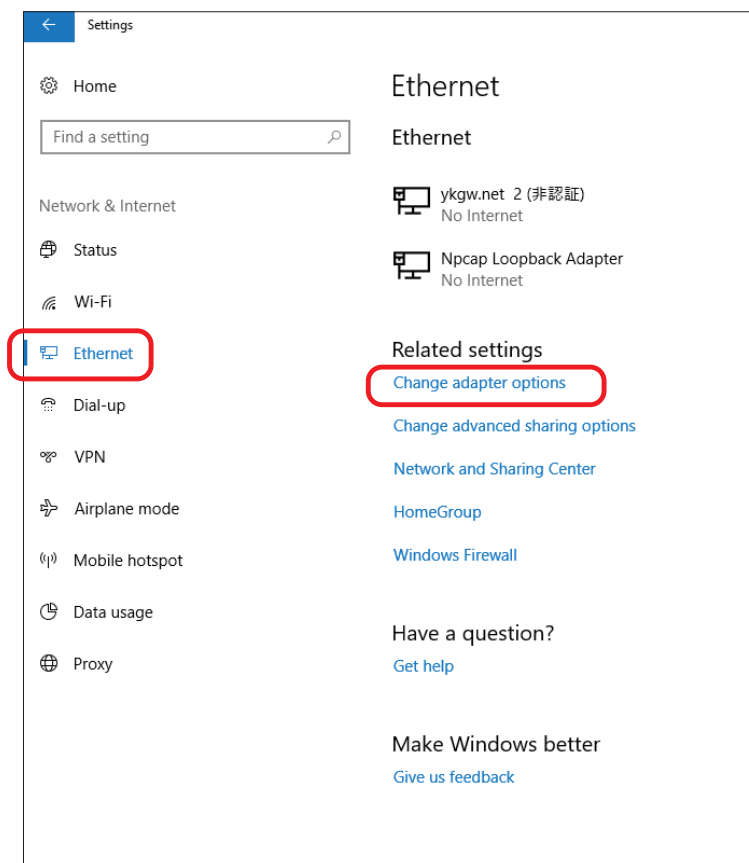
F0303.ai

2. Select "Network & Internet".



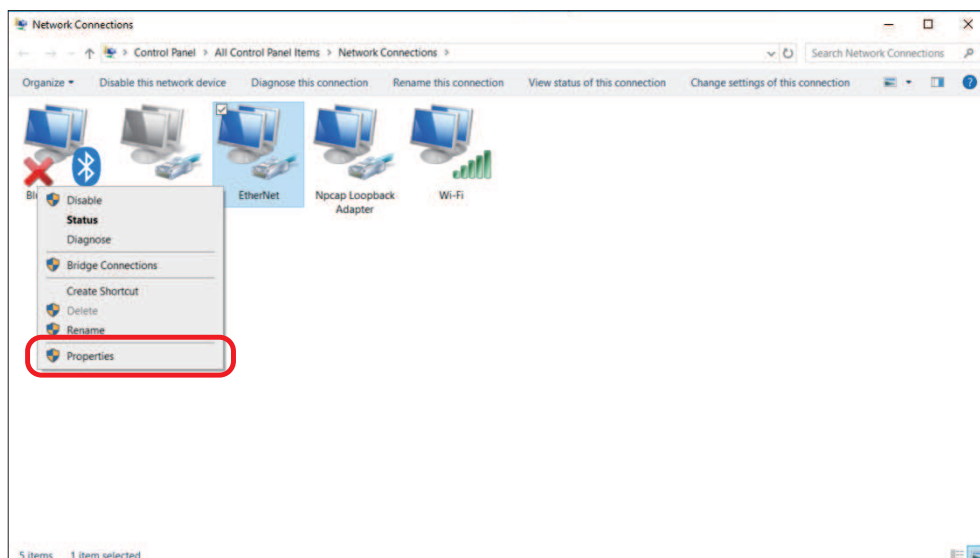
F0304.ai

3. Select "Ethernet" and click "Change adapter options".



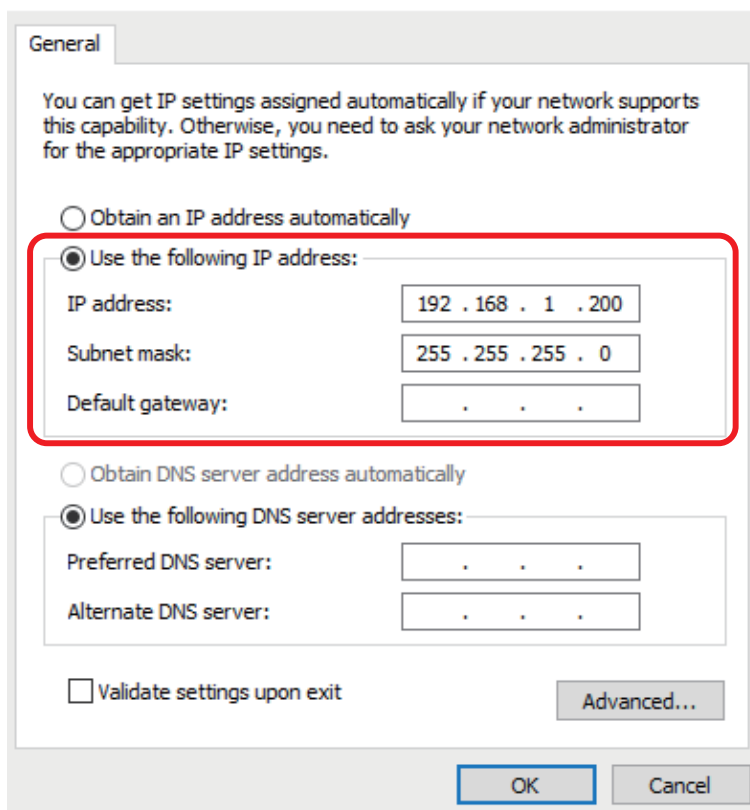
F0305.ai

4. Right-click "Ethernet" (Local Area Network) and select "Properties".



F0306.ai

5. Select "Internet Protocol Version 4" (TCP/IPv4) and press "Properties" button.
6. Select "Use the following address" and enter IP address, Subnet mask.



F0307.ai



Typical settings of IP address, subnet mask and default gateway

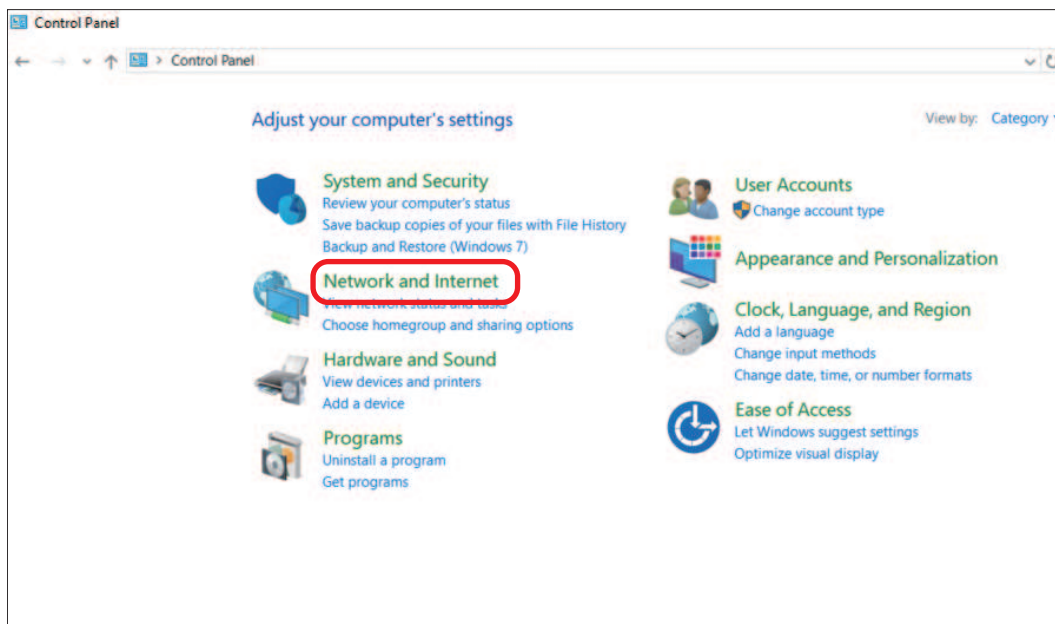
IP address: 192.168.1.xxx (xxx is 1...254 except for 210)

Example setting

- ▶ IP address: 192.168.1.200
- ▶ Subnet mask: 255.255.255.0
- ▶ Default gateway: empty

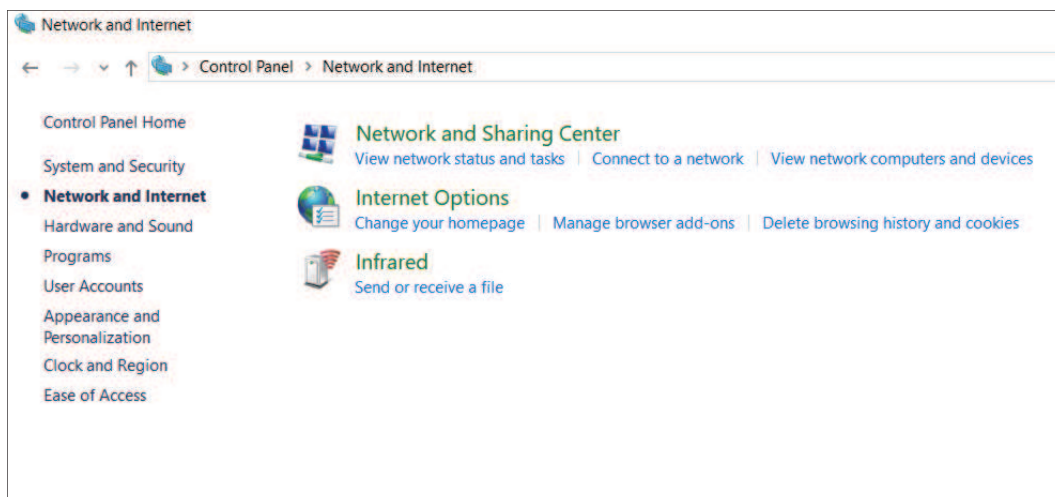
⇒ Default IP address of the device is 192.168.1.210 if no delivery setting is specified.

7. Press "OK" button to close "Internet Protocol Version 4" (TCP/IPv4).
8. Press "OK" button to close "Ethernet" (Local Area Network) properties screen.
9. Move to "Control Panel" and click "Network and Internet".



F0308.ai

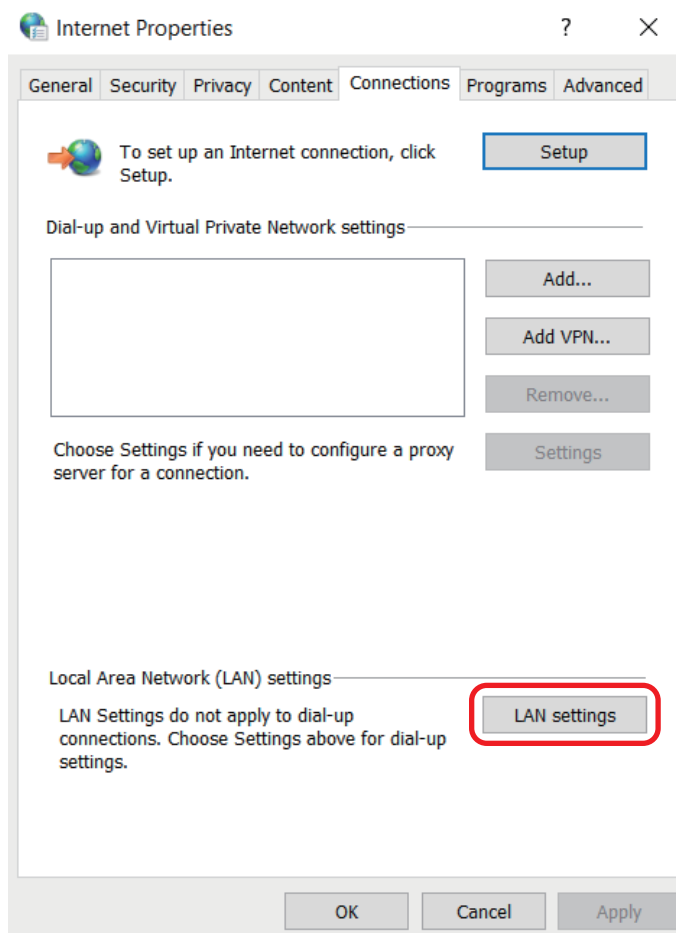
10. Click "Internet Options".



F0309.ai

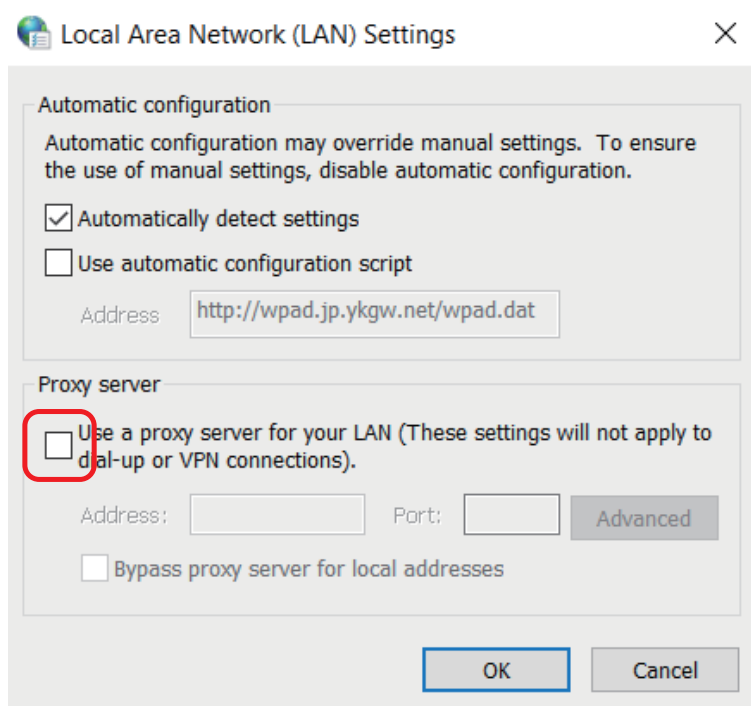
11. Click "Internet Properties".

12. Select "Connections" tab and click "LAN settings" button.



F0310.ai

13. Uncheck "Proxy sever" and click "OK" button.

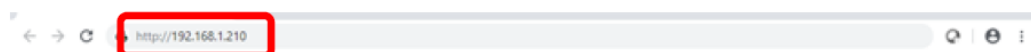


F0311.ai

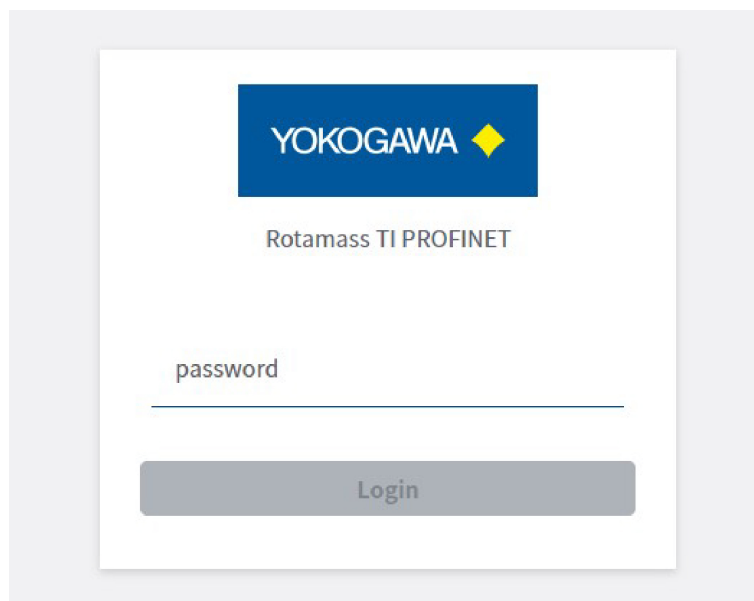
14. Press "OK" button to close "Internet properties screen".

15. Open web browser.

16. Enter `http://192.168.1.210` and press "Enter" button.



17. Enter a password: Rotamass TI



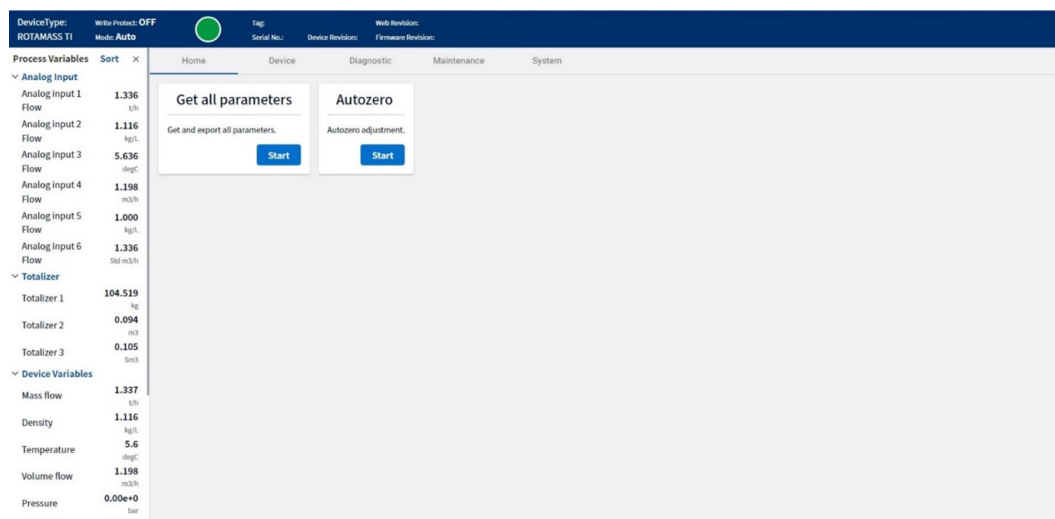
Password is locked for a while due to incorrect password entering 5 times in a row.

Recommend to change the password. Password can be changed from the "System" tab on the top page. Password is 8 byte characters or more, and can be used the 1 byte alphabet, number and the following symbols. Available symbols: `!"#$%&'()*+,-./:;<=>?@[\]^_`{|}~`.

`@[\]^_`{|}~`.

Combination among 1 byte alphabet, number and symbols are recommended for the security.

Top page for parameter settings is shown.



Web page structure

The screenshot shows the web interface for a device. At the top is the **Header** section with device details. Below it is the **Process Variables** section, which is expanded to show a list of variables like 'Analog input 1' through 'Analog input 6' and 'Totalizer 1' through 'Totalizer 3'. To the right of this is the **Menu** section, which has a tree view with options like 'Basic Setup', 'Installation', 'configuration', 'Process Variables', 'Analog Input', 'Totalizer', 'Display select', and 'Date/Time'. The 'configuration' option is selected. On the far right is the **Parameter** section, which displays a table of parameters with columns for 'Parameter name', 'Value', and 'Unit'. The parameters listed are 'Installation orientation' (Vertical), 'Density offset orientation' (3.500e-4 kg/L), 'Flow direction' (positive), and 'Pressure fixed value' (0.00e+0 bar). At the bottom right of the parameter table are buttons for 'Upload from device' and 'Download to device'.



If device is turned off or communication is lost while a Web page is open, the Web page may not be displayed even if you press the reload button on your browser. In that case, please access the TOP page directly.

Header

This area shows device information and status of write protect.

Process Variables

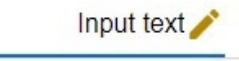
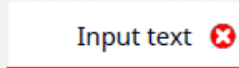
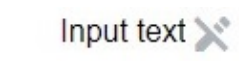
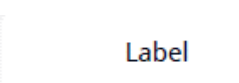
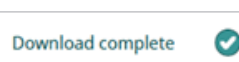
This area shows the process/sensor variables. This can be closed. In addition, variables can be changed the display order from Sort mark.

Menu

This area shows menu structure for parameter settings. See chapter 5 for details of menu structure.

Parameter

This area shows parameters.

Items	Display	Usage	Remarks
Input		Shows parameter inputting	
Wrong input		Shows wrong input parameter value	
Read only		Shows "Read only"	Shows  icon when device returns error response
Read/Write		Shows "Read/Write"	Shows  icon when device returns error response
Read/Write (selectable)		Shows "Read/Write" (selectable)	Shows  icon when device returns error response
Cancellation of input value		Shows to revert original state before inputting	
Parameter writing		Write inputted parameters to device	
Parameter reading		Read current parameters from device	
Writing successful		Writing parameters are successful	
Writing failed		One or more writing parameters are failed	
Help		Help button is NOT active	
Help (active)		Help button is active. If there is no help explanation, empty	
Alarm (no error)		Normal status	
Alarm (error)		Error status	

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* [▶ 50] and *Change log* [▶ 61]
- Data from the *Monitoring history* [▶ 51]
- *Data logging* [▶ 53]
- *Parameter Backup* [▶ 62]

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.

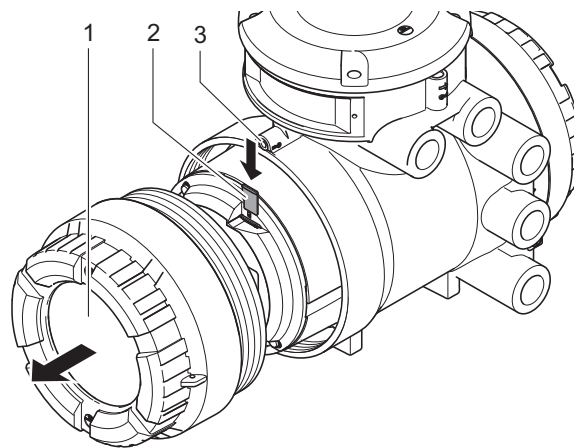


Fig. 2: microSD card on the device

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

On the microSD card, the following files are stored:

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

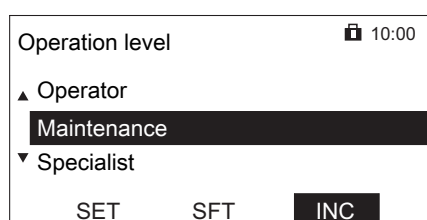
4 System configuration and operation

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. 7: Operation levels and related user rights

Operation level	User rights	Description
Operator	All parameters can be displayed. The following parameter can be used: Language [▶ 86].	No password is required.
Maintenance	All parameters can be displayed. The following parameters can be used: - Language [▶ 86] - Autozero [▶ 102] - Basic setup [▶ 173]	- Password is required. Default value is 0000. - Password can be changed, see Root menu [▶ 342].
Specialist	All parameters can be displayed and all parameters can be used.	- Password is required. Default value is 0000. - Password can be changed, see Root menu [▶ 342].



4.1.1 Select operation level

- Press and hold [SET] for 2 seconds.
- Press [SFT] + [INC] switches to enter [Setting Mode].
 - ⇒ Menu [No] is preselected.
- Press [INC] switch and select [yes], then press [SET].
- [yes] is blinking, then press [SET] switch to enter the menu [Operation level].
- Press [INC] to select the desired operation level.
- 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.
- Press [INC] to choose the first number of the numeric password.
- Press [SFT] to switch to the remaining numbers of the numeric password.
- Press [INC] to choose the remaining numbers of the numeric password.
- 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.	▪ Easy setup wizard [▶ 150] ▪ Basic setup [▶ 177] ▪ Detailed setup [▶ 197] ▪ Additional function [▶ 199]
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.	▪ Easy setup wizard [▶ 152] ▪ Basic setup [▶ 179] ▪ Detailed setup [▶ 203] ▪ Additional function [▶ 204]
Temperature	Temperature of medium is measured by a temperature sensor (RTD) attached to the measuring tube.	▪ Easy setup wizard [▶ 154] ▪ Basic setup [▶ 180] ▪ Detailed setup [▶ 208] ▪ Additional function [▶ 210]
Volume flow	Volume flow is calculated from mass flow and density. In a gas measurement, a fixed density value is used for the calculation.	▪ Easy setup wizard [▶ 156] ▪ Basic setup [▶ 182] ▪ Detailed setup [▶ 212] ▪ Additional function [▶ 215]

Process variable	Outline	Reference
Pressure	Pressure is obtained from a pressure sensor that is connected to the AO function block, or a fixed value can be used. AO function block is necessary on the device and proper configuration is necessary to obtain the value from a pressure sensor. When an external pressure sensor is used, set the value of the parameter External function 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 [Fix val] is used as the pressure value. When an external pressure sensor is used, the measurement at the AO function block for measuring the signal from the pressure sensor should be set prior to the measurement appropriately. Parameters for configuring the external value signal on the AO function block for pressure sensor are as follows: ▪ Unit of pressure to be input at the AO function block: Flow units ▪ LRV of pressure signal: AO function block: Lo limit ▪ URV of pressure signal: Hi Limit After these parameters have been configured, pressure measurement conditions, such as the unit for pressure value ([Unit]), LRV ([LRV]), URV ([URV]), should be configured.	▪ Detailed setup [217] ▪ Additional function [219]
Reference density	Density value at reference temperature, which is calculated by a quadratic polynomial with user-defined coefficients for the calculation. To use this function, reference temperature, 1st order and 2nd order temperature coefficients have to be set. Reference density is calculated by the following formula: $\text{Reference density} = \rho / (1 + A (t - t_{\text{ref}}) + B (t - t_{\text{ref}})^2)$ ρ: measured density value (or specified fixed density) t: measured temperature t_{ref}: reference temperature (parameter: [Ref temp]) A: 1st order coefficient (parameter: [Temp coeff A]) B: 2nd order coefficient (parameter: [Temp coeff B])	▪ Detailed setup [221] ▪ Additional function [223]

Process variable	Outline	Reference
Relative density	Relative density is relative to a specified density reference, such as specific gravity, Baume degree or API degree. 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.	▪ Detailed setup [225] ▪ Additional function [228]
Corrected volume flow	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.	▪ Detailed setup [229] ▪ Additional function [231]
Calorific value	Calorific value (energy) is a value obtained from an AO function block or a fixed value. When calorific value is obtained from AO function block, set the value of the parameter External function 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. When the calorific value is obtained from an AO function block, the current measurement on the external calorific value for measuring the signal should be set prior to the measurement. Parameters to configure the input signal on the AO function block for calorific value are as follows. ▪ Unit of calorific value to be input at the AO function block: Flow units ▪ LRV of calorific value signal: AO function block: Lo limit ▪ URV of calorific value signal: AO function block: Hi limit 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 – 3 [302] as Energy. When using Energy, the same unit as Calorific value has to be set on Energy.	▪ Detailed setup [233]
Velocity	The Flow velocity of the medium is calculated from volume flow.	▪ Detailed setup [234]
Concentration (option)	Concentration is calculated from density and temperature.	▪ Detailed setup [235]

Process variable	Outline	Reference
Net mass flow (option)	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 or AC_ is enabled on the device. 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.	Net mass flow 1 – 2 [▶ 260]
Net volume flow (option)	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 or AC_ has been enabled on the device. 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.	Net volume flow 1 – 2 [▶ 264]
Net corrected volume flow (option)	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 or AC_ 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.	Net corrected volume flow [▶ 268]
Viscosity (option)	Viscosity calculates the value from delta pressure. To calculate it, delta pressure has to be received via AO function block. It is available if the Viscosity option VM has been enabled on the device.	- Detailed setup [▶ 272] - Additional function [▶ 274]



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* [▶ 149], Basic setup, *Installation configuration* [▶ 175] or Detailed setup, *Installation configuration* [▶ 195].

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

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 parameter of each process variable.	[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 parameter of each process variable.	[Conv factor], [Unit]

4.3 Pulse/Frequency signal output

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



Pulse/Frequency signal can be used only for local calibration. Do not use the function for plant operation.

	Process variable that can output a frequency signal to the Pulse/Frequency output
Standard	▪ Mass flow ▪ Density ▪ Temperature ▪ Volume flow ▪ Reference density ▪ Relative density ▪ Corrected volume flow ▪ Pressure: – Measured value if external value is available and pressure sensor is connected and configured. – Fixed value if external value is not available. ▪ Drive current
Option	The following parameters are available if the concentration measurement option CST, AC_ or C52 has been enabled: ▪ Concentration ▪ Net mass flow ▪ Net volume flow ▪ Net corrected volume flow The following parameter is available if the Viscosity VM has been enabled: ▪ Viscosity

	Process variable that can output a pulse signal to the Pulse/Frequency output
Standard	▪ Mass flow ▪ Volume flow ▪ Corrected volume flow ▪ Energy
Option	The following parameters are available if the concentration measurement option CST, AC_ or C52 has been enabled: ▪ Net mass flow ▪ Net volume flow ▪ Net corrected volume flow

One of 2 output signal types - Fixed pulse output or Frequency output - can be selected and used.

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

- *Easy setup wizard* [▶ 159]
- *Detailed setup* [▶ 292]

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):

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

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

Tab. 8: 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 $\geq 5s$. 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.

4.4 Totalizer

A maximum of three 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	▪ Mass flow ▪ Volume flow ▪ Corrected volume flow ▪ Energy
Option	The following parameters are available if the concentration measurement option CST, AC_ or C52 has been enabled: ▪ Net mass flow 1 ▪ Net mass flow 2 ▪ Net volume flow 1 ▪ Net volume flow 2 ▪ Net corrected volume flow

Each totalizers value can be displayed on the LCD of the Indicator and can be transmitted through PROFINET communication. The totalizing mode assigned to a flow process variable can be selected from one of the following 4 modes. In addition, the density totalizer function can be used. For details, see *Detailed setup* [▶ 302]

Totalizer modes	Description
Balanced	Positive and negative incoming values. The differential between the positive and negative incoming values.
Positive only	Only positive incoming values. Default configuration for Totalizer 1 – 3.
Negative only	Only negative incoming values. Default.
Hold	Value is held, not changed.

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* [▶ 166].

To configure all functions of Totalizer 1 – 3, refer to *Detailed setup* [▶ 302].

4.5 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:

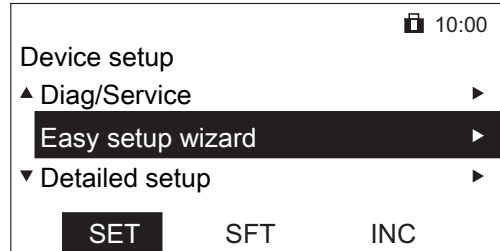
Wizard menu	Description
Installation configuration	Configuration of parameters for basic installation. ▪ Step-by-step instruction serving as an example, see chapter <i>Installation configuration</i> [▶ 39]. ▪ For more detailed information, see chapter <i>Installation configuration</i> in the menu description [▶ 147].
Standard device variables	Configuration for measurement of basic process variables, such as process variable, range, damping, etc. ▪ Step-by-step instruction serving as an example, see chapter <i>Configure Standard device variables</i> [▶ 42]. ▪ For more detailed information, see chapter <i>Standard device variables</i> in the menu description [▶ 150].
Pulse/Frequency output	Configuration for pulse/status output, such as process variables, unit, pulse width, pulse rate, etc. or status signal. ▪ Step-by-step instructions, see chapter <i>Pulse/Frequency output</i> [▶ 43]. ▪ For more detailed information, see chapter <i>Pulse/Frequency output</i> in the menu description [▶ 159].
Totalizer	Configuration for totalizer, such as process variables, unit, action at alarm, totalizing scheme, etc. ▪ Step-by-step instruction, see <i>Configure Totalizer</i> [▶ 45]. ▪ For more detailed information, see chapter <i>Totalizer</i> in the menu description [▶ 166].
Display select	Configuration to set process variables to be displayed on 1 to 4 lines on display. ▪ Step-by-step instruction, see <i>Configure Display select</i> [▶ 46]. ▪ For more detailed information, see chapter <i>Display select</i> in the menu description [▶ 168].
Date/Time	Configuration of date and time. ▪ Step-by-step instruction, see <i>Configure Date/Time</i> [▶ 47]. ▪ For more detailed information, see chapter <i>Date/Time</i> in the menu description [▶ 171].

4.5.1 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* [▶ 28].

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



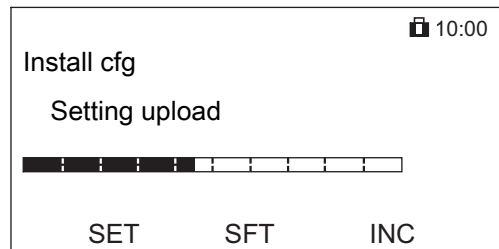
2. Press [SET] to enter the menu [Easy setup wizard].

⇒ Menu [Install cfg] is preselected.



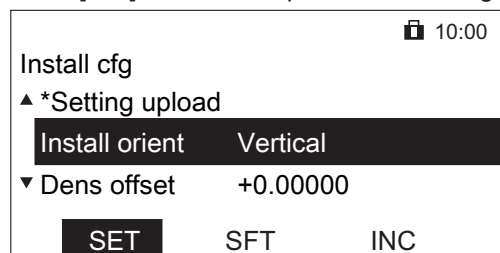
3. Press [SET] to enter the menu [Install cfg].

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

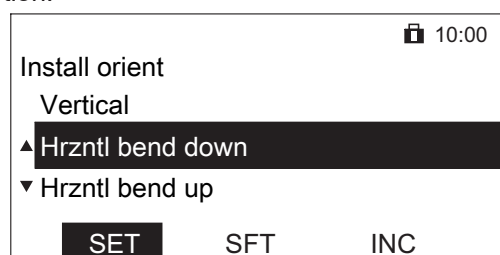


⇒ Parameter [Install orient] is preselected.

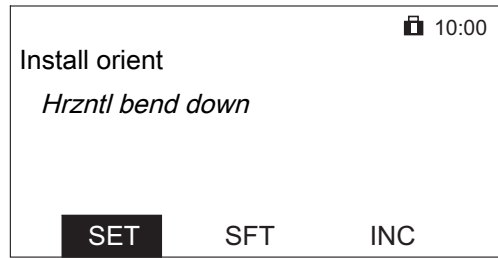
4. Press [SET] to enter the parameter settings of [Install orient].



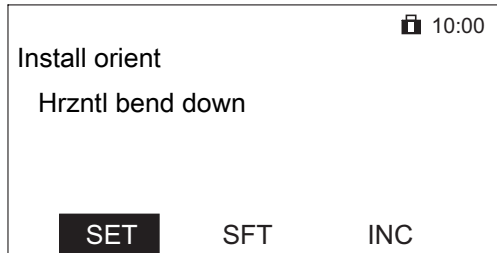
5. Press [INC] until [Hrzntrl bend down] is selected and press [SET] to choose the selection.



⇒ The chosen value flashes.



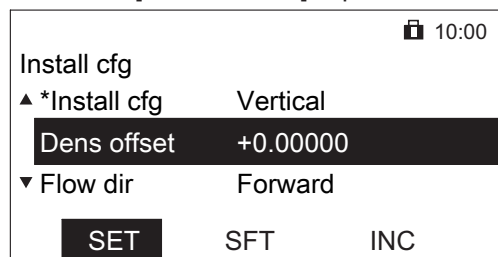
6. Press [SET] to confirm.



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.

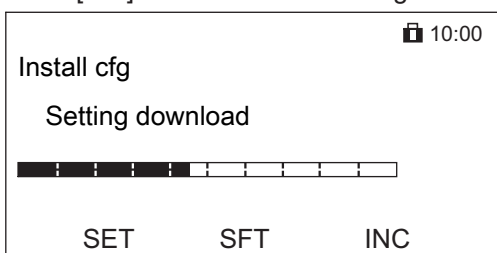
14. Press [SET] to set the value.

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

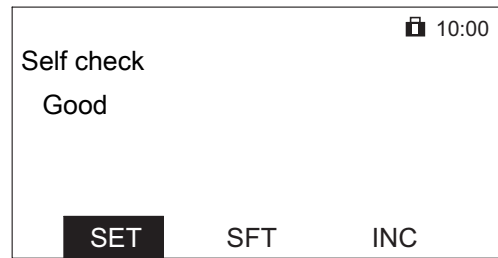
16. Continue to configure the other parameters: [Flow dir] and [Fix val] can be configured in the same way.

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* [▶ 426].

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

4.5.2 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* [▶ 28].

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* [▶ 426].

21. Press and hold [SFT] 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.

4.5.3 Pulse/Frequency output

Wizard to configure Pulse/Frequency 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/Frequency output

Configuration of Pulse/Frequency 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* [▶ 28].

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/Sts1 mode] is preselected.
6. Press [SET] to enter the selection [Pls/Sts1 mode].
7. Press [INC] to select [No func], [Fix pls out] or [Freq out]. For additional information, see *Pulse/Frequency Output* [▶ 292].
8. Press [INC] to select the output mode.
9. Press [SET] to choose the selection.
 - ⇒ The chosen value flashes.
10. Press [SET] to confirm.
 - ⇒ The chosen [Pls/Sts1 mode] flashes.
11. Press [SET] to go back to the menu [Pls/Sts cfg].
12. After configuration, press [INC] until the parameter [Setting download] is selected.
13. 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* [▶ 426].

Configure Single Pulse and Frequency output

If Pulse/Frequency 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* [► 28].

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/Frequency 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 [sel] is preselected.
7. Press [SET] to enter the selection [sel].
8. Press [INC] until the desired variable is selected and press [SET] to choose the selection. For additional information, see *Pulse output* [► 160].
 - ⇒ The chosen value flashes.
9. Press [SET] to confirm.
10. Press [SET] to go back to the menu [Pls out1].
 - ⇒ Parameter [sel] 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* [► 160].
 - ⇒ 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* [► 163].
 - ⇒ 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 [SET] 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* [▶ 164].
 - ⇒ 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* [▶ 426].

4.5.4 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.

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* [▶ 28].

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 [channel1] is preselected.
6. Press [SET] to enter the selection [channel1].
7. Press [INC] until the desired variable is selected and press [SET] to choose the selection. For additional information, see *Total 1 – 3 channel* [▶ 166].
 - ⇒ The chosen value flashes.
8. Press [SET] to confirm.
9. Press [SET] to go back to the menu [Tt11].
 - ⇒ Parameter [channel1] 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* [▶ 167].
 - ⇒ 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* [▶ 167].
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 [Setting download] is preselected.
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* [▶ 426].
 - ⇒ The parameter [Tt12] and [Tt13] can be configured in the same way.
20. Press and hold [SFT] and press [SET] twice to go back to the menu [Easy setup wizard].

4.5.5 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* [▶ 28].
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* [▶ 168].
 - ⇒ 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* [▶ 426].
12. Press and hold [SFT] and press [SET] to go back to the menu [Easy setup wizard].

4.5.6 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* [▶ 28].

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 [**SET**] 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* [▶ 426].
24. Press and hold [**SET**] and press [**SET**] to go back to the menu [**Easy setup wizard**].

4.6 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

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* [▶ 49].



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* [▶ 372].

4.6.1 Event setting

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

Tab. 9: 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.
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.

Configurable behavior

Configurable event behaviors can be defined by setting the value in the event setting parameters, see chapters *Alarm/Event behavior settings* [▶ 104] 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. 10: Event setting behavior when event occurs

Behavior type	Notification	Record of history	
		Event	Data
Ignore	✗	✗	✗
History only	✗	✓ ²	✗
Generate	✓ ¹	✓ ³	✗
Monitor	✓ ¹	✓ ³	✓ ⁴

¹ Notification of the event by display.

² Occurrence of the event is recorded along with time information in the event history. For detailed information, see chapter *Event history* [▶ 50].

- ³ Reset of the event is recorded along with time information in the event history. For detailed information, see chapter Event history [▶ 50].
- ⁴ Three samples of data before and after the event – six samples total – are recorded in monitoring. For detailed information, see chapter Monitoring history [▶ 51].

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* [▶ 54].

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* [▶ 92].

4.6.2 Event history

If History only, Generate or Monitor 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] or [Monitor] is defined as the event setting behavior of an event.
 - ✓ Operation level has been *selected* [▶ 28].
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* [▶ 97].

4.6.3 Monitoring history

If Monitor 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.

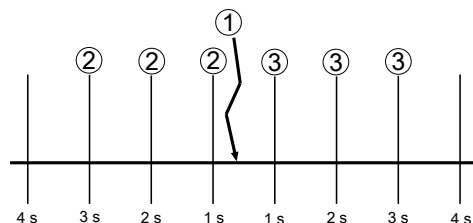


Fig. 3: Monitoring variables before and after an event

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

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
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

Order	Parameter	Example of value
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
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

Order	Parameter	Example of value
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
84	TuHC change ratio of inlet stiffness	0.00E+00
85	TuHC change ratio of outlet stiffness	0.00E+00

4.6.4 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. As long as data logging is running, the status icon *Access to microSD card* blinks on the LCD display *Display* [▶ 13], and the value of the parameter Logging Execute is changed to "Execute". See also *Data logging* [▶ 140].

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* [▶ 372].

If the additional functions for display are *enabled* [▶ 53], trend charts of logged process variables can be shown on the main *display* [▶ 54].

Trend charts of LRV and URV can also be shown on the main display. For additional information, see chapters *Trend Offline LRV* [▶ 338] and *Trend Offline URV* [▶ 339] in the menu description.

Set data logging functions

✓ [Specialist] is selected as the *operation level* [▶ 28].

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 [Itrvl time], select logging type [Log sel1 - 4], choose end time [End time] and execute [Exe] the data logging manually as described in *Data logging* [▶ 136].

Enable Additional function menu

✓ [Specialist] is selected as the *operation level* [▶ 28].

✓ 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* [► 28].
 - ✓ 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 sel] is selected.
 6. Press [SET] to enter the menu [Disp sel].
 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.

4.6.5 Possible events and related settings and behavior

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

- *Process alarms* [► 57]
- *Setting alarms* [► 58]
- *Warnings* [► 60]
- *Information* [► 61]

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.

This chapter shows the device specific alarms. See troubleshooting about PROFINET specific alarms.

Tab. 11: Explanation of statuses

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

System alarms

Tab. 12: System alarms 101 – 109

NE 107	Alarm no.	Event/Alarm name	Event setting	Total-ing	Pulse/Freq. out-put ¹	
					Pulse	Freq.
F	101	Resonance frequency failure	Generate	Hold	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		Depends ²		
F	108	Temperature sensor failure				

¹ The status of the Pulse/Freq. output is configurable for all alarms.

² If Alarm out is selected as the output signal behavior, outputs and totalizer functions can be defined.

Tab. 13: System alarms 121 – 129

NE 107	Alarm no.	Event/Alarm name	Event setting	Total-ing	Pulse/Freq. out-put ¹	
					Pulse	Freq.
F	121	Main board CPU failure	Generate	Not defined	Not defined	
F	122	Main board EEPROM failure		Hold	Stop	
F	123	Parameter restore incom- plete				
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 fail- ure				
F	129	Option board mismatch				

¹ The status of the Pulse/Frequency output is configurable for all alarms.

Tab. 14: System alarms 130 – 143

NE 107	Alarm no.	Event/Alarm name	Event setting	Total- ing	Pulse/Freq. out- put ¹	
					Pulse	Freq.
F	130	Indicator board failure	Generate		Depends ²	
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				
F	141	Option board communication error1		Hold	Stop	
F	142	Option board communication error2				
F	143	Option board communication error3				

¹ The status of the Pulse/Frequency output is configurable for all alarms.

Process alarms

Tab. 15: Process alarms 201 – 212

NE 107	Alarm no.	Event/Alarm name	Event setting	Total-ing	Pulse/Freq. out-put ¹	
					Pulse	Freq.
S	201	Slug detection	Configurable [▶ 105]	Depends ^{2, 3}		
S	202	Empty pipe detection	Configurable [▶ 105]			
S	203	Corrosion detection	Configurable [▶ 106]			
M	204	Autozero judgement multi-phase	Generate	Depends ³		
M	205	Autozero judgement flow				
M	206	Autozero judgement temperature				
S	210	Oil density calculation failure	Generate	Continue		
S	211	Water density calculation failure				
S	212	NOC calculation failure				

¹⁾ The status of the Pulse/Frequency output is configurable for all alarms.

²⁾ If Generate or Monitor are defined as the event setting behavior, a selectable output signal behavior is executed when an event occurs.

³⁾ If Alarm out is selected as the output signal behavior, outputs and totalizer functions can be defined.

Setting alarms

Tab. 16: Setting alarms 301 – 320

NE 107	Alarm no.	Event/Alarm name	Event setting	Total-ing	Pulse/Freq. out-put ¹	
					Pulse	Freq.
C	301	Mass flow configuration error	Generate		Depends ²	
C	302	Density configuration error				
C	303	Temperature configuration error				
C	305	Pressure configuration error				
C	307	Volume flow configuration error				
C	308	Reference density configura-tion error				
C	309	Relative density configura-tion error				
C	310	Corrected volume flow configuration error				
C	311	Calorific value configuration error				
C	313	Concentration configuration error				
C	314	Net mass flow 1 configura-tion error				
C	315	Net mass flow 2 configura-tion error				
C	316	Net volume flow 1 configura-tion error				
C	317	Net volume flow 2 configura-tion error				
C	318	Net corrected volume flow configuration error				
C	319	Velocity configuration error			Continue	
C	320	Viscosity configuration error				

¹ The status of the Pulse/Freq. output is configurable for all alarms.

² If Alarm out is selected as the output signal behavior, outputs and totalizer functions can be defined.

Tab. 17: Setting alarms 323 – 324

NE 107	Alarm no.	Event/Alarm name	Event setting	Total-ing	Pulse/Freq. out-put ¹	
					Pulse	Freq.
C	323	Pulse output configuration error			De-pends or Con-tinue ²	Con-tinue
C	324	Frequency output configura-tion error			Con-tinue	De-pends or Con-tinue ²

¹ The status of the Pulse/Freq. output is configurable for all alarms.

² If Alarm out is selected as the output signal behavior, outputs and totalizer functions can be defined.

Tab. 18: Setting alarms 335 – 342

NE 107	Alarm no.	Event/Alarm name	Event setting	Total-ing	Pulse/Freq. out-put ¹	
					Pulse	Freq.
N	335	Totalizer 1 configuration error	Generate	De-pends ²	Continue	
N	336	Totalizer 2 configuration error				
N	337	Totalizer 3 configuration error				
C	342	Data logging not started			Continue	

¹ The status of the Pulse/Freq. output is configurable for all alarms.

² If Alarm out is selected as the output signal behavior, outputs and totalizer functions can be defined.

Warnings

Tab. 19: Warnings 703 – 718

NE 107	Alarm no.	Event/Alarm name	Event setting	Total-ing	Pulse/Freq. out-put ¹	
					Pulse	Freq.
C	703	Density fixed	Configurable [▶ 107]	Con- tinue	Continue	
C	704	Temperature fixed	Configurable [▶ 108]			
C	705	Pressure fixed	Configurable [▶ 108]			
C	706	Reference density fixed	Configurable [▶ 109]			
C	707	Calorific value fixed	Configurable [▶ 109]			
C	710	Pulse output simulation	Generate			
C	711	Status output simulation				
C	715	Process variable trimming	Configurable [▶ 110]			
S	718	Pulse output saturated	Configurable			

¹ The status of the Pulse/Freq. output is configurable for all alarms.

Tab. 20: Warnings 721 – 735

NE 107	Alarm no.	Event/Alarm name	Event setting	Total-ing	Pulse/Freq. out-put ¹		
					Pulse	Freq.	
C	721	Autozero running	Generate	Con- tinue	Hold		
N	722	Tube health check execution error			Configurable [▶ 112]	Continue	
N	723	Date/Time not set					
N	724	Display over warning	Generate				
N	725	microSD card size warning					
S	726	microSD card mismatch					
M	728	microSD card removal pro- cedure error					
M	729	Parameter backup incom- plete					
C	730	Parameter restore running	Hold				
M	733	Viscosity not calculated	Continue				
M	734	Viscosity not reliable					
M	735	Autozero warning					

¹ The status of the Pulse/Freq. output is configurable for all alarms.

Information

Tab. 21: Information 901 – 932

NE 107	Alarm no.	Event/Alarm name	Event setting	Total-ing	Pulse/Freq. out-put ¹	
					Pulse	Freq.
N	901	Device configuration locked	Configurable [▶ 113]	Con- tinue	Continue	
N	902	Device configuration not locked	Configurable [▶ 113]			
N	903	Parameter backup running	Generate			
N	904	Data logging running				
N	905	Tube health check running				
C	909	Maintenance mode running			Depends ²	
N	921	Event history cleared	History only		Continue	
N	923	microSD card inserted				
N	924	micro SD card removed				
N	925	Power on				
N	926	Watchdog reset executed				
N	927	Instant power fail				
N	929	Tube health check completed	Monitor			
N	931	Option board power on				
N	932	Option board watchdog reset executed				

¹ The status of the Pulse/Freq. output is configurable for all alarms.

² If Alarm out is selected as the output signal behavior, outputs and totalizer functions can be defined.

4.6.6 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 *Parameter list* [▶ 433]
- 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* [▶ 372].

When parameter is written via PROFINET, change log is worked based on the following restrictions.

- Change log is not stored when PROFINET specific parameter is written.

4.7 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* [▶ 141].



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.



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.

4.7.1 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.

The PROFINET communication relevant parameters are not included.



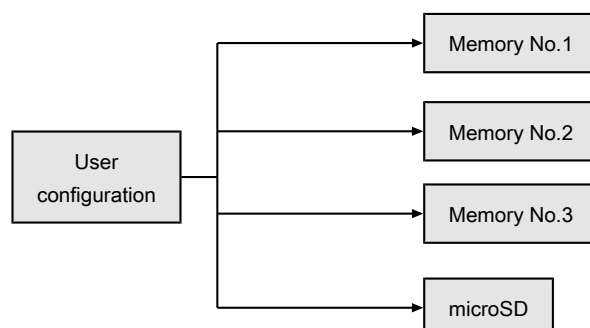
Note the chapter containing *Handling of microSD* [▶ 63].

The configuration of the device can be backed up by using the parameter *User configuration backup* [▶ 141].

The following operations can be performed. For details, see *Parameter backup/restore* [▶ 140].

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* [▶ 141].



4.7.2 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.

The PROFINET communication relevant parameters are not included.



When restoration is performed, Target mode in all Physical block is set to O/S and its block mode settings are automatically restored if the restoration is finished without any problem.



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* [▶ 140].

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* [▶ 143].

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

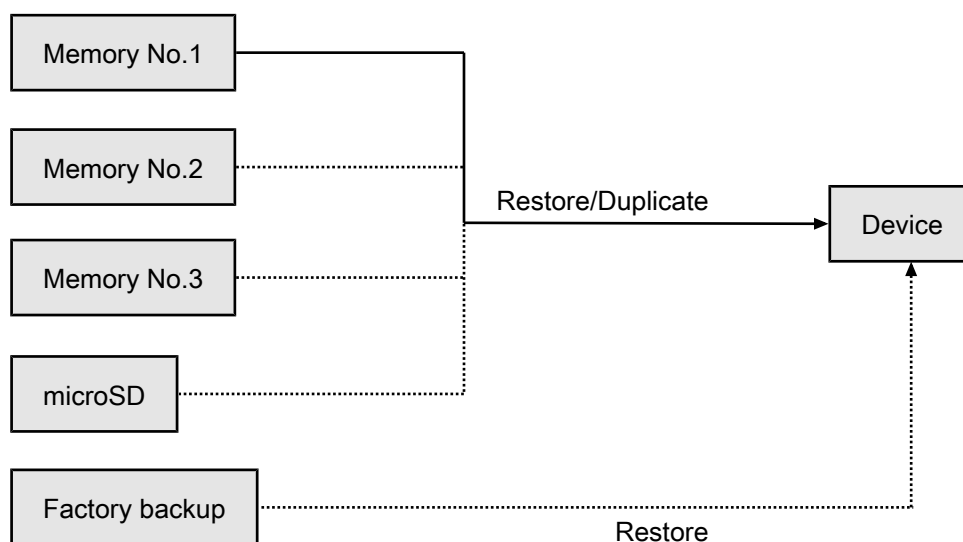
If the function cannot be used, e.g., the hardware configuration is different from that in the backup file, an error message appears and the backup is not restored.

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* [▶ 143]. 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.

4.8 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* [▶ 235].

4.8.1 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_{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_{carrier}	First-order density-temperature coefficient of the carrier liquid
b_{carrier}	Second-order density-temperature coefficient of the carrier liquid
ρ_{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_{product}	First-order density-temperature coefficient of the product/substance
b_{product}	Second-order density-temperature coefficient of the product/substance
ρ_{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_{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_{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 ρ_{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* [▶ 236].

Variable	Parameter on the device
T _{ref}	Concentration reference temperature set 1 – 4
ρ _{ref(carrier)}	Concentration reference density carrier set 1 – 4
a _{carrier}	Concentration temperature coeff A carrier set 1 – 4
b _{carrier}	Concentration temperature coeff B carrier set 1 – 4
ρ _{ref(product)}	Concentration reference density product set 1 – 4
a _{product}	Concentration temperature coeff A product set 1 – 4
b _{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 IM 01U10C10-00_--R.

4.8.2 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
ρ_{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* [▶ 242].

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

For typical concentration measurements, pre-defined parameter sets are provided. For more detailed information refer to the general specification of the device.

4.8.3 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 PROFINET:

- 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 PROFINET, 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: ▪ 0 = Concentration (mass) ▪ 1 = Concentration (volume) ▪ 2 = Water cut
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	ρ_{oil}	Indicates the value of Oil Density. The unit set under Density unit applies.
NOC Water Density	ρ_{water}	Indicates the value of Water Density. 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. 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. 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. 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. 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. The unit set under Net corrected volume flow unit applies.
NOC GVF Value	GVF	Indicates the value of GVF (Gas Void Fraction).

Parameter Name	Variable	Explanation
NOC GVF Select	-	Selects the mode of "Inhibit" or "Enable" for the value of GVF (Gas Void Fraction). 0 = Disable 1 = Enable
NOC Pressure Value Fixed	P	Sets the value of Pressure for NOC calculation. 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. 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. The unit set under Density unit applies.
NOC Oil Calculator	-	Selects the calculation method for oil density: 0 = Off 1 = Crude oil 2 = Products 3 = Lubricating oil 4 = Fixed thermal exp factor 5 = Other
NOC Oil Thermal Expansion Factor	α_{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: 0 = SMOW 1 = UNESCO1980 2 = Fresh water 3 = Produced water 4 = Brine water 5 = STD formula (Standard formula)
NOC Salinity ppt	S_{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_{brine}	Defines the fixed value of salinity, when "3:Produced water" is selected and "NOC Reference Water Density" is set to 0.

Parameter Name	Variable	Explanation
NOC Water Density UN-ESCO1980	-	Selects the type of density for calculation: 0 = SMOW 1 = VSMOW This parameter is necessary in situations where "1 = UNESCO1980" has been selected under NOC Water Calculator.
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. 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, 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, 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 α_{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 (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) (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, ρ_{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 $\rho_{\text{water(smow)}}$ (kg/m³) of Standard Mean Ocean Water at temperature t_c (°C) is calculated as follows:

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

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/m³) at temperature t_c (°C) is calculated by the following equation.

ρ_{ref} , the density (kg/m³) of produced water at 15 (°C) or 60 (°F), or S_{unesco} , the salinity of produced water, have to be specified by the user. The salinity of produced water S_{unesco} is calculated by the following equation from ρ_{ref} , the density (kg/m³) 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/m³), water density according to UNESCO1980 at temperature t_c (°C) is calculated by the following equation. $\rho_{\text{water(smow)}}$ or $\rho_{\text{water(vsmow)}}$ can be used as base density of this calculation:

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

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/m³), 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))

ρ_0 999.97358 (kg/m³), density of fresh water at t_0

t_0 3.9818 (°C)

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

ρ_{ref} , the density (kg/m³) 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/m³), 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/m³), 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
ρ_{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%)
ρ_{oil}	calculated density of the oil at the current temperature
ρ_{water}	calculated density of the water liquid at the current temperature
ρ_{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%)
ρ_{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
 ρ_{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%)
 ρ_{meas} actual measured density
 ρ_{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%)
 ρ_{oil} calculated density of the oil at the current temperature
 ρ_{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:

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

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

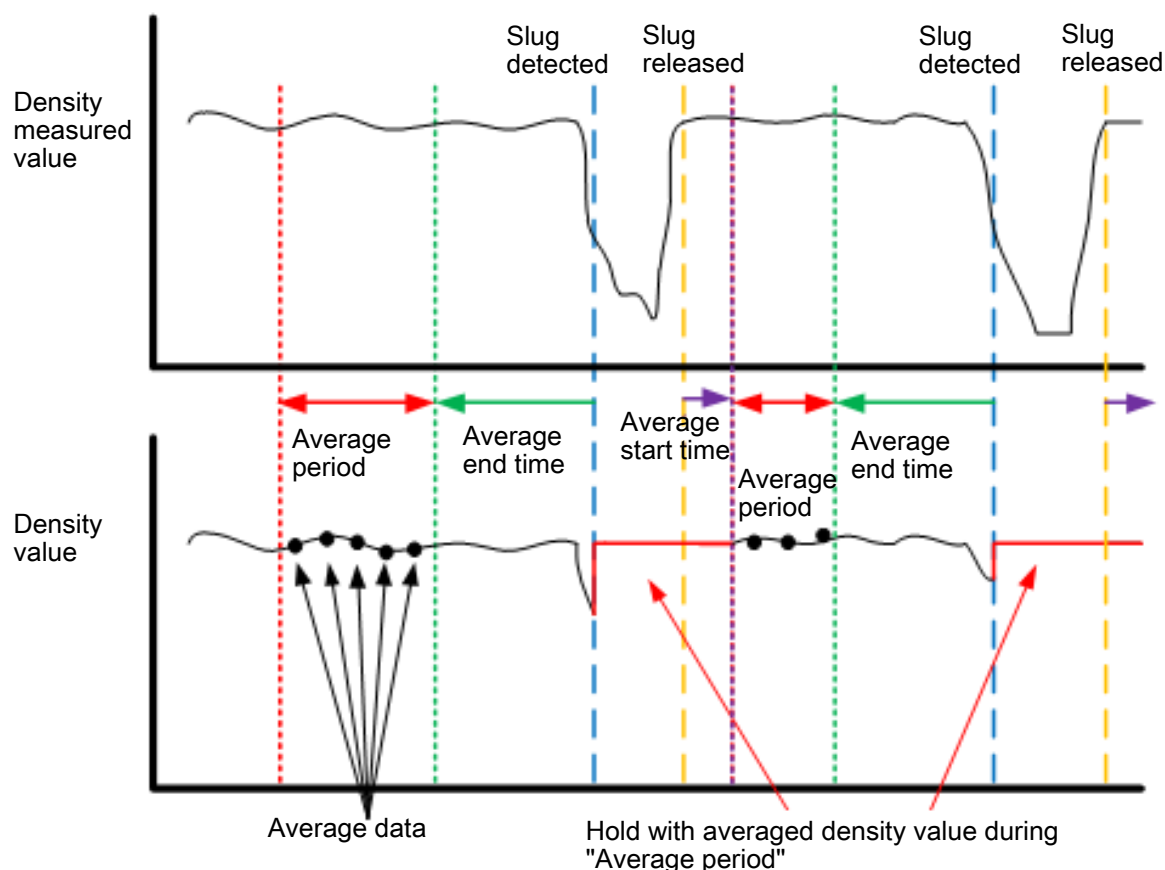
$MassFlow_{meas}$	actual measured mass flow of the mixture
$MassFlow_{oil}$	net mass flow of oil
$VolFlow_{oil}$	net volume flow of oil
ρ_{oil}	calculated density of the oil at the current temperature

4.9 Diagnosis

4.9.1 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* [114].

4.9.2 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* [117].

4.9.3 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* [▶ 118].

4.9.4 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 ± 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* [▶ 120].
 - ⇒ 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 Total Insight 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.

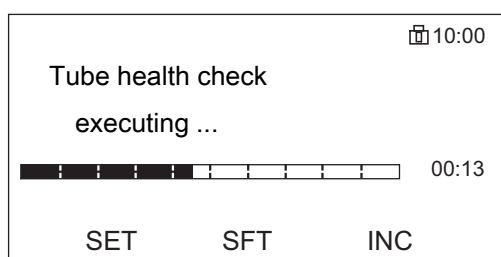
- ✓ Appropriate reference values for the tube health check must be obtained.

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* [▶ 126].

Configuration	Parameter	Outline
Check interval	TuHC Continue Interval	Setting range: 0 – 65535 min. Default value is 60 min.
Number of checks	TuHC Continue Number	Setting range: 0 – 65535. Default value is 1. If 0 is set, the check continues until it is manually aborted.
Threshold for detection	TuHC Stiffness Change Limit	Threshold value for tube stiffness. Setting range: 0.5 – 100 %. 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. Setting range: 0 – 65535. 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. Setting range: 0 – 65535 mins. 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* [▶ 122].
 - ⇒ 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	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: ▪ TuHC Alarm ▪ TuHC Warning 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.
Error	Change of tube stiffness exceeds the threshold value and alarm 203 occurs.

Value	Description
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.

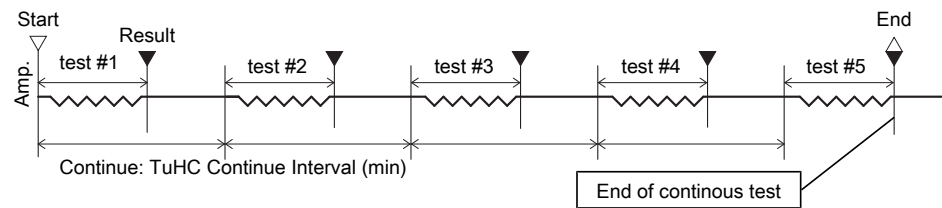


Fig. 4: Test with *TuHC continue number* = 5

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.

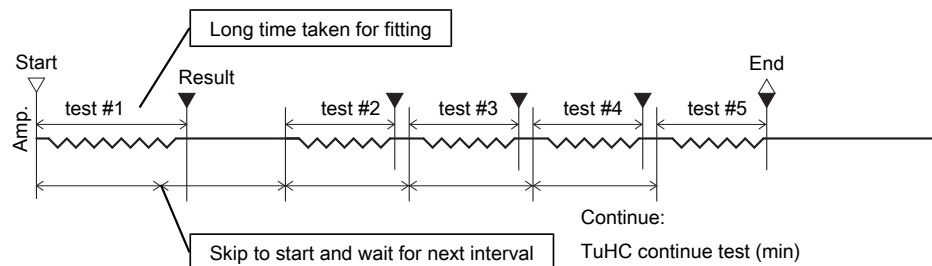


Fig. 5: Test with *TuHC continue number* = 5

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*.

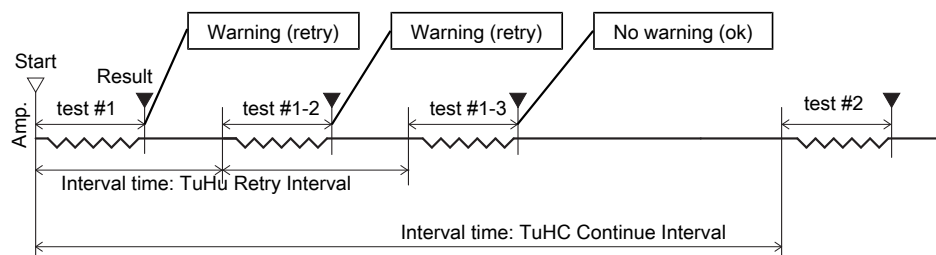


Fig. 6: Execute *Continue: number* times



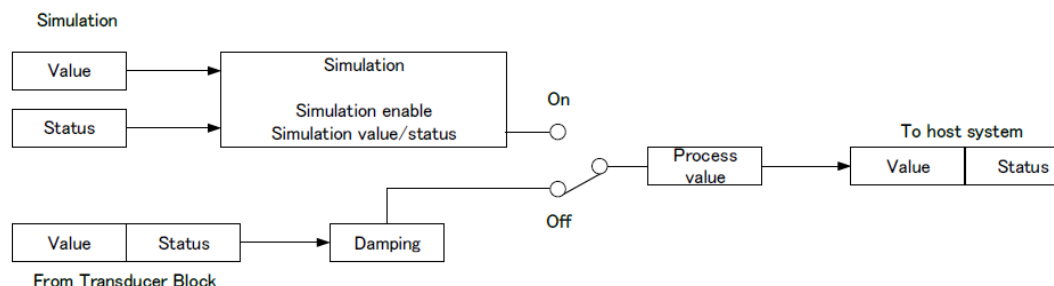
In order to perform Tube health check without count limitation, the *TuHC* retry interval needs to be set to more than 1440 minutes if *TuHC* retry number is 0.

4.10 Explanation of basic items on Analog input/output function blocks

4.10.1 Analog input block

The AI function block is a unit of the software. During execution, it incorporates data from the Flow/Concentration/Advanced Diagnostics transducer block. After execution, it updates analog outputs and processes newly generated alarms. In terms of function, there is no difference between the six AI function blocks provided in Rotamass TI.

The AI function block, via the Channel, incorporates analog signals from the transducer block, performs scaling processing, filtering, signal linearization, fail safe control and alarm processing before outputting. The following figure presents the AI function block.



Flow (FLOW): The function block parameter Flow contains the current measurement value with Flow unit in Auto mode.

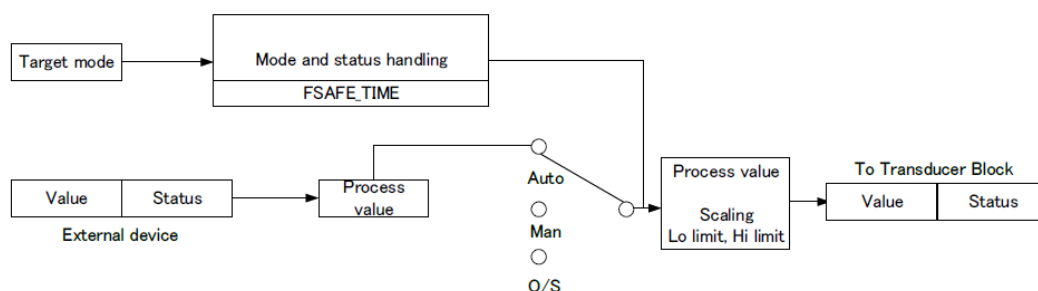
Simulation (SIMULATE): Simulation parameters are used to simulate mainly for checking arbitrarily set the value and status by operator etc.

Damping (DAMPING): Damping time of the process variable.

4.10.2 Analog output function block

The AO function block is a unit of the software. During execution, it incorporates data from external device which is connected to the AO. After execution, it updates value from external device and send it to Flow Transducer Block.

AO function block for Rotamass TI can use the block only to receive the value from external device. The AO function block is connected to Flow Transducer Block. The following figure presents the AO function block for Rotamass TI.



Target Mode: The target modes permitted for the AO function block are Automatic (Auto), Manual (Man), and Out of Service (O/S). When the target mode of PB (Physical Block) is Out of Service (O/S), Actual is Out of Service (O/S) even if Automatic (Auto) or Manual (Man) is written to Target.

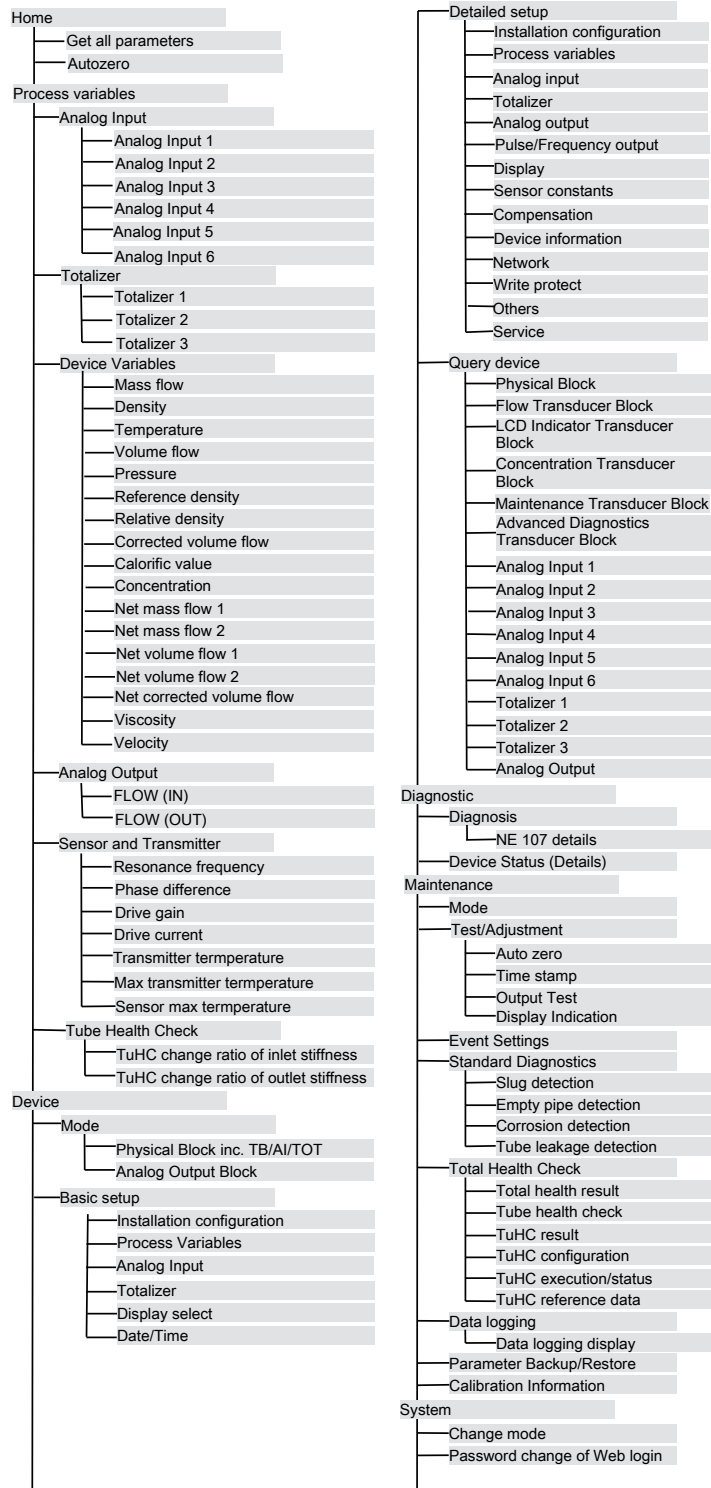
Flow (FLOW): The function block parameter Flow contains the external measurement value.

Out (FLOW_OUT): The function block parameter Out contains the external measurement value with Flow units by scaling of Lo limit and Hi limit in Auto Mode. Also contains the value and status set by an operator in Man Mode.

5 Menu description

An appropriate operation level must be selected under *Operation level* [▶ 28] to enter the device setup. The following descriptions show the menu path without a user role selected.

First 3 levels of the Web page 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 Web page.

page reference links to the explanation of the respective menu item

	① Full name	LCD name	Web name
② –	Current date	[Date]	[Current date]
③ ①	Set current date	[Set date]	x

④ Current date

⑤ ① [Detailed setup] ► [Date/Time] ► [Date]

⑥ ② [Detailed setup] ► [Date/Time] ► [Date]

Current date shows current date on the Rotamass.

	Value ⑦	Description ⑧
–	Quantity	Shows actual current date if date was set the device started running.

Set current date

① [Detailed setup] ► [Date/Time] ► [Set date]

Set current date sets date

Fig. 7: Explanation of the menu description

- ① Menu overview
- ② No restrictions
- ③ Availability for display
- ④ Full name of the menu item
- ⑤ Display menu path
- ⑥ Web menu path
- ⑦ Values or parameters of the menu item
- ⑧ Description of the corresponding value or display parameter

Tab. 22: 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 Web page.

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. 23: Explanation of symbols used in the menu description

Symbols	Description
①	Menu item or menu path is available via display.
②	Menu item or menu path is available via the Web page.
③	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. All menus are available for all devices.

	Full name	Display name	Web name	Page
Ⓛ	Target mode	[Target mode]	–	[▶ 86]
Ⓛ	Language	[Lang]	–	[▶ 86]
–	Process variables	[Process variables]	[Process variables]	[▶ 87]
Ⓛ	Diag/Service	[Diag/Service]	–	[▶ 92]
Ⓜ	Home	–	[Home]	[▶ 145]
Ⓛ	Easy setup wizard	[Easy setup wizard]	–	[▶ 147]
–	Detailed setup / Device	[Detailed setup]	[Device]	[▶ 172]
Ⓜ	Diagnostic	–	[Diagnostic]	[▶ 374]
Ⓜ	Maintenance	–	[Maintenance]	[▶ 378]
Ⓜ	System	–	[System]	[▶ 424]

5.1 Target mode

Target mode

Ⓛ [Target mode]

Target mode sets the Target mode for Physical Block, All Transducer Block and All Function Blocks. Many parameters cannot be written when Target mode is set to Auto.

	Display parameter	Description
Ⓛ	Auto	Operation is Auto mode.
Ⓛ	O/S	Operation is out of service mode.

5.2 Language

Language

Ⓛ [Lang]

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

- *Detailed setup* [▶ 336]

Only available if the device is equipped with a display.

Sets the language to be used on the LCD display.

	Value	Description
–	English [English]	The desired display language can be selected. Available languages depend on the language package that was ordered: <i>Package 1:</i> ▪ English ▪ French ▪ German ▪ Italian ▪ Spanish ▪ Portuguese ▪ Japanese <i>Package 2:</i> ▪ English ▪ German ▪ Russian ▪ Kazakh ▪ Polish <i>Package 3:</i> ▪ English ▪ French ▪ German ▪ Italian ▪ Spanish ▪ Portuguese ▪ Chinese
–	French [French]	
–	German [German]	
–	Italian [Italian]	
–	Spanish [Spanish]	
–	Portuguese [Portuguese]	
–	Polish [Polish]	
–	Russian [Russian]	
–	Kazakh [Kazakh]	
–	Chinese [Chinese]	
–	Japanese [Japanese]	

5.3 Process variables

The following menus/settings are available:

	Full name	Display name	Web name	Page
Ⓜ	Analog Input	—	[Analog Input]	[▶ 87]
Ⓜ	Totalizer	—	[Totalizer]	[▶ 87]
—	Device variables	[Dev var]	[Device variables]	[▶ 89]
Ⓜ	Analog Output	—	[Analog Output]	[▶ 90]
—	Sensor and Transmitter	[Snsr/Trsmtr]	[Sensor and Transmitter]	[▶ 90]
Ⓜ	Tube Health Check	—	[Tube Health Check]	[▶ 91]

5.3.1 Analog Input

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

	Full name	Display name	Web name	Page
Ⓜ	Analog Input 1-6	—	[Analog Input 1-6]	[▶ 87]

Analog Input 1 – 6

Ⓜ [Process variables] ▶ [Analog Input 1 – 6]

This parameter shows the process value of the assigned variable.

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

- *Analog Input* [▶ 278]

	Value	Description
Ⓜ	Value	Process value of the assigned variable. The value is output to system such as DCS/PLC.
Ⓜ	Status	Shows the current status of the value.

5.3.2 Totalizer

The following overview shows the selectable menu items within the submenu *Totalizer*.

	Full name	Display name	Web name	Page
Ⓜ	Totalizer 1 – 3	—	[Totalizer 1 – 3]	[▶ 87]

Totalizer 1 – 3

Ⓜ [Process variables] ▶ [Totalizer 1 – 3]

This parameter shows the Total value of the assigned variable.

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

- *Totalizer 1 – 3* [▶ 281]

	Value	Description
—	Value	Total value of the assigned variable. The value is output to system such as DCS/PLC.
—	Status	Shows the current status of the value.

5.3.3 Device variables

Device variables

Ⓐ [Process variables] ► [Dev var]

Ⓜ [Process variables] ► [Device variables]

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

	Display parameter	Description
–	Mass flow [Mass] [Mass flow]	Measured mass flow value. For configuration of mass flow measurement, see Mass flow settings [► 197]. For web page, status of value is also shown.
–	Density [Dens] [Density]	Measured density value. For configuration of density measurement, see Density settings [► 203]. For web page, status of value is also shown.
–	Temperature [Temp] [Temperature]	Measured temperature value. For configuration of temperature measurement, see Temperature settings [► 208]. For web page, status of value is also shown.
–	Volume flow [Vol] [Volume flow]	Measured volume flow value. For configuration of volume flow measurement, see Volume flow settings [► 212]. For web page, status of value is also shown.
–	Pressure [Pres] [Pressure]	Measured pressure value, if pressure sensor is connected to the analog current input. For configuration of pressure measurement, see Pressure settings [► 217]. For web page, status of value is also shown.
–	Reference density [Ref dens] [Reference density]	Calculated reference density value at reference temperature. For configuration of reference density measurement, see Reference density settings [► 221]. For web page, status of value is also shown.
–	Relative density [Rel dens] [Relative density]	Relative density value, which is calculated from the measured density, the selected unit and the equation. For configuration of relative density measurement, see Relative density settings [► 225]. For web page, status of value is also shown.
–	Corrected volume flow [Corr vol] [Corrected volume flow]	Volume flow, which is calculated from the measured mass flow and the reference density. For more detailed Information, see Corrected volume flow settings [► 229]. For web page, status of value is also shown.
–	Velocity [Vel] [Velocity]	Calculated velocity of fluid inside the measuring tube. For configuration of velocity measurement, see Velocity settings [► 234].
Ⓜ	Calorific value [Calorific value]	Calculated calorific value. For configuration of calorific value measurement, see Calorific value settings [► 233]. For web page, status of value is also shown.

	Display parameter	Description
Ⓔ Ⓕ	Concentration [Concentration]	Measured concentration. For web page, status of value is also shown. In addition, NOC (Net Oil Computing) relevant parameters are shown under the NOC (Net Oil Computing). See the details from NOC settings. Oil density Water density Mass concentration value Volume concentration value Water cut value Gas void fraction Current thermal expansion factor Current K0 coefficient Current K1 coefficient Current K2 coefficient
Ⓔ Ⓕ	Net mass flow 1 – 2 [Net mass flow1 – 2]	Net mass flow of a component, product or carrier of mixed fluid. For web page, status of value is also shown.
Ⓔ Ⓕ	Net volume flow 1 – 2 [Net vol1 – 2] [Net volume flow 1 – 2]	Net volume flow of a component, product or carrier of mixed fluid. For web page, status of value is also shown.
Ⓔ Ⓕ	Net corrected volume flow [Net corrected volume flow]	Net corrected volume flow of a component or product of mixed fluid. For web page, status of value is also shown.
Ⓔ Ⓕ	Viscosity [Viscosity]	Viscosity value, which is calculated from the delta pressure which is received from external differential pressure instrument via Analog Output Block. For web page, status of value is also shown.
Ⓖ	Totalizer 1 – 3 [Tt11 – 3] [Totalizer 1 – 3]	Values of the Totalizer 1 – 3. For configuration of totalizer functions, see Totalizer settings [▶ 302].

5.3.4 Additional function

Additional function

Ⓖ [Process variables] ▶ [Dev var]

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

	Display parameter	Description
Ⓔ	Concentration [Conc] [Concentration]	Measured concentration.
Ⓔ	Net mass flow 1 – 2 [Net mass1 – 2] [Net mass flow 1 – 2]	Net mass flow of a component, product or carrier of mixed fluid.

	Display parameter	Description
Ⓢ	Net volume flow 1 – 2 [Net vol1 – 2] [Net volume flow 1 – 2]	Net volume flow of a component, product or carrier of mixed fluid.
Ⓢ	Net corrected volume flow [Net corr vol] [Net corrected volume flow]	Net corrected volume flow of a component or product of mixed fluid.
Ⓢ	Viscosity [Visc] [Viscosity]	Viscosity value, which is calculated from the delta pressure which is received from external differential pressure instrument via Analog Output Block.

5.3.5 Analog Output

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

	Full name	Display name	Web name	Page
Ⓢ	Analog Output	–	[Analog Output]	[90]

Analog Output

Ⓢ [Process variables] ► [Analog Output]

This parameter shows the external process value from external device.

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

- *Analog output flow units* [► 291]
- *Analog output low limit* [► 291]
- *Analog output high limit* [► 292]

	Value	Description
Ⓢ	Value	External process value from external device. The value is input from system such as DCS/PLC.
Ⓢ	Status	Shows the current status of the external process value.

5.3.6 Sensor and transmitter

Sensor and transmitter

Ⓢ [Process variables] ► [Snsr/Trsmtr]

Ⓢ [Process variables] ► [Sensor and transmitter]

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

	Display parameter	Description
–	Resonance frequency [Freq] [Resonance frequency]	Measured resonance frequency of the sensor in Hz.

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

5.3.7 Tube Health Check

Tube Health Check

④ [Process variables] ► [Tube Health Check]

The menu item *Tube Health Check* displays the change ratio when Tube Health Check is executed.

	Display parameter	Description
④	TuHC change ratio of inlet stiffness [TuHC change ratio of inlet stiffness]	Specifies stiffness in percent calculated from the inlet pick-off.
④	TuHC change ratio of outlet stiffness [TuHC change ratio of outlet stiffness]	Specifies stiffness in percent calculated from the outlet pick-off.

5.4 Diag/Service

The following menus/settings are available:

	Full name	Display name	Page
①	Status/Self test	[Sts/Self test]	[▶ 92]
①	Time stamp	[Time stamp]	[▶ 98]
①	Output test	[Out test]	[▶ 99]
①	Display indication	[Display ind]	[▶ 101]
①	Autozero	[AZ]	[▶ 102]
①	Alarm/Event behavior settings	[Alm/Evt bhvr set]	[▶ 104]
①	Standard diagnostics	[Std diag]	[▶ 114]
①	Total health check	[Ttl health chk]	[▶ 120]
①			
①	Data logging	[Data log]	[▶ 136]
①	Parameter backup/restore	[Param bkup/restore]	[▶ 140]
①	Last calibration information	[Last calib info]	[▶ 144]

5.4.1 Status/Self test

The following menus/settings are available:

	Full name	Display name	Web name	Page
–	Detailed device status	[Detail dev sts]	[Detailed device status]	[▶ 92]
–	Event history	[Evt hist]	[Event history]	[▶ 97]

Detailed device status

The following menus/settings are available:



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

	Full name	Display name	Web name	Page
①	System alarm status	[Sys alm sts]	[System alarm status]	[▶ 93]
–	Process alarm status	[Pro alm sts]	[Process alarm status]	[▶ 94]
①	Setting alarm status	[Set alm sts]	[Setting alarm status]	[▶ 94]
①	Warning status	[Warn sts]	[Warning status]	[▶ 95]
①	Information status	[Info sts]	[Information status]	[▶ 96]

System alarm status

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

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* [▶ 54]
- *Troubleshooting* [▶ 426]

	Display parameter	Description
①	System alarm status 0 [Sys alm0]	Alarm statuses: ▪ 101:Frequency failure ▪ 102:Signal failure ▪ 103:Pick off 1 failure ▪ 104:Pick off 1 failure ▪ 105:Pick off 2 failure ▪ 106:Pick off 2 failure ▪ 107:Temperature range failure ▪ 108:Temperature sensor failure
①	System alarm status 1 [Sys alm1]	Alarm statuses: ▪ 109:Tube leakage detection ▪ 141:Option board communication error1 ▪ 142:Option board communication error2 ▪ 143:Option board communication error3
①	System alarm status 2 [Sys alm2]	Alarm statuses: ▪ 121:Main board CPU failure ▪ 122:Main board EEPROM failure ▪ 123:Parameter restore incomplete ▪ 124:Sensor board failure ▪ 125:Sensor board mismatch ▪ 126:Sensor communication error ▪ 127:Option board failure ▪ 128:Option board EEPROM failure
①	System alarm status 3 [Sys alm3]	Alarm statuses: ▪ 130:Indicator board failure ▪ 131:Indicator board EEPROM failure ▪ 132:LCD driver failure ▪ 133:Indicator board mismatch ▪ 134:Indicator communication error ▪ 135:microSD failure

Process alarm status

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

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* [► 54]
- *Troubleshooting* [► 426]

	Display parameter	Description
Ⓛ	Process alarm status 0 [Pro alm0]	Alarm statuses: ▪ 201:Slug detection ▪ 202:Empty pipe detection ▪ 203:Corrosion detection ▪ 204:Autozero judgment multiphase ▪ 205:Autozero judgment flow ▪ 206:Autozero judgment temperature ▪ 210:Oil density calculation failure ▪ 211:Water density calculation failure ▪ 212:NOC calculation failure
Ⓛ	Process alarm status 1 [Pro alm1]	Alarm statuses: ▪ 210:Oil density calculation failure ▪ 211:Water density calculation failure ▪ 212:NOC calculation failure

Setting alarm status

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

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* [► 54]
- *Troubleshooting* [► 426]

	Display parameter	Description
–	Setting alarm status 0 [Set alm0]	Alarm statuses: ▪ 301:Mass flow configuration error ▪ 302:Density configuration error ▪ 303:Temperature configuration error ▪ 305:Pressure configuration error ▪ 307:Volume flow configuration error ▪ 308:Reference density configuration error
–	Setting alarm status 1 [Set alm1]	Alarm statuses: ▪ 309:Relative density configuration error ▪ 310:Corrected volume flow configuration error ▪ 311:Calorific value configuration error ▪ 313:Concentration configuration error ▪ 314:Net mass flow 1 configuration error ▪ 315:Net mass flow 2 configuration error ▪ 316:Net volume flow 1 configuration error

	Display parameter	Description
–	Setting alarm status 2 [set alm2]	Alarm statuses: ▪ 317:Net volume flow 2 configuration error ▪ 318:Net corrected volume flow configuration error ▪ 319:Velocity configuration error ▪ 320:Viscosity configuration error
–	Setting alarm status 3 [set alm3]	Alarm statuses: ▪ 323:Pulse output 1 configuration error ▪ 324:Frequency output 1 configuration error
–	Setting alarm status 5 [set alm5]	Alarm statuses: ▪ 335:Totalizer 1 configuration error ▪ 336:Totalizer 2 configuration error ▪ 337:Totalizer 3 configuration error ▪ 342:Data logging not started

Warning status

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

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

- *Possible events and related settings and behavior* [► 54]
- *Troubleshooting* [► 426]

	Display parameter	Description
–	Warning status 0 [warn sts0]	Warning statuses: ▪ 703:Density fixed ▪ 704:Temperature fixed ▪ 705:Pressure fixed ▪ 706:Reference density fixed ▪ 707:Calorific value fixed
–	Warning status 1 [warn sts1]	Warning statuses: ▪ 710:Pulse output simulation ▪ 715:Process variable trimming
–	Warning status 2 [warn sts2]	Warning statuses: ▪ 718:Pulse output 1 saturated ▪ 721:Autozero running ▪ 722:Tube health check execution error ▪ 723:Date/Time not set ▪ 724:Display over warning
–	Warning status 3 [warn sts3]	Warning statuses: ▪ 725:microSD card size warning ▪ 726:microSD card mismatch ▪ 728:microSD card removal procedure error ▪ 729:Parameter backup incomplete ▪ 730:Parameter restore running

	Display parameter	Description
—	Warning status 4 [Warn sts4]	Warning statuses: ▪ 733:Viscosity not calculated ▪ 734:Viscosity not reliable ▪ 735:Autozero warning

Information status

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

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

- *Possible events and related settings and behavior* [► 54]
- *Troubleshooting* [► 426]

	Display parameter	Description
—	Information status 0 [Info sts0]	Information statuses: ▪ 901:Device configuration locked ▪ 902:Device configuration not locked ▪ 903:Parameter backup running ▪ 904:Data logging running ▪ 905:Tube health check running
—	Information status 1 [Info sts1]	Information status: 909:Maintenance mode running

Event history

The following menus/settings are available:

	Full name	Display name	Page
Ⓛ	Event file name	[Evt file]	[97]
Ⓛ	Monitor file name	[Mon file]	[97]
Ⓛ	Event history 1 – 10	[Evt hist1 – 10]	[97]
Ⓛ	Clear Event history	[Clr Evt hist]	[98]

Event File Name

Ⓛ [Diag/Service] ► [Sts/Self test] ► [Evt hist] ► [Evt file]

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. Maximum length is 8 characters. The following are invalid characters: space, ", *, +, ,, ., /, :, ;, <, =, >, ?, [, \,]

Monitor File Name

Ⓛ [Diag/Service] ► [Sts/Self test] ► [Evt hist] ► [Mon file]

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. Maximum length is 8 characters. The following are invalid characters: space, ", *, +, ,, ., /, :, ;, <, =, >, ?, [, \,]

**Event history
1 – 10**

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

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

	Display parameter	Description
–	Event No 1 – 10 [Evt No1 – 10] [Event no 1 – 10]	Shows event ID number of event 1 – 10.
–	Event contents 1 – 10 [Contents1 – 10] [Event contents 1 – 10]	Shows event name of event 1 – 10. (Event set, Event clear or Acknowledge as event name)
–	Event 1 – 10 date [Date1 – 10] [Event 1 – 10 date]	Shows date of occurrence of event 1 – 10. It shows the actual date of the event, if date was set correctly when the device started running.

	Display parameter	Description
–	Event 1 – 10 time [Time1 – 10] [Event 1 – 10 time]	Shows time of occurrence of event 1 – 10. It shows the actual time of the event, if the time was set correctly when the device started running.
–	Event 1 – 10 operation time [Op time1 – 10] [Event 1 – 10 operation time]	Shows operating time of occurrence of event 1 – 10. It shows cumulative operating time since the device started running until the event occurred.

Clear event history

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

Clears the entire event history.

	Value	Description
–	Not execute [Not exe] [Not execute]	Default value.
–	Execute [Exe] [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> .

5.4.2 Time stamp**Time stamp**

⌚ [Diag/Service] ► [Time stamp]

Shows parameters for time information.

	Display parameter	Description
–	Current Date [Date] [Current Date]	Shows actual current date, if the date was set correctly when the device started running. This parameter is also available in additional menus. The values can be shown in each of these menus: ▪ Basic setup [▶ 192]
–	Current Time [Time] [Current Time]	Shows actual current time, if the time was set correctly when the device started running. This parameter is also available in additional menus. The values can be shown in each of these menus:
–	Operation time [Op time] [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 IO4. 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* [▶ 100], 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	Page
Ⓛ	Test mode	[Test mode]	[▶ 99]
Ⓛ	Frequency output test	[Freq test]	[▶ 99]
Ⓛ	Test auto release time	[Auto rel time]	[▶ 100]

Test mode

Ⓛ [Diag/Service] ▶ [Out test] ▶ [Test mode]

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

	Value	Description
–	On [on] [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 Frequency output test. The measured value is not output during test mode.
–	Off [off] [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.

Frequency Output Test

Ⓛ [Diag/Service] ▶ [Out test] ▶ [Freq test]

Sets the test output value of Frequency output.

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

Test auto release time

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

Sets a time period for ending the test mode automatically.

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

5.4.4 Display indication

LCD test

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

Squawk

Ⓜ [Maintenance] ► [Test/Adjustment] ► [Display indication] ► [Squawk]

Sets a flashing back light on the display.

	Value	Description
–	Off [off] [Off]	No flashing back light. Default value.
–	On [on] [On]	Permanent flashing back light.
–	Squawk once [Squawk once] [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	Page
①	Autozero execute	[Exe]	[▶ 102]
①	Autozero time	[Time]	[▶ 102]
①	Autozero value	[Val]	[▶ 102]
①	Autozero standard deviation	[Std devi]	[▶ 102]
①	Clear autozero failure	[Clr AZ fail]	[▶ 103]
①	Clear autozero	[Clr AZ]	[▶ 103]
①	Autozero failure detection	[AZalm]	[▶ 103]

Autozero execute

① [Diag/Service] ▶ [AZ] ▶ [Exe]

	Value	Description
–	Not execute [stop] [Not execute]	Autozero will not be executed. This value will be displayed, if the zero point alignment does not run.
–	Execute [start] [Execute]	Autozero will be executed. This value will be displayed, if the zero point alignment runs.

Autozero time

① [Diag/Service] ▶ [AZ] ▶ [Time]

Sets the execution time for autozero.

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

Autozero value

① [Diag/Service] ▶ [AZ] ▶ [val]

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]

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]

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

	Value	Description
–	[Not exe] [Not execute]	Default value.
–	[Exe] [Execute]	Clears autozero failure alarm.

Clear autozero

① [Diag/Service] ► [AZ] ► [Clr AZ]

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

	Value	Description
–	[Not exe] [Not execute]	Default value.
–	[Exe] [Execute]	Clears autozero value and resets autozero value to factory default.

Autozero failure detection

① [Diag/Service] ► [AZ] ► [AZalm]

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] [Off]	Process condition is not checked when Autozero is performed.
–	[on] [On]	Process condition is checked when Autozero is performed Default value.

5.4.6 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* [▶ 49].

The following menus/settings are available:

	Full name	Display name	Page
①	Alarm/Event additional parameters	[Alm/Evt add]	[▶ 104]
①	Process alarms	[Pro alm]	[▶ 104]
①	Warnings/Information	[Warn]	[▶ 107]
①	Event setting lock status	[Evt set lock]	[▶ 112]

Alarm/Event additional parameters

Alarm/Event additional parameters

① [Diag/Service] ▶ [Alm/Evt bhvr set] ▶ [Alm/Evt add]

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

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

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	Page
①	Standard diagnostics	[Std diag]	[▶ 104]

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	Page
①	Event setting slug detection	[Evt slug]	[▶ 105]
①	Event setting empty pipe detection	[Evt empty]	[▶ 105]
①	Event setting corrosion detection	[Evt crrsn]	[▶ 106]

Event setting slug detection

🕒 [Diag/Service] ► [Alm/Evt bhvr set] ► [Pro alm] ► [Std diag] ► [Evt slug]

Event setting slug detection defines the event action when the following alarm occurs:

201: Slug detection
[201:Slug detect]

	Value	Description
–	Ignore [Ignore] [Ignore]	Event does not have any effect. Default value.
–	History only [Hist only] [History only]	Pre-defined Event is recorded in the device history.
–	Generate [Generate] [Generate]	An alarm is generated by the event.
–	Monitor [Monitor] [Monitor]	Diagnostics data is logged when the event occurs.

Event setting empty pipe detection

🕒 [Diag/Service] ► [Alm/Evt bhvr set] ► [Pro alm] ► [Std diag] ► [Evt empty]

Event setting empty pipe detection defines the event action when the following alarm occurs:

202: Empty pipe detection
[202:Empty detect]

	Value	Description
–	Ignore [Ignore] [Ignore]	Event does not have any effect. Default value.
–	History only [Hist only] [History only]	Pre-defined Event is recorded in the device history.
–	Generate [Generate] [Generate]	An alarm is generated by the event.
–	Monitor [Monitor] [Monitor]	Diagnostics data is logged when the event occurs.

**Event setting
corrosion
detection**

🕒 [Diag/Service] ► [Alm/Evt bhvr set] ► [Pro alm] ► [Std diag] ► [Evt crrsn]

Event setting corrosion detection defines the event action when the following alarm occurs:

203: Corrosion detection

[203:Crrsn detect]

	Value	Description
–	Ignore [Ignore] [Ignore]	Event does not have any effect. Default value.
–	History only [Hist only] [History only]	Pre-defined Event is recorded in the device history.
–	Generate [Generate] [Generate]	An alarm is generated by the event.
–	Monitor [Monitor] [Monitor]	Diagnostics data is logged when the event occurs.

Warnings/Information

Sets parameters that define the device behavior when a warning occurs.

The following menus/settings are available:

	Full name	Display name	Page
Ⓛ	Variables	[Var]	[▶ 107]
Ⓛ	Others	[Others]	[▶ 112]

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	Page
Ⓛ	Event setting density fixed	[Evt dens fix]	[▶ 107]
Ⓛ	Event setting temperature fixed	[Evt temp fix]	[▶ 108]
Ⓛ	Event setting pressure fixed	[Evt pres fix]	[▶ 108]
Ⓛ	Event setting reference density fixed	[Evt ref dens fix]	[▶ 109]
Ⓛ	Event setting calorific value fixed	[Evt cal fix]	[▶ 109]
Ⓛ	Event setting process variables trim	[Evt pro var trim]	[▶ 110]
Ⓛ	Event setting pulse status output saturated	[Evt pls/sts1 sat]	[▶ 110]

Event setting density fixed

Ⓛ [Diag/Service] ▶ [Alm/Evt bhvr set] ▶ [Warn] ▶ [Var] ▶ [Evt dens fix]

Defines the device behavior when the following warning occurs:

703: Density fixed

[703:Dens fix]

	Value	Description
–	Ignore [Ignore] [Ignore]	Event does not have any effect.
–	History only [Hist only] [History only]	Pre-defined Event is recorded in the device history.
–	Generate [Generate] [Generate]	An alarm is generated by the event. Default value.
–	Monitor [Monitor] [Monitor]	Diagnostics data is logged when the event occurs.

**Event setting
temperature fixed**

🕒 [Diag/Service] ► [Alm/Evt bhvr set] ► [Warn] ► [Var] ► [Evt temp fix]

Defines the device behavior when the following warning occurs:

704:Temperature Fixed

[704:Temp fix]

	Value	Description
	Ignore	
–	[Ignore] [Ignore]	Event does not have any effect.
	History only	
–	[Hist only] [History only]	Pre-defined Event is recorded in the device history.
	Generate	
–	[Generate] [Generate]	An alarm is generated by the event. Default value.
	Monitor	
–	[Monitor] [Monitor]	Diagnostics data is logged when the event occurs.

**Event setting
pressure fixed**

🕒 [Diag/Service] ► [Alm/Evt bhvr set] ► [Warn] ► [Var] ► [Evt pres fix]

Defines the device behavior when the following warning occurs:

705: Pressure fixed

[705:Pres fix]

	Value	Description
	Ignore	
–	[Ignore] [Ignore]	Event does not have any effect. Default value.
	History only	
–	[Hist only] [History only]	Pre-defined Event is recorded in the device history.
	Generate	
–	[Generate] [Generate]	An alarm is generated by the event.
	Monitor	
–	[Monitor] [Monitor]	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]

Defines the device behavior when the following warning occurs:

706: Reference density fixed

[706:Ref dens fix]

	Value	Description
	Ignore	
–	[Ignore] [Ignore]	Event does not have any effect. Default value.
	History only	
–	[Hist only] [History only]	Pre-defined Event is recorded in the device history.
	Generate	
–	[Generate] [Generate]	An alarm is generated by the event.
	Monitor	
–	[Monitor] [Monitor]	Diagnostics data is logged when the event occurs.

**Event setting
calorific value
fixed**

① [Diag/Service] ► [Alm/Evt bhvr set] ► [Warn] ► [Var] ► [Evt cal fix]

Defines the device behavior when the following warning occurs:

707: Calorific value fixed

[707:Cal fix]

	Value	Description
	Ignore	
–	[Ignore] [Ignore]	Event does not have any effect. Default value.
	History only	
–	[Hist only] [History only]	Pre-defined Event is recorded in the device history.
	Generate	
–	[Generate] [Generate]	An alarm is generated by the event.
	Monitor	
–	[Monitor] [Monitor]	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]

Defines the device behavior when the following warning occurs:

715: Process variable trimming

[715:Pro var trim]

	Value	Description
	Ignore	
–	[Ignore] [Ignore]	Event does not have any effect.
	History only	
–	[Hist only] [History only]	Pre-defined Event is recorded in the device history.
	Generate	
–	[Generate] [Generate]	An alarm is generated by the event. Default value.
	Monitor	
–	[Monitor] [Monitor]	Diagnostics data is logged when the event occurs.

Event setting
pulse status
output saturated

Ⓛ [Diag/Service] ► [Alm/Evt bhvr set] ► [Warn] ► [Out] ► [Evt pls/sts1 sat]

Ⓜ [Maintenance root menu] ► [Alarm/Event behavior settings] ►
[Warnings/Information] ► [Output] ► [Event setting pulse status
output saturated]

Event setting pulse status output saturated defines the device behavior when the following warning occurs:

718: Pulse output saturated

718:Pls1 saturte

	Value	Description
	Ignore	
–	[Ignore] [Ignore]	Event does not have any effect.
	History only	
–	[Hist only] [History only]	Pre-defined Event is recorded in the device history.
	Generate	
–	[Generate] [Generate]	An alarm is generated by the event. Default value.
	Acknowledge	
–	[Ack] [Acknowledge]	An alarm is generated by the event that must be confirmed by the user, using the Alarm/Event acknowledge function.
	Monitor	
–	[Monitor] [Monitor]	Diagnostics data is logged when the event occurs.

	Value	Description
	Monitor + Acknowledge	
–	[Monitor+ack] [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.

Others

Sets the parameters that define the device behavior when other warnings occur.

The following menus/settings are available:

	Full name	Display name	Page
①	Event setting date/time not set	[Evt not date/time]	[▶ 112]

**Event setting date/
time not set**

① [Diag/Service] ▶ [Alm/Evt bhvr set] ▶ [Warn] ▶ [Others] ▶ [Evt not date/time]

Defines the device behavior when the following warning occurs:

723: Date/Time not set

[723:Date/Time WARN]

	Value	Description
–	Ignore [Ignore] [Ignore]	Event does not have any effect. Default value.
–	History only [Hist only] [History only]	Pre-defined Event is recorded in the device history.
–	Generate [Generate] [Generate]	An alarm is generated by the event.
–	Monitor [Monitor] [Monitor]	Diagnostics data is logged when the event occurs.

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	Page
①	Event setting device configuration locked	[Evt dev lock]	[▶ 113]
①	Event setting device configuration not locked	[Evt dev not lock]	[▶ 113]

**Event setting
device
configuration
locked**

① [Diag/Service] ► [Alm/Evt bhvr set] ► [Evt set lock] ► [Evt dev lock]

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* [13].

901: Device configuration locked

[901:Dev cfg lock]

	Value	Description
	Ignore	
–	[Ignore] [Ignore]	Event does not have any effect.
	History only	
–	[Hist only] [History only]	Pre-defined Event is recorded in the device history.
	Generate	
–	[Generate] [Generate]	An alarm is generated by the event. Default value.
	Monitor	
–	[Monitor] [Monitor]	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]

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* [13].

902: Device configuration not locked

[902:No dev cfg lock]

	Value	Description
	Ignore	
–	[Ignore] [Ignore]	Event does not have any effect. Default value.
	History only	
–	[Hist only] [History only]	Pre-defined Event is recorded in the device history.
	Generate	
–	[Generate] [Generate]	An alarm is generated by the event.
	Monitor	
–	[Monitor] [Monitor]	Diagnostics data is logged when the event occurs.

5.4.7 Standard diagnostics

Sets the parameters for configuring standard diagnostic functions.

The following menus/settings are available:

	Full name	Display name	Page
①	Standard diagnostics: additional parameters	[Std diag add]	[▶ 114]
①	Slug detection	[Slug]	[▶ 114]
①	Empty pipe detection	[Empty]	[▶ 117]
①	Corrosion detection	[Crrsn]	[▶ 118]
①	Tube leakage detection	[Tube lkg]	[▶ 118]

**Standard diagnostics:
additional
parameters**

① [Diag/Service] ▶ [Std diag] ▶ [Std diag add]

Sets the parameters for enabling or disabling access to the menu for standard diagnostic parameters.

	Value	Description
–	Not apply [Not apply] [Not apply]	Menu for standard diagnostic parameters is disabled. Default value.
–	Apply [Apply] [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	Page
①	Slug detection level	[Slug lvl]	[▶ 115]
①	Slug hysteresis	[Slug hys]	[▶ 115]
①	After slug mass flow	[After slug mass]	[▶ 115]
①	After slug density	[After slug dens]	[▶ 115]
①	Average start time	[Start time]	[▶ 116]
①	Average end time	[End time]	[▶ 116]
①	After slug mass flow fixed value	[Fix mass]	[▶ 116]
①	After slug density fixed value	[Fix dens]	[▶ 116]
①	Slug alarm delay	[Slug alm delay]	[▶ 116]

Slug detection level

① [Diag/Service] ► [Std diag] ► [Slug] ► [Slug lvl]

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. Default value is 350 mApp.

Slug hysteresis

① [Diag/Service] ► [Std diag] ► [Slug] ► [Slug hys]

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 %. Default value is 10.0 %.

After slug mass flow

① [Diag/Service] ► [Std diag] ► [Slug] ► [After slug mass]

Sets the mass flow value during a slug alarm or when the drive current exceeds the slug detection level.

–	Measured value [Meas val] [Measured value]	Actual measured mass flow values during the slug alarm. Default value.
–	Hold [Hold] [Hold]	Measured mass flow values before the slug alarm are held and output.
–	Fixed value [Fix val] [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]

Sets the Density value during slug alarm or when the driving current exceeds Slug detection level.

–	Measured value [Meas val] [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. Default value.
–	Hold [Hold] [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 [Fix val] [Fixed value]	After slug density fixed value is used during slug alarm output.

Average start time

⌚ [Diag/Service] ► [Std diag] ► [Slug] ► [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]. Default value is 5 [sec].

Average end time

⌚ [Diag/Service] ► [Std diag] ► [Slug] ► [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]. Default value is 5 [sec].

After slug mass flow fixed value

⌚ [Diag/Service] ► [Std diag] ► [Slug] ► [Fix mass]

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

⌚ [Diag/Service] ► [Std diag] ► [Slug] ► [Fix dens]

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

⌚ [Diag/Service] ► [Std diag] ► [Slug] ► [Slug alm 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. Default value is 0.0 s.

Empty pipe detection

Sets the parameters for configuring the empty pipe detection function.

The following menus/settings are available:

	Full name	Display name	Page
①	Empty pipe criteria	[Empty crit]	[▶ 117]
②	After empty pipe	[After empty]	[▶ 117]
③	Empty pipe alarm delay	[Empty alm delay]	[▶ 117]

Empty pipe criteria

① [Diag/Service] ▶ [Std diag] ▶ [Empty] ▶ [Empty crit]

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. Default value is 0.0. Unit correspondent to the customer configuration for density measurement.

After empty pipe

② [Diag/Service] ▶ [Std diag] ▶ [Empty] ▶ [After empty]

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 [0%] [0%]	Mass flow value is set to 0. Default value.
–	Measured value [Meas val] [Measured value]	Actual measured mass flow and density values during the empty pipe alarm are output.
–	Hold [Hold] [Hold]	Measured mass flow and density values before the slug alarm are held and output.

Empty pipe alarm delay

③ [Diag/Service] ▶ [Std diag] ▶ [Empty] ▶ [Empty alm 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. 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	Page
①	Corrosion criteria	[Crrsn crit]	[▶ 118]
①	Corrosion damping	[Crrsn damp]	[▶ 118]

Corrosion criteria

① [Diag/Service] ▶ [Std diag] ▶ [Crrsn] ▶ [Crrsn crit]

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. Default value is 1.5. Unit corresponds to the customer definition for density measurement.

Corrosion damping

① [Diag/Service] ▶ [Std diag] ▶ [Crrsn] ▶ [Crrsn damp]

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. Default value is 10 h.

Tube leakage detection

Sets parameters for configuring the tube leakage detection function.

The tube leakage alarm can only be used in conjunction with a pressure sensor attached to the secondary containment of the Rotamass Total Insight. When the inner tube is damaged the process medium enters the secondary containment, causing an increase in pressure. The pressure limit of the secondary containment can be set by the user. It is preset to the highest possible value in order to prevent false alarms.

The following menus/settings are available:

	Full name	Display name	Page
①	Tube leakage criteria	[Tube lkg crit]	[▶ 119]
①	Clear tube leakage detection	[Clr tube lkg]	[▶ 119]

Tube leakage criteria

① [Diag/Service] ► [Std diag] ► [Tube lkg] ► [Tube lkg crit]

Sets the threshold pressure value for activating the tube leakage alarm. If the measured pressure is larger than this value, the tube leakage alarm is activated.

	Value	Description
Ⓢ	Numeric digits	Setting range: 0.0 – 500.0 bar. Default value is 500.0 bar. The value is converted according to the unit that the customer configures.

Clear tube leakage detection

① [Diag/Service] ► [Std diag] ► [Tube lkg] ► [Clr tube lkg]

Clears the tube leakage detection alarm. If Execute is set for this parameter, the tube leakage alarm is cleared and the value returns to Not execute.

	Value	Description
Ⓢ	Not execute [Not exe] [Not execute]	Default value.
Ⓢ	Execute [Exe] [Execute]	Clear tube leakage alarm.

5.4.8 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	Web name	Page
Ⓔ	Total health result	[Ttl health result]	[Total health result]	[120]
Ⓕ	Tube health check	[Tube health chk]	[Tube health check]	[121]

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) - [Good(with TuHC)] [Good (with TuHC and No critical failure)]	The following conditions are applied: - Result of TuHC(TuHC health result) is OK - System alarm status 0,1,2,3 and Process alarm status 0 are not set 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) - [Good] [Good (No critical failure)]	The following conditions are applied: - Result of TuHC(TuHC health result) is OK over 24hours or TuHC is not done (Not execute) - System alarm status 0,1,2,3 and Process alarm status 0 are not set 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 - [Warn] [Warning]	The following conditions are applied: - Result of TuHC(TuHC health result) is Warning - System alarm status 0,1,2,3 and Process alarm status 0 are not set
	Error - [Error] [Error]	The following 1 or more conditions are applied: - Result of TuHC(TuHC health result) is Bad 1 or more alarms of System alarm status 0,1,2,3 or Process alarm status 0 are set
	Start - [Start] [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* [127]), 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 ± 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	Page
ⓔ Ⓛ	TuHC enable	[Enable]	[▶ 122]
Ⓛ	Tube health check additional parameters	[Tube health chk add]	[▶ 123]
ⓔ Ⓛ	TuHC result	[Result]	[▶ 124]
Ⓛ	TuHC configuration	[Cfg]	[▶ 126]
ⓔ Ⓛ	TuHC execution/status	[Exe/Sts]	[▶ 130]
Ⓛ	TuHC reference data	[Ref data]	[▶ 136]

TuHC enable

Ⓛ [Diag/Service] ▶ [Ttl health chk] ▶ [Exe/Sts] ▶ [Enable]

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

- *TuHC execution/status* [▶ 130]

	Value	Description
ⓔ [Not run] [Not running]	Not running	Indicates that the tube health check has not been executed. If it is set, the test is interrupted before completion.
ⓔ [Start TuHC] [Start Tube Health Check]	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 ref] [Take Reference]	Take reference	Acquires reference data.
ⓔ [AGC test] [AGC Test]	AGC test	Function that self-checks the stability test. Executes the stability test in automatic gain control mode. Stiffness is not measured.
ⓔ [Copy result to ref] [Copy current result to reference]	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 ref to test] [Copy reference from shipment to test]	Copy reference from shipment to test	Copies the shipment reference to the reference data.

	Value	Description
Ⓢ	Initialize result and flags [Init result flag] [Initialize result and flags]	Resets the internal TuHC alarm and TuHC warning.
Ⓢ	Initialize counter [Init cnt] [Initialize counter]	Resets the test counter.
Ⓢ	Initialize coeff for FDG [Init coeff FDG] [Initialize coeff for FDG]	Resets the drive gain control coefficient. The next test starts following adjustment of the coefficient. This is a maintenance function.
Ⓢ	Clear reference [Clr ref] [Clear reference]	Clears the reference data for the test.
Ⓢ	Clear all history [Clr all hist] [Clear all history]	Sets all histories and current history number to 0. This is a maintenance function.
Ⓢ	Start one TuHC as interrupt [Start one TuHC] [Start one TuHC as interrupt]	Starts one tube health check immediately.

Tube health check additional parameters

① [Diag/Service] ► [Ttl health chk] ► [Tube health chk] ► [Tube health chk add]

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 [Not apply] [Not apply]	Menu for Tube health check is disabled. Default value.
Ⓢ	Apply [Apply] [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	Page
Ⓛ Ⓢ	TuHC health result	[Result]	[▶ 124]
Ⓛ Ⓢ	TuHC result flag	[Result flag]	[▶ 125]
Ⓛ Ⓢ	TuHC change ratio of inlet stiffness	[Inlet stiff chg]	[▶ 125]
Ⓛ Ⓢ	TuHC change ratio of outlet stiffness	[Outlet stiff chg]	[▶ 125]
Ⓛ Ⓢ	TuHC date at start	[Date start]	[▶ 126]
Ⓛ Ⓢ	TuHC time at start	[Time start]	[▶ 126]
Ⓛ Ⓢ	TuHC operation time at start	[Op time start]	[▶ 126]

TuHC health result

Ⓛ [Diag/Service] ▶ [Ttl health chk] ▶ [Tube health chk] ▶ [Result] ▶ [Result]

Shows the result of the Tube health check. This result is also reflected by the icon on Indicator.

	Value	Description
Ⓢ	Not execute [Not exe] [Not execute]	Test is not executed.
Ⓢ	Warning [Warn] [Warning]	Test is stopped or skipped with Alarm or Warning.
Ⓢ	Error [Error] [Error]	Change in stiffness is above the threshold.
Ⓢ	OK [Good] [OK]	Change in stiffness is within the threshold.

TuHC result flag

① [Diag/Service] ► [Ttl health chk] ► [Tube health chk] ► [Result] ► [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
Ⓕ	Change of inlet stiffness is over threshold [Chg inlet stiff] [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.
Ⓕ	Change of outlet stiffness is over threshold [Chg outlet stiff] [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.
Ⓕ	Suspicious test (continue test) [Suspicious test] [Suspicious test (continue test)]	Suspicious test is set when Suspicious test on TuHC warning [▶ 133] has been set and an unstable condition occurs.
Ⓕ	Skip test (continue test) [Skip test] [Skip test (continue test)]	Skip test is set when Stop test on TuHC warning [▶ 133] has been set, but the slope cannot be controlled. Tube health check skips this test, but continues the testing.
Ⓕ	Stop test [Stop test] [Stop test]	Stop test is set when any TuHC alarm [▶ 132] has been set with an error. Tube health check stops the test and sets TuHC enable [▶ 122] to Not running.

TuHC change ratio of inlet stiffness

① [Diag/Service] ► [Ttl health chk] ► [Tube health chk] ► [Result] ► [Inlet stiff chg]

	Value	Description
Ⓕ	Numeric digits	Specifies stiffness in percent calculated from the inlet pick-off.

TuHC change ratio of outlet stiffness

① [Diag/Service] ► [Ttl health chk] ► [Tube health chk] ► [Result] ► [Outlet stiff chg]

	Value	Description
Ⓕ	Numeric digits	Specifies stiffness in percent calculated from the outlet pick-off.

TuHC date at start

① [Diag/Service] ► [Ttl health chk] ► [Tube health chk] ► [Result] ► [Date start]
 ②

	Value	Description
②	Numeric digits	Specifies test start date.

TuHC time at start

① [Diag/Service] ► [Ttl health chk] ► [Tube health chk] ► [Result] ► [Time start]
 ②

	Value	Description
②	Numeric digits	Specifies test start time.

TuHC operation time at start

① [Diag/Service] ► [Ttl health chk] ► [Tube health chk] ► [Result] ► [Op time start]
 ②

	Value	Description
②	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	Page
① ②	TuHC continue interval	[Cont itrvl]	[▶ 127]
① ②	TuHC continue number	[Cont num]	[▶ 127]
① ②	TuHC stiffness change limit	[Stiff chg lim]	[▶ 127]
① ②	TuHC retry number	[Retry num]	[▶ 127]
① ②	TuHC retry interval	[Retry itrvl]	[▶ 127]
① ②	TuHC setting retry	[Set retry]	[▶ 128]
① ②	TuHC reference number copy from	[Ref cpy num]	[▶ 128]
① ②	TuHC magnet temperature selection	[Mgnt temp sel]	[▶ 128]
① ②	TuHC fixed temperature	[Fix temp]	[▶ 129]
① ②	TuHC temperature ratio for magnet 1	[Mgnt temp ratio1]	[▶ 129]
① ②	TuHC temperature ratio for magnet 2	[Mgnt temp ratio2]	[▶ 129]

TuHC continue interval

① [Diag/Service] ► [Ttl health chk] ► [Tube health chk] ► [Cfg] ► [Cont itrvl]

	Value	Description
②	Numeric digits	Specifies time between consecutive diagnostics in minutes. Setting range: 0 – 65535 min. Default value is 60 min.

TuHC continue number

① [Diag/Service] ► [Ttl health chk] ► [Tube health chk] ► [Cfg] ► [Cont num]

	Value	Description
②	Numeric digits	Specifies the number of consecutive tests to be executed. If set to 0, consecutive diagnostics are executed until stopped by TuHC enable [122]. Setting range: 0 – 65535. 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] ► [Cfg] ► [Stiff chg lim]

	Value	Description
②	Numeric digits	Indicates the threshold value for the change in stiffness. An alarm 203 is output, if the change exceeds the numeric value. Setting range: 0.1 – 100 %. Default value is 4.0 %.

TuHC retry number

① [Diag/Service] ► [Ttl health chk] ► [Tube health chk] ► [Cfg] ► [Retry num]

	Value	Description
②	Numeric digits	Specifies the maximum number of retries. If a TuHC warning is output, diagnostics are attempted again after the specified period has elapsed. Setting range: 0 – 255. Default value is 3.

TuHC retry interval

① [Diag/Service] ► [Ttl health chk] ► [Tube health chk] ► [Cfg] ► [Retry itrvl]

	Value	Description
②	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. Setting range: 0 – 255 mins. Default value is 2 min.

TuHC setting retry

① [Diag/Service] ► [Ttl health chk] ► [Tube health chk] ► [Cfg] ► [Set retry]

Sets the condition for executing the retry.

	Value	Description
②	No retry [No retry] [No retry]	Do not attempt a retry of the Tube health check when it has failed due to unstable process conditions.
②	Retry when skip test [Retry when skip test] [Retry when skip test]	Retry the Tube health check when Skip test has occurred.
②	Retry when suspicious test [Retry when sus. test] [Retry when suspicious test]	Retry the Tube health check when Suspicious test has occurred. Default value.
②	Retry by force [Retry by force] [Retry by force]	Force retry of Tube health check.

TuHC reference number copy from

① [Diag/Service] ► [Ttl health chk] ► [Tube health chk] ► [Cfg] ► [Ref cpy num]

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* [122] to Copy reference from shipment to test.

	Value	Description
②	Test [Test] [Test]	Reference for test.
②	Air [Air] [Air]	Reference for air. Default value.
②	Water [Water] [Water]	Reference for water.

TuHC magnet temperature selection

① [Diag/Service] ► [Ttl health chk] ► [Tube health chk] ► [Cfg] ► [Mgnt temp sel]

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
⑤	Use temperature on sensor [Snsr temp] [Use temperature on sensor]	Use temperature on sensor as the temperature of the driver system and pick-offs. Default value.
⑤	Compensate with fixed temperature [Comp fix temp] [Compensate with fixed temperature]	Use analog input temperature that is set with the parameter TuHC fixed temperature [▶ 129] as the temperature of the driver system and pick-offs.
⑤	Compensate with indicator temperature [Comp ind temp] [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.
⑤	Compensate with transmitter temperature [Comp trsmtr temp] [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

④ [Diag/Service] ▶ [Ttl health chk] ▶ [Tube health chk] ▶ [Cfg] ▶ [Fix temp]

	Value	Description
⑤	Numeric digits	Specifies field temperature for calculating the temperature of the driver system and pick-offs. Default value is 20 degrees Celsius.

TuHC temperature ratio for magnet 1

④ [Diag/Service] ▶ [Ttl health chk] ▶ [Tube health chk] ▶ [Cfg] ▶ [Mgnt temp ratio1]

	Value	Description
⑤	Numeric digits	Specifies the temperature change ratio from the temperature of the tube to the temperature of the S1 pick-off and driver system. Default value is 0.1.

TuHC temperature ratio for magnet 2

④ [Diag/Service] ▶ [Ttl health chk] ▶ [Tube health chk] ▶ [Cfg] ▶ [Mgnt temp ratio2]

	Value	Description
⑤	Numeric digits	Specifies the temperature change ratio from the temperature of the tube to the temperature on the S2 pick-off and driver system. 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	Page
Ⓛ ⓕ	TuHC enable	[Enable]	[▶ 130]
Ⓛ ⓕ	TuHC progress percentage	[Progress %]	[▶ 131]
Ⓛ ⓕ	TuHC test counter	[Test cnt]	[▶ 131]
Ⓛ ⓕ	TuHC alarm	[Alm]	[▶ 132]
Ⓛ ⓕ	TuHC warning	[Warn]	[▶ 133]

TuHC enable

Ⓛ [Diag/Service] ▶ [Ttl health chk] ▶ [Tube health chk] ▶ [Exe/Sts] ▶
[Enable]

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

Total health check [▶ 122]

	Value	Description
ⓕ	Not running [Not run] [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 [Start TuHC] [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 [Take ref] [Take Reference]	Acquires reference data.
ⓕ	AGC test [AGC test] [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 [Copy result to ref] [Copy current result to reference]	Copies the test results to the reference data. This function is not effective, if the next diagnostic has started.

	Value	Description
ⓔ	Copy reference from shipment to test [Copy ref to test] [Copy reference from shipment to test]	Copies the shipment reference to the reference data.
ⓔ	Initialize result and flags [Init result flag] [Initialize result and flags]	Resets the internal TuHC alarm and TuHC warning.
ⓔ	Initialize counter [Init cnt] [Initialize counter]	Resets the test counter.
ⓔ	Initialize coeff for FDG [Init coeff FDG] [Initialize coeff for FDG]	Resets the drive gain control coefficient. The next test starts following adjustment of the coefficient. This is a maintenance function.
ⓔ	Clear reference [Clr ref] [Clear reference]	Clears the reference data for the test.
ⓔ	Clear all history [Clr all hist] [Clear all history]	Sets all histories and current history number to 0. This is a maintenance function.
ⓔ	Start one TuHC as interrupt [Start one TuHC] [Start one TuHC as interrupt]	Starts one tube health check immediately.

TuHC progress percentage

① [Diag/Service] ► [Ttl health chk] ► [Tube health chk] ► [Exe/Sts] ► [Progress %]

	Value	Description
ⓔ	Numeric digits	Specifies test progress by percentage. Progress is 100 % when a single test has been completed.

TuHC test counter

① [Diag/Service] ► [Ttl health chk] ► [Tube health chk] ► [Exe/Sts] ► [Test cnt]

	Value	Description
ⓔ	Numeric digits	Specifies total test count. Reset to 0 when TuHC enable [▶ 122] = Initialize result and flags.

TuHC alarm

④ [Diag/Service] ► [Ttl health chk] ► [Tube health chk] ► [Exe/Sts] ► [Alm]

	Value	Description
⑤	No error [No err] [No error]	No error.
⑤	S1 amplitude is zero at AGC [S1 amp zero AGC] [S1 amplitude is zero at AGC]	S1 (Pick-off #1) amplitude is zero at AGC. Check the connection to the sensor.
⑤	S2 amplitude is zero at AGC [S2 amp zero AGC] [S2 amplitude is zero at AGC]	S2 (Pick-off #2) amplitude is zero at AGC. Check the connection to the sensor.
⑤	Drive current is zero at AGC [Drv curr zero AGC] [Drive current is zero at AGC]	Drive current is zero at AGC. Check the connection to the sensor.
⑤	Drive gain is zero at AGC [Drv gain zero AGC] [Drive gain is zero at AGC]	Drive gain is zero at AGC. Check the connection to the sensor.
⑤	Amplitude is zero at fixed drive gain [Amp zero fix drv] [Amplitude is zero at fixed drive gain]	Amplitude of pick-off is zero at AGC. Check the connection to the sensor.
⑤	No reference data [No ref data] [No reference data]	No reference data. A new reference must be taken.
⑤	Different sensor parameters from reference [Snsr param to ref] [Different sensor parameters to reference]	Different sensor from reference. When sensor or parameters are changed, a new reference must be taken.

	Value	Description
Ⓢ	Unable to copy bad result to reference [Unable copy result] [Unable to copy bad result to reference]	Unable to copy result to reference because test result is bad (warning has occurred). Check TuHC warning [▶ 133] and try again.
Ⓢ	Next test was started to copy reference [Next test start] [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.
Ⓢ	Parameter error [Param err] [Parameter error]	TuHC parameter is out of range. Check TuHC parameters.

TuHC warning

Ⓢ [Diag/Service] ▶ [Ttl health chk] ▶ [Tube health chk] ▶ [Exe/Sts] ▶ [Warn]

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 [Suspicious test] [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 [▶ 125] 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 [▶ 128] is Retry when suspicious test or Retry by force, Tube Health Check retries the test.
Ⓢ	Unstable condition at AGC1 & AGC2 [Unstable AGC1,2] [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 [Unstable test/ref] [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.

	Value	Description
⑥	Fluctuation of condition at AGC1 [Fluct at AGC1] [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.
⑥	Change threshold level [Chng thresh lev] [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.
⑥	Temperature or Pressure is out of range [T or P out] [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).
⑥	Fluctuation of condition at scan [Fluct at scan] [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.
⑥	No cross thresholds [No cross thr] [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.
⑥	Deviation of slope [Dev of slope] [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.
⑥	Unstable condition at AGC1 & scan [Unstable AGC1 sc] [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.
⑥	Skip test [Skip test] [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 [▶ 125] 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 [▶ 128] is not No retry, Tube Health Check retries the test.
⑥	Slope control error [Slope cnt err] [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.

	Value	Description
⑥	Amplitude is out of limit [Amp out limit] [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.
⑥	Data trans error [Data trans err] [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.
⑥	Calculation error [Calc err] [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	Page
① ⓔ	TuHC date at reference 1	[Date ref]	[▶ 136]
① ⓔ	TuHC time at reference 1	[Time ref]	[▶ 136]
① ⓔ	TuHC operation time at reference 1	[Op time ref]	[▶ 136]

TuHC date at reference 1

① [Diag/Service] ▶ [Ttl health chk] ▶ [Tube health chk] ▶ [Ref data] ▶ [Date ref]

	Value	Description
ⓔ	Numeric digits	Date when TuHC reference was taken.

TuHC time at reference 1

① [Diag/Service] ▶ [Ttl health chk] ▶ [Tube health chk] ▶ [Ref data] ▶ [Time ref]

	Value	Description
ⓔ	Numeric digits	Time when TuHC reference was taken.

TuHC operation time at reference 1

① [Diag/Service] ▶ [Ttl health chk] ▶ [Tube health chk] ▶ [Ref data] ▶ [Op time ref]

	Value	Description
ⓔ	Numeric digits	Operation time when the reference measurement was taken.

5.4.9 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	Page
①	Logging file name	[Log file]	[▶ 137]
①	Logging 1 – 4 select	[Log sel1 - 4]	[▶ 137]
①	Logging interval time	[Itrvl time]	[▶ 138]
①	Logging end time	[End time]	[▶ 139]
①	Logging execute	[Exe]	[▶ 140]
①	Logging start date	[Start date]	[▶ 140]
①	Logging start time	[Start time]	[▶ 140]

Logging file name

① [Diag/Service] ► [Data log] ► [Log file]

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. The following are invalid characters: space, ", *, +, ,, ., /, :, ;, <, =, >, ?, [, \,]

Logging 1 – 4 select

① [Diag/Service] ► [Data log] ► [Log sel1 – 4]

Sets the process variables that are to be logged to the microSD card.

	Value	Description
–	None [None]	Set Logging 1 – 4 select. Default value for setting of Logging 1 is Mass flow. Default value for setting of Logging 2 is Density. Default value for setting of Logging 3 is Temperature. Default value for setting of Logging 4 is Volume flow.
–	Mass flow [Mass] [Mass flow]	
–	Density [Dens] [Density]	
–	Temperature [Temp] [Temperature]	
–	Volume flow [Vol] [Volume flow]	
–	Pressure [Pres] [Pressure]	
Ⓢ	Concentration [Conc] [Concentration]	
Ⓢ	Net mass flow 1 [Net mass1] [Net Mass Flow 1]	
Ⓢ	Net volume flow 1 [Net vol1] [Net volume flow 1]	
Ⓢ	Viscosity [Visc] [Viscosity]	

	Value	Description
–	Frequency [Freq] [Frequency]	Set Logging 1 – 4 select. Default value for setting of Logging 1 is Mass flow. Default value for setting of Logging 2 is Density. Default value for setting of Logging 3 is Temperature. Default value for setting of Logging 4 is Volume flow.
–	Phase difference [Phase diff] [Phase difference]	
–	Drive gain [Drv gain] [Drive gain]	
–	Drive current [Drv curr] [Drive current]	
–	S1 amplitude [s1 amp] [S1 amplitude]	
–	S2 amplitude [s2 amp] [S1 amplitude]	
–	Transmitter temperature [Trsmtr temp] [Transmitter temperature]	

Logging interval time

🕒 [Diag/Service] ► [Data log] ► [Itrvl 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 [1s] [1s]	Data logging takes place once a second. Default value.
–	10 s [10s] [10s]	Data logging takes place every 10 seconds.
–	30 s [30s] [30s]	Data logging takes place every 30 seconds.
–	1 min [1min] [1min]	Data logging takes place every minute .
–	5 min [5min] [5min]	Data logging takes place every 5 minutes.

	Value	Description
	30 min	
–	[30min] [30min]	Data logging takes place every 30 minutes.
	60 min	
–	[60min] [60min]	Data logging takes place every hour.

Logging end time

🕒 [Diag/Service] ► [Data log] ► [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] [10min]	Data logging is executed for 10 minutes. Default value.
	30 min	
–	[30min] [30min]	Data logging is executed for 30 minutes.
	60 min	
–	[60min] [60min]	Data logging is executed for 1 hour.
	3 hour	
–	[3h] [3hour]	Data logging is executed for 3 hours.
	12 hour	
–	[12h] [12hour]	Data logging is executed for 12 hours.
	24 hour	
–	[24h] [24hour]	Data logging is executed for 24 hours.
	72 hour	
–	[72h] [72hour]	Data logging is executed for 72 hours.
	240 hour	
–	[240h] [240hour]	Data logging is executed for 240 hours.
	720 hour	
–	[720h] [720hour]	Data logging is executed for 720 hours.

Logging execute

① [Diag/Service] ► [Data log] ► [Exe]

Starts data logging and indicates the status.

	Value	Description
–	Not Execute [Not exe] [Not Execute]	Data logging is stopped. While this value is set, data logging is not executed.
–	Execute [Exe] [Execute]	Data logging is started. While this value is set, data logging is executing. When data logging via manual control is completed, this value becomes Not execute. Through auto control of a monitoring event, this value becomes Execute with monitor event.
–	Execute with monitor event [Exe with monitor] [Execute with monitor event]	While this value is set, data logging is not executed. When a monitored Event, as set in the Event settings, occurs, this parameter value becomes Execute, so data logging is started.

Logging start date

① [Diag/Service] ► [Data log] ► [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. Date format is YYYY/MM/DD.

Logging start time

① [Diag/Service] ► [Data log] ► [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.

5.4.10 Parameter backup/restore

Menu for configuring the backup/restore function.

The following menus/settings are available:

	Full name	Display name	Page
①	Backup file name	[Bkup name]	[► 141]
–	User configuration backup	[U cfg bkup]	[► 141]
①	User configuration backup name 1 – 3	[U bkup name1 – 3]	[► 143]
①	User configuration backup date 1 – 3	[U bkup date1 – 3]	[► 141]
①	Factory backup name	[F bkup name]	[► 142]
–	Factory backup date	[F bkup date]	[► 142]
①	Restoration	[Restore]	[► 142]

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
–	ASCII characters	Maximum length is 8 characters. Default value is SD_FILE. The following are invalid characters: space, ", *, +, ,, /, :, ;, <, =, >, ?, [, \,]

User configuration backup

① [Diag/Service] ► [Param bkup/restore] ► [U cfg bkup]

Ⓜ [Maintenance root menu] ► [Parameter backup/restore] ► [Backup] ► [User configuration backup]

Executes parameter backup.

	Value	Description
–	Not execute [Not exe]	Parameter backup is not executed.
–	Store to 1 [Store to 1]	Parameter backup is executed to indicator memory 1.
–	Store to 2 [Store to 2]	Parameter backup is executed to indicator memory 2.
–	Store to 3 [Store to 3]	Parameter backup is executed to indicator memory 3.
–	Store to microSD [Store to SD]	Parameter backup is executed to the microSD card. The file name defined in the parameter Backup file name is used.
–	Store from 1 to mi- croSD [Store 1 to SD]	Parameter backup is copied from indicator memory 1 to the microSD card. The file name defined in the parameter Backup file name is used.
–	Store from 2 to mi- croSD [Store 2 to SD]	Parameter backup is copied from indicator memory 2 to the microSD card. The file name defined in the parameter Backup file name is used.
–	Store from 3 to mi- croSD [Store 3 to SD]	Parameter backup is copied from indicator memory 3 to the microSD card. The file name defined in the parameter Backup file name is used.

User configuration backup date 1 – 3

① [Diag/Service] ► [Param bkup/restore] ► [U bkup date1 – 3]

Shows the date of the parameter Backup data in indicator memory 1 – 3.

	Value	Description
–	Numeric digits	Date format is YYYY/MM/DD.

Factory backup name

⌚ [Diag/Service] ► [Param bkup/restore] ► [F bkup name]

	Value	Description
–	Factory Delivery	Name of factory backup. Cannot be changed.

Factory backup date

⌚ [Diag/Service] ► [Param bkup/restore] ► [F bkup date]

Shows the date of factory backup.

	Value	Description
–	Numeric digits	Date format is YYYY/MM/DD. Cannot be changed.

Restore

⌚ [Diag/Service] ► [Param bkup/restore] ► [Restore]

Restores or duplicates the user configuration backup to a device.

	Value	Description
–	Not Execute [Not exe]	Parameter restore is not executed or cancelled.
–	Duplicate user configuration 1 [Duplicate cfg1]	Parameters are duplicated from backup settings in indicator memory 1.
–	Duplicate user configuration 2 [Duplicate cfg2]	Parameters are duplicated from backup settings in indicator memory 2.
–	Duplicate user configuration 3 [Duplicate cfg3]	Parameters are duplicated from backup settings in indicator memory 3.
–	Duplicate from microSD [Duplicate SD]	Parameters are duplicated from backup settings on the microSD card. The file on the microSD card that has the name defined in the parameter Backup file name is used.
–	Restore user configuration 1 [Restore cfg1]	Parameters are restored from backup settings in indicator memory 1.
–	Restore user configuration 2 [Restore cfg2]	Parameters are restored from backup settings in indicator memory 2.
–	Restore user configuration 3 [Restore cfg3]	Parameters are restored from backup settings in indicator memory 3.
–	Restore from microSD [Restore SD]	Parameters are restored from backup settings on the microSD card. The file on the microSD card that has the name defined in the parameter Backup file name is used.
–	Restore factory default [Restore F val]	Parameters are restored from default settings.

	Value	Description
–	Download sensor constant from user configuration 1 [DL snsr cnst cfg1]	Sensor constants are downloaded from indicator memory 1.
–	Download sensor constant from microSD [DL snsr cnst SD]	Sensor constants are downloaded from the microSD card. The file on the microSD card that has the name defined in the parameter Backup file name is used.
	Disable compensations [Disable comp]	Disable compensations to keep compatibility with Device Revision 3. Specifically, initialize each coefficient of SKT1/SKT2/SKT3/FT1/FT2/FT3.

User configuration backup name 1 – 3

⌚ [Diag/Service] ► [Param bkup/restore] ► [U bkup name1 – 3]

Shows the file name of the parameter Backup data in indicator memory 1 – 3.

	Value	Description
–	ASCII characters	Maximum length is 16 characters. Default value is blank.

5.4.11 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	Page
⌚	Last calibration information 1 – 5	[Last calib info1 – 5]	[▶ 143]
⌚	Last calibration date 1 – 5	[Last calib date1 – 5]	[▶ 143]
⌚	Next calibration date	[Next calib date]	[▶ 144]

Last calibration information 1 – 5

⌚ [Diag/Service] ► [Last calib info] ► [Last calib info1 – 5]

Sets text about calibration or service.

	Value	Description
–	ASCII characters	Maximum length is 32 characters. Default value is space.

Last calibration date 1 – 5

⌚ [Diag/Service] ► [Last calib info] ► [Last calib date1 – 5]

Sets the date when the calibration was performed. The display format of the date is specified by the *Display format date* [▶ 336] parameter.

	Value	Description
–	Numeric digits	Date format is DD/MM/YYYY. Default value is 01/01/2015. The date format for Web page depends on the OS regional setting. Hour, minutes and seconds are always zero on the Web page.

Next calibration date

🕒 [Diag/Service] ► [Last calib info] ► [Next calib date]

Sets the planned date for the next calibration. The display format of the date is specified by the *Display format date* [▶ 336] parameter.

	Value	Description
–	Numeric digits	Date format is DD/MM/YYYY. Default value is 01/01/2155. The date format for Web page depends on the OS regional setting. Hour, minutes and seconds are always zero on the Web page.

5.4.12 Last calibration information

Defines parameters for setting calibration or service information.

Last calibration information 1 – 5

🕒 [Diag/Service] ► [Last calib info] ► [Last calib info1 – 5]

Sets text about calibration or service.

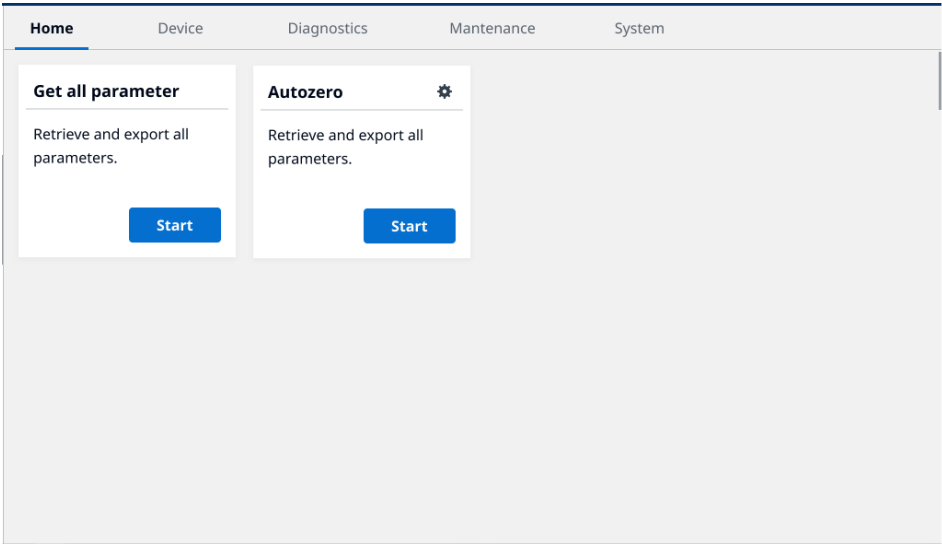
	Value	Description
–	ASCII characters	Maximum length is 32 characters. Default value is space.

5.5 Home

Auto zero and export all web page parameters for the device.

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

Sym-bols	Description
Ⓜ	Menu item or menu path is available via the Web page.



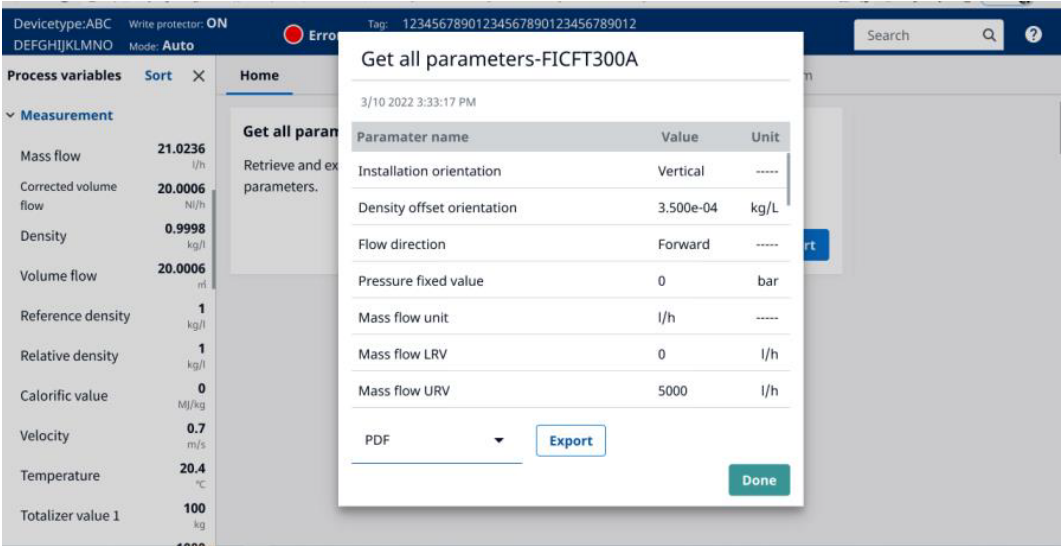
The following menus/settings are available:

	Full name	Display name	Web name	Page
Ⓜ	Get all parameters	—	[Get all parameters]	[▶ 145]
Ⓜ	Autozero	—	[Autozero]	[▶ 146]

Get all parameters Ⓜ [Home] ▶ [Get all parameters]

Shows/exports all web page parameters by clicking start button.

When Start button is clicked, then the following screen is shown and start reading all parameters automatically. After complete reading the values, all parameter values can be shown and exported by PDF or csv format. The date type is fixed to YYYY/MM/DD regardless of the OS regional setting.



Autozero

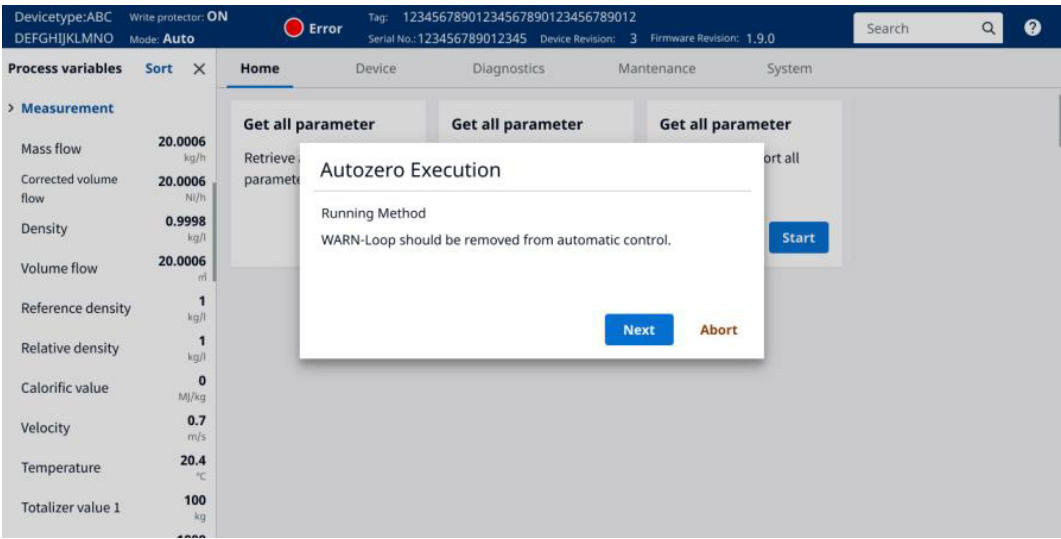


Autozero can be executed.

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

- *Diag/Service* ► 102
- *Maintenance* ► 380

When Start button is clicked, then the following screen is shown and operate interactively.



5.6 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. 25: 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 Web page.
Ⓞ	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	Page
Ⓐ	Target mode	[Target mode]	[▶ 147]
Ⓐ	Installation configuration	[Install cfg]	[▶ 147]
Ⓐ	Standard device variables	[Std dev var]	[▶ 150]
Ⓐ	Pulse/Frequency output	[Pls/Sts out]	[▶ 159]
Ⓐ	Totalizer	[Ttl]	[▶ 166]
Ⓐ	Display select	[Disp sel]	[▶ 168]
Ⓐ	Date/Time	[Date/Time]	[▶ 171]

5.6.1 Target mode

Target mode

Ⓐ [Easy setup wizard] ▶ [Target mode]

Sets the Target mode for Physical block, All transducer block and All function blocks.



Many parameters cannot be written when Target mode is set to Auto.

	Value	Description
—	Auto	Operation is Auto mode.
—	O/S	Operation is out of service mode.

5.6.2 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* [▶ 147]
- *Detailed setup* [▶ 194]

The following menus/settings are available:

	Full name	Display name	Web name	Page
①	Installation orientation	[Install orient]	[Installation orientation]	[▶ 148]
①	Density offset orientation	[Dens offset]	[Density offset orientation]	[▶ 148]
①	Flow direction	[Flow dir]	[Flow direction]	[▶ 149]
①	Pressure fixed value	[Fix val]	[Pressure fixed value]	[▶ 149]

Installation orientation

① [Easy setup wizard] ▶ [Install cfg] ▶ [Install orient]

Sets the installation orientation of the device.

	Value	Description
–	Vertical [Vertical]	Default value is Vertical.
–	Horizontal bend down [Hrzntl bend down]	
–	Horizontal bend up [Hrzntl bend up]	

Density offset orientation

① [Easy setup wizard] ▶ [Install cfg] ▶ [Dens offset]

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. 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

Meter size	Default value in kg/l
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]

Sets the flow direction of the device.

	Value	Description
–	Forward [Forward]	Direction of flow is the same as the arrow mark on the sensor. Default value.
–	Reverse [Reverse]	Opposite direction.

Pressure fixed value

🕒 [Easy setup wizard] ► [Install cfg] ► [Fix val]

This parameter is also available in additional menus. The values can be set in each of these menus:

- Easy setup wizard [► 149]
- Basic setup [► 176]
- Detailed setup
 - Pressure [► 218]
 - Installation configuration [► 195]

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. Default value is 0.0. 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.

5.6.3 Standard device variables

Menu for parameters that configure standard process variables.

The following menus/settings are available:

	Full name	Display name	Page
①	Mass flow	[Mass]	[▶ 150]
①	Density	[Dens]	[▶ 152]
①	Temperature	[Temp]	[▶ 154]
①	Volume flow	[Vol]	[▶ 156]

Mass flow

Menu for configuring the mass flow measurement.

The following menus/settings are available:

	Full name	Display name	Page
①	Mass flow unit	[Unit]	[▶ 151]
①	Mass flow LRV	[LRV]	[▶ 151]
①	Mass flow URV	[URV]	[▶ 152]
①	Mass flow damping	[Damp]	[▶ 152]

Mass flow unit

🕒 [Easy setup wizard] ► [Std dev var] ► [Mass] ► [Unit]

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

- *Easy setup wizard* [► 151]
- *Basic setup* [► 177]
- *Detailed setup* [► 197]

Sets the unit for mass flow.

Value	Description
– g/s	Sets the displayed Mass flow unit. Default value is kg/h.
– g/min	
– g/h	
– kg/s	
– kg/min	
– kg/h	
– kg/d	
– t/min	
– t/h	
– t/d	
– t(US)/min	
– t(US)/h	
– t(US)/d	
– t(UK)/min	
– t(UK)/h	
– t(UK)/d	
– lb/s	
– lb/min	
– lb/h	
– lb/d	
– User unit	

Mass flow LRV

🕒 [Easy setup wizard] ► [Std dev var] ► [Mass] ► [LRV]

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

- *Easy setup wizard* [► 151]
- *Basic setup* [► 178]
- *Detailed setup* [► 198]

Sets the lower range value, 0 %, for scaling the frequency and pulse outputs during mass flow measurement.

Value	Description
– Numeric digits	Default value is 0.0. Settings must satisfy the following conditions: $URV \neq LRV$ $LRV \leq Q_{max}$ $LRV \geq -Q_{max}$ 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]

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

- *Easy setup wizard* [▶ 152]
- *Basic setup* [▶ 178]
- *Detailed setup* [▶ 198]

	Value	Description
–	Numeric digits	Default value is 10.0. Settings must satisfy the following conditions: $URV \leq Q_{max}$ $URV \geq -Q_{max}$ $URV \neq LRV$ For the Q_{max} value refer to the General Specification (GS) of each product.

Mass flow damping

⌚ [Easy setup wizard] ► [Std dev var] ► [Mass] ► [Damp]

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

- *Easy setup wizard* [▶ 152]
- *Basic setup* [▶ 178]
- *Detailed setup* [▶ 199]

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. The default value is 3.0 s.

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.

	Full name	Display name	Page
⌚	Density unit	[Unit]	[▶ 153]
⌚	Density LRV	[LRV]	[▶ 153]
⌚	Density URV	[URV]	[▶ 153]
⌚	Density FTime (damping)	[Damp]	[▶ 154]

Density unit

① [Easy setup wizard] ► [Std dev var] ► [Dens] ► [Unit]

This parameter is also available in additional menus. The values can be set in each of these menus:

- *Easy setup wizard* [► 153]
- *Basic setup* [► 179]
- *Detailed setup* [► 203]

Sets the unit for density.

	Value	Description
–	g/mL	Sets the displayed Density unit. Default value is g/ml.
–	kg/L	
–	kg/m3	
–	lb/gal	
–	lb/ft3	
–	g/cm3	
–	g/L	
–	User unit	
–	kg/cm3	
–	kg/dm3	
–	g/cc	

Density LRV

① [Easy setup wizard] ► [Std dev var] ► [Dens] ► [LRV]

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

- *Easy setup wizard* [► 153]
- *Basic setup* [► 179]
- *Detailed setup* [► 203]

Sets the lower range value, 0 %, for the scaling of frequency output during density measurement.

	Value	Description
Ⓔ	Numeric digits	Default value is 0. Setting must satisfy the following condition: URV ≠ LRV

Density URV

① [Easy setup wizard] ► [Std dev var] ► [Dens] ► [URV]

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

- *Easy setup wizard* [► 153]
- *Basic setup* [► 180]
- *Detailed setup* [► 204]

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. Settings must satisfy the following condition: URV ≠ LRV

Density damping

🕒 [Easy setup wizard] ► [Std dev var] ► [Dens] ► [Damp]

This parameter is also available in additional menus. The values can be set in each of these menus:

- *Easy setup wizard* [► 154]
- *Basic setup* [► 180]
- *Detailed setup* [► 204]

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. Default value is 3.0 s.

Temperature

Menu for configuring the temperature measurement.

The following menus/settings are available:

	Full name	Display name	Page
🕒	Temperature unit	[Unit]	[► 154]
🕒	Temperature LRV	[LRV]	[► 155]
🕒	Temperature URV	[URV]	[► 155]
🕒	Temperature FTime (damping)	[Damp]	[► 155]

Temperature unit

🕒 [Easy setup wizard] ► [Std dev var] ► [Temp] ► [Unit]

This parameter is also available in additional menus. The values can be set in each of these menus:

- *Easy setup wizard* [► 154]
- *Basic setup* [► 180]
- *Detailed setup* [► 208]

Sets the unit for temperature.

	Value	Description
–	degC [°C]	Sets the displayed Temperature unit. Default value is degC.
–	degF [°F]	
–	degR [°R]	
–	K	

Temperature LRV

① [Easy setup wizard] ► [Std dev var] ► [Temp] ► [LRV]

This parameter is also available in additional menus. The values can be set in each of these menus:

- *Easy setup wizard* [► 155]
- *Basic setup* [► 181]
- *Detailed setup* [► 209]

Sets the lower range value, 0 %, for scaling the analog and frequency output during temperature measurement.

Sets the lower range value, 0 %, for scaling the frequency output during temperature measurement.

	Value	Description
–	Numeric digits	Default value is 0.0. Settings must satisfy the following conditions: URV $\neq$ LRV LRV $\geq$ Temperature Lower Limit [► 358] LRV $\leq$ Temperature Upper Limit [► 358]

Temperature URV

① [Easy setup wizard] ► [Std dev var] ► [Temp] ► [URV]

This parameter is also available in additional menus. The values can be set in each of these menus:

- *Easy setup wizard* [► 155]
- *Basic setup* [► 181]
- *Detailed setup* [► 209]

Sets the upper range value, 100 %, for scaling the analog and frequency output during temperature measurement.

Sets the upper range value, 100 %, for scaling the frequency output during temperature measurement.

	Value	Description
–	Numeric digits	Default value is 150.0. Settings must satisfy the following conditions: URV $\neq$ LRV URV $\geq$ Temperature lower limit [► 358] URV $\leq$ Temperature upper limit [► 358]

Temperature damping

① [Easy setup wizard] ► [Std dev var] ► [Temp] ► [Damp]

This parameter is also available in additional menus. The values can be set in each of these menus:

- *Easy setup wizard* [► 155]
- *Basic setup* [► 181]
- *Detailed Setup* [► 210]

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. 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:

	Full name	Display name	Web name	Page
①	Volume flow unit	[Unit]	[Volume flow unit]	[▶ 156]
①	Volume flow LRV	[LRV]	[Volume flow LRV]	[▶ 157]
①	Volume flow URV	[URV]	[Volume flow URV]	[▶ 158]
①	Volume flow damping	[Damp]	[Volume flow damping]	[▶ 158]

Volume flow unit

① [Easy setup wizard] ▶ [Std dev var] ▶ [Vol] ▶ [Unit]

This parameter is also available in additional menus. The values can be set in each of these menus:

- *Easy setup wizard* [▶ 156]
- *Basic setup* [▶ 182]
- *Detailed setup* [▶ 212]

Sets the unit for volume flow.

	Value	Description
–	L/s	Sets the displayed Volume flow unit. Default value is m ³ /h.
–	L/min	
–	L/h	
–	L/d	
–	cm ³ /s	
–	cm ³ /min	
–	cm ³ /h	
–	m ³ /s	
–	m ³ /min	
–	m ³ /h	
–	m ³ /d	
–	gal/s	
–	gal/min	
–	gal/h	
–	gal/d	
–	ft ³ /s	
–	ft ³ /min	
–	ft ³ /h	
–	ft ³ /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]

This parameter is also available in additional menus. The values can be set in each of these menus:

- *Easy setup wizard* [► 157]
- *Basic setup* [► 183]
- *Detailed Setup* [► 213]

Sets the lower range value, 0 %, for scaling the analog, frequency and pulse output during volume flow measurement.

Sets the lower range value, 0 %, for scaling the frequency and pulse output during volume flow measurement.

	Value	Description
–	Numeric digits	Default value is 0.0. Settings must satisfy the following conditions: URV ≠ LRV

Volume flow URV

⌚ [Easy setup wizard] ► [Std dev var] ► [Vol] ► [URV]

This parameter is also available in additional menus. The values can be set in each of these menus:

- *Easy setup wizard* [▶ 158]
- *Basic setup* [▶ 184]
- *Detailed setup* [▶ 214]

Sets the upper range value, 100 %, for scaling the analog, frequency and pulse output during volume flow measurement.

Sets the upper range value, 100 %, for scaling the frequency and pulse output during volume flow measurement.

	Value	Description
–	Numeric digits	Default value is 10.0. Settings must satisfy the following conditions: URV ≠ LRV

Volume flow damping

⌚ [Easy setup wizard] ► [Std dev var] ► [Vol] ► [Damp]

This parameter is also available in additional menus. The values can be set in each of these menus:

- *Easy setup wizard* [▶ 158]
- *Basic setup* [▶ 184]
- *Detailed setup* [▶ 214]

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. Default value is 3.0 s.

5.6.4 Pulse/Frequency output

Menu for configuring the pulse/frequency output.

The following menus/settings are available:

	Full name	Display name	Page
Ⓛ	Pulse/Frequency configuration	[Pls/Sts cfg]	[▶ 159]
Ⓛ	Pulse output	[Pls out1]	[▶ 159]
Ⓛ	Frequency output	[Freq out1]	[▶ 164]

Pulse/Frequency configuration

Menu for configuring the pulse/frequency output.

The following menus/settings are available:

	Full name	Display name	Page
Ⓛ	Pulse/Frequency output mode	[Pls/Sts1 mode]	[▶ 159]

Pulse/Frequency output mode

Ⓛ [Easy setup wizard] ▶ [Pls/Sts out] ▶ [Pls/Sts cfg] ▶ [Pls/Sts1 mode]

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

- *Detailed setup* [▶ 292]

Sets the pulse signal mode of Pulse/Frequency output.

If Pulse/Frequency output mode has just been changed, the output signal of pulse/frequency is not exact.

	Value	Description
–	No function [No func]	Pulse signal or status signal is not available. Default value.
–	Fixed pulse output [Fix pls out]	Pulse signal with fixed pulse width, duty ratio changes. Status signal is not available. When the value is selected, Pulse output menu is shown.
–	Frequency output [Freq out]	Pulse signal with fixed duty ratio, pulse width changes. Status signal is not available. When the value is selected, Frequency output menu is shown.

Pulse output

Menu for configuring the pulse signal. This is available when Fixed pulse output is selected in the parameter Pulse/Frequency output mode.

The following menus/settings are available:

	Full name	Display name	Page
Ⓛ	Pulse output select	[Sel]	[▶ 160]
Ⓛ	Pulse output unit select	[Unit]	[▶ 160]
Ⓛ	Pulse output width	[Width]	[▶ 163]
Ⓛ	Pulse output rate	[Rate]	[▶ 164]

**Pulse output
select**

④ [Easy setup wizard] ► [Pls/Sts out] ► [Pls out1] ► [Sel]

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

- *Detailed setup* [► 293]

Assigns a process variable to pulse output.

	Value	Description
—	Mass flow [Mass]	Sets the value for Pulse output. The default value of Pulse output is Mass flow.
—	Volume flow [Vol]	
—	Corrected volume flow [Corr vol]	
—	Energy [Energy]	
Ⓕ	Net mass flow 1 [Net mass1]	
Ⓕ	Net mass flow 2 [Net mass2]	
Ⓕ	Net volume flow 1 [Net vol1]	
Ⓕ	Net volume flow 2 [Net vol2]	
Ⓕ	Net corrected volume flow [Net corr vol]	

**Pulse output unit
select**

④ [Easy setup wizard] ► [Pls/Sts out] ► [Pls out1] ► [Unit]

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

- *Detailed setup* [► 294]

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 is kg/P.

If the unit and process variable are inconsistent, 323:Pulse output configuration error is shown. Available units are depend on the Display unit selection.

See *Units of the parameters* [► 596] for details of shown units and the labels.

	For – Mass flow [Mass]	▪ g/P ▪ kg/P ▪ t/P ▪ t(US)/P ▪ t(UK)/P ▪ lb/P ▪ P/g ▪ P/kg ▪ P/t ▪ P/t(US) ▪ P/t(UK) ▪ P/lb
	For – Net mass flow 1 – 2 [Net mass1 – 2]	▪ g/P ▪ kg/P ▪ t/P ▪ lb/P ▪ P/g ▪ P/kg ▪ P/t ▪ P/lb
	For – Volume flow [v _{o1}]	▪ cm³/P ▪ L/P ▪ m³/P ▪ gal/P ▪ kgal/P ▪ ft³/P ▪ bbl/P ▪ Impgal/P ▪ kImpgal/P ▪ P/cm³ ▪ P/L ▪ P/m³ ▪ P/gal ▪ P/kgal ▪ P/ft³ ▪ P/bbl ▪ P/Impgal ▪ P/kImpgal

–	For Net volume flow 1 – 2 [Net vol1 – 2]	▪ cm^3/P ▪ L/P ▪ m^3/P ▪ gal/P ▪ kgal/P ▪ ft^3/P ▪ bbl/P ▪ Impgal/P ▪ $\text{kImpgal}/\text{P}$ ▪ P/m^3 ▪ P/L ▪ P/m^3 ▪ P/gal ▪ P/kgal ▪ P/ft^3 ▪ P/bbl ▪ P/Impgal ▪ $\text{P}/\text{kImpgal}$
–	For Corrected volume flow [Corr vol]	▪ NL/P ▪ Nm^3/P ▪ SL/P ▪ Sft^3/P ▪ Sm^3/P ▪ P/NL ▪ P/Nm^3 ▪ P/SL ▪ PSft^3 ▪ P/Sm^3
–	For Net corrected volume flow [Net corr vol]	▪ NL/P ▪ Nm^3/P ▪ SL/P ▪ Sft^3/P ▪ Sm^3/P ▪ P/NL ▪ P/Nm^3 ▪ P/SL ▪ PSft^3 ▪ P/Sm^3
–	For Energy [Energy]	▪ MJ/P ▪ Btu/P ▪ P/MJ ▪ P/Btu

Pulse output width

🕒 [Easy setup wizard] ► [Pls/Sts out] ► [Pls out1] ► [Width]

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

- *Detailed setup* [► 297]

Sets the pulse width, this means the duration of the active state.

	Value	Description
–	0.05 ms [0.05ms]	Sets the pulse width. Default value of Pulse output is 1 ms.
–	0.1 ms [0.1ms]	
–	0.5 ms [0.5ms]	
–	1 ms [1ms]	
–	5 ms [5ms]	
–	10 ms [10ms]	
–	20 ms [20ms]	
–	33 ms [33ms]	Sets the pulse width. Default value of Pulse output is 1 ms.
–	50 ms [50ms]	
–	100 ms [100ms]	
–	200 ms [200ms]	
–	330 ms [330ms]	
–	500 ms [500ms]	
–	1000 ms [1000ms]	
–	2000 ms [2000ms]	

Pulse output rate

① [Easy setup wizard] ► [Pls/Sts out] ► [Pls out1] ► [Rate]

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

- *Detailed setup* [► 299]

Parameter for defining the number of units of the assigned process variable for 1 pulse of Pulse output.

	Value	Description
–	Numeric digits	Setting range: 0 – no check. Default value is 1.0. The unit for this value is defined in the parameter Pulse output unit. This value depends on the parameter of Pulse output width and on maximum flow.

Frequency output

Menu for configuring the frequency signal. It is available when Frequency output is selected in the parameter Pulse/Frequency output mode.

The following menus/settings are available:

	Full name	Display name	Page
①	Frequency output select	[Sel]	[► 164]
①	Min frequency	[Min freq]	[► 165]
①	Max frequency	[Max freq]	[► 165]

Frequency output select

① [Easy setup wizard] ► [Pls/Sts out] ► [Freq out1] ► [Sel]

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

- *Detailed setup* [► 300]

Assigns a process variable to Frequency output.

	Value	Description
–	Mass flow [Mass]	Sets the process variable for Frequency output. The default value of Frequency output is Mass flow.
–	Density [Dens]	
–	Temperature [Temp]	
–	Volume flow [Vol]	
–	Pressure [Pres]	
–	Reference density [Ref dens]	
–	Relative density [Rel dens]	

	Value	Description
–	Corrected volume flow [Corr vol]	Sets the process variable for Frequency output. The default value of Frequency output is Mass flow.
Ⓢ	Concentration [Conc]	
Ⓢ	Net mass flow 1 [Net mass1]	
Ⓢ	Net mass flow 2 [Net mass2]	
Ⓢ	Net volume flow 1 [Net vol1]	
Ⓢ	Net volume flow 2 [Net vol2]	
Ⓢ	Net corrected volume flow [Net corr vol]	
Ⓢ	Viscosity [Visc]	
–	Drive current [Drv curr]	

Min frequency

Ⓢ [Easy setup wizard] ► [Pls/Sts out] ► [Freq out1] ► [Min freq]

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

- *Detailed setup* [► 302]

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. Default value is 0.0 Hz.

Max frequency

Ⓢ [Easy setup wizard] ► [Pls/Sts out] ► [Freq out1] ► [Max freq]

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

- *Detailed setup* [► 301]

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. Default value is 10000.0 Hz.

5.6.5 Totalizer

Menu for configuring the totalizer.

Totalizer 1 – 3

Menus for configuring Totalizer 1 – 3.

The following menus/settings are available:

	Full name	Display name	Page
①	Total 1 – 3 channel	[Channel]	[▶ 166]
①	Total 1 – 3 unit	[Unit]	[▶ 167]
①	Total 1 – 3 failure option	[Fail opt]	[▶ 167]

Total 1 – 3 channel

① [Easy setup wizard] ▶ [Tt1] ▶ [Tt11 – 3] ▶ [Channel]

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

- *Detailed setup* [▶ 303]

	Value	Description
–	Mass flow [Mass]	Sets the displayed process variable for Totalizer 1 – 3. The default value for Totalizer 1 is Mass flow. The default value for Totalizer 2 is Volume flow. The default value for Totalizer 3 is Corrected volume flow.
–	Volume flow [Vol]	
–	Corrected volume flow [Corr vol]	
–	Energy [Energy]	
ⓔ	Net mass flow 1 [Net mass1]	Sets the displayed process variable for Totalizer 1 – 3. The default value for Totalizer 1 is Mass flow. The default value for Totalizer 2 is Volume flow. The default value for Totalizer 3 is Corrected volume flow.
ⓔ	Net mass flow 2 [Net mass2]	
ⓔ	Net volume flow 1 [Net vol1]	
ⓔ	Net volume flow 2 [Net vol2]	
ⓔ	Net corrected volume flow [Net corr vol]	

Total 1 – 3 unit

🕒 [Easy setup wizard] ► [Tt1] ► [Tt11 – 3] ► [Unit]

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

- *Basic setup* [► 187]
- *Detailed setup* [► 282]

Sets the unit for Total 1 – 3.

Value	Description
– g	Sets the unit for Totalizer 1 – 3. The default value for Totalizer 1 is kg. The default value for Totalizer 2 is m ³ . The default value for Totalizer 3 is Sm ³ .
– kg	
– t	
– t(US)	
– t(UK)	
– lb	
– L	
– cm ³	
– m ³	
– gal	
– kgal	
– ft ³	
– bbl	
– Impgal	
– kImpgal	
– NL	
– Nm ³	
– SL	
– Sm ³	
– Sft ³	
– MMSft ³	
– MJ	
– Btu	
– User unit	

Total 1 – 3 failure option

🕒 [Easy setup wizard] ► [Tt1] ► [Tt11 – 3] ► [Fail opt]

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

- *Basic setup* [► 188]
- *Detailed setup* [► 304]

Defines the behavior of the totalizers when an alarm occurs.

Value	Description
– Run [Run]	Totalizer accumulates assigned process value anyway. Default value.
– Hold [Hold]	Totalizer stops accumulating the assigned process value.
– Last Valid Value [Last valid val]	Totalizer accumulates the value that was measured before the alarm occurred.

5.6.6 Display select

Menu for assigning process variables to be displayed.

**Display select
1 – 4**

⌚ [Easy setup wizard] ► [Disp sel] ► [Sel1 – 4]

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

- *Basic setup* [► 190]
- *Detailed setup* [► 314]

Assigns process variables to display lines 1, 2, 3 and 4 of the LCD display. On display, Display measurement mode can be selected and Logging select 1 – 4 can be selected based on the selection of Display measurement mode.

	Value	Description
–	None [None]	Sets Display select 1 – 4. The default value for Display select 1 is Mass flow. None is not available for Display select 1. The default value for Display select 2 is Density. The default value for Display select 3 is Temperature. The default value for Display select 4 is Volume flow.
–	Mass flow [Mass]	
–	Density [Dens]	
–	Temperature [Temp]	
–	Volume flow [Vol]	
–	Pressure [Pres]	
–	Reference density [Ref dens]	
–	Relative density [Rel dens]	
–	Corrected volume flow [Corr vol]	
–	Velocity [Vel]	

	Value	Description
–	Totalizer 1 [Tt11]	Sets Display select 1 – 4. The default value for Display select 1 is Mass flow. None is not available for Display select 1. The default value for Display select 2 is Density. The default value for Display select 3 is Temperature. The default value for Display select 4 is Volume flow.
–	Totalizer 2 [Tt12]	
–	Totalizer 3 [Tt13]	
–	Mass flow % graph [Mass %]	
–	Volume flow % graph [Vol %]	
–	Corrected volume flow % graph [Corr vol %]	
–	Tag [Tag]	
–	Long tag [Long tag]	
Ⓕ	Concentration [Conc]	
Ⓕ	Net mass flow 1 [Net mass1]	

	Value	Description
Ⓔ	Net mass flow 2 [Net mass2]	Sets Display select 1 – 4. The default value for Display select 1 is Mass flow. None is not available for Display select 1. The default value for Display select 2 is Density. The default value for Display select 3 is Temperature. The default value for Display select 4 is Volume flow.
Ⓔ	Net volume flow 1 [Net vol1]	
Ⓔ	Net volume flow 2 [Net vol2]	
Ⓔ	Net corrected volume flow [Net corr vol]	
Ⓔ	Viscosity [visc]	
–	Drive current [Drv curr]	
Ⓔ	Gas void fraction [GVF]	
–	24hours totalizer 1 [24h tt11]	
	24hours totalizer 2 [24h tt12]	
	24hours totalizer 3 [24h tt13]	
	Display unit flow dual [Mass flow (dual)]	
	Display unit density dual [Dens (dual)]	

5.6.7 Date/Time

The following menus/settings are available:

	Full name	Display name	Page
–	Set current date	[Set date]	[▶ 171]
–	Set current time	[Set time]	[▶ 171]

Set current date

🕒 [Easy setup wizard] ▶ [Date/Time] ▶ [Set date]

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

- *Basic setup* [▶ 193]
- *Detailed setup* [▶ 340]

Sets the date.

	Value	Description
–	Numeric digits	The date format on the LCD is defined in the parameter Display format date. The default format is MM/DD/YYYY. Default value is 01/01/2015.

Set current time

🕒 [Easy setup wizard] ▶ [Date/Time] ▶ [Set time]

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

- *Detailed setup* [▶ 340]

Sets the time.

	Value	Description
–	Numeric digits	Time format is hh:mm:ss. Default value is 00:00.00.

5.7 Detailed setup / Device

Detailed setup / Device is structured from the following 4 submenus. For the Web page, the 4 submenus are combined into a 1 drop-down list. Therefore, submenus can be selected by clicking on the drop-down list.

- Mode (only for Web page)
- Basic Setup (only for Web page)
- Detailed setup
- Query Device (only for Web page)

This chapter shows these parameter explanation.

5.7.1 Mode

Menu for parameters used to configure the Target mode.

Tab. 26: Explanation of symbols used in the menu description

Symbols	Description
Ⓜ	Menu item or menu path is available via the Web page.

The following menus/settings are available:

	Full name	Display name	Web name	Page
Ⓜ	Physical Block inc. TB/AI/TOT	—	[Physical Block inc. TB/AI/TOT]	[▶ 172]
Ⓜ	Analog Output Block	—	[Analog Output Block]	[▶ 173]

Physical Block inc. TB/AI/TOT

Menu for parameters used to configure the Target mode.

The following menus/settings are available:

	Full name	Display name	Web name	Page
Ⓜ	Current mode	—	[Current mode]	[▶ 172]
Ⓜ	Target mode	—	[Target mode]	[▶ 173]

Current mode

Ⓜ [Device setup] ▶ [Mode] ▶ [Physical Block inc. TB/AI/TOT] ▶ [Current mode]

This parameter shows the current Target mode for Physical Block, All Transducer Block and All Function Blocks.

	Value	Description
—	Auto	Operation is Auto mode.
—	O/S	Operation is out of service.
—	Man	Operation is manual mode.

Target mode

Ⓜ [Device setup] ► [Mode] ► [Physical Block inc. TB/AI/TOT] ► [Target mode]

Target mode sets the Target mode for Physical Block, All Transducer Block and All Function Blocks. Many parameters cannot be written when Target mode is set to Auto.

	Value	Description
–	Auto	Operation is Auto mode.
–	O/S	Operation is out of service.

Analog Output Block

Menu for parameters used to configure the Target mode.

The following menus/settings are available:

	Full name	Display name	Web name	Page
Ⓜ	Current mode	–	[Current mode]	[► 172]
Ⓜ	Target mode	–	[Target mode]	[► 173]

Current mode

Ⓜ [Device setup] ► [Mode] ► [Analog Output Block] ► [Current mode]

This parameter shows the current Target mode for Analog Output Block.

	Value	Description
–	Auto	Operation is Auto mode.
–	O/S	Operation is out of service.

Target mode

Ⓜ [Device setup] ► [Mode] ► [Analog Output Block] ► [Target mode]

Target mode sets the Target mode for Analog Output Block

	Value	Description
–	Auto	Operation is Auto mode.
–	O/S	Operation is out of service.
–	Man	Operation is manual mode.

5.7.2 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. 27: 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 Web page.
Ⓜ	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	Web name	Page
Ⓜ	Installation configuration	—	[Installation configuration]	[▶ 174]
Ⓜ	Mass flow	—	[Mass flow]	[▶ 177]
Ⓜ	Density	—	[Density]	[▶ 179]
Ⓜ	Temperature	—	[Temperature]	[▶ 180]
Ⓜ	Volume flow	—	[Volume flow]	[▶ 182]
Ⓜ	Analog Input	—	[Analog Input]	[▶ 185]
Ⓜ	Totalizer	—	[Totalizer]	[▶ 186]
Ⓜ	Display select	—	[Display select]	[▶ 190]
Ⓜ	Date/Time	—	[Date/Time]	[▶ 192]

Installation configuration

Menu for configuring installation information via PROFINET communication.

This submenu is also available in additional menus. The values can be set in each of these menus:

- *Easy setup wizard* [▶ 147]
- *Basic setup* [▶ 174]
- *Detailed setup* [▶ 194]

The following menus/settings are available:

	Full name	Display name	Web name	Page
Ⓜ	Installation orientation	—	[Installation orientation]	[▶ 174]
Ⓜ	Density offset orientation	—	[Density offset orientation]	[▶ 175]
Ⓜ	Flow direction	—	[Flow direction]	[▶ 175]
Ⓜ	Pressure fixed value	—	[Pressure fixed value]	[▶ 176]

Installation orientation

Ⓜ [Device] ▶ [Basic setup] ▶ [Installation configuration] ▶ [Installation orientation]

Sets the installation orientation of the device.

	Value	Description
Ⓜ	Vertical [Vertical]	The default value is Vertical.
Ⓜ	Horizontal bend down [Horizontal bend down]	
Ⓜ	Horizontal bend up [Horizontal bend up]	

Density offset orientation

④ [Device] ► [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
④	Numeric digits	The value is automatically converted based on the unit setting. 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

④ [Device] ► [Basic setup] ► [Installation configuration] ► [Flow direction]

Sets the flow direction of the device.

	Value	Description
④	Forward [Positive]	The direction of flow is same as the arrow mark on the sensor. Default value.
④	Reverse [Negative]	Opposite direction.

Pressure fixed value

④ [Device] ► [Basic setup] ► [Installation configuration] ► [Pressure fixed value]

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

- *Easy setup wizard* [► 149]
- *Basic setup* [► 176]
- Detailed setup
 - *Pressure* [► 218]
 - *Installation configuration* [► 195]

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
④	Numeric digits	The value is automatically converted based on the unit setting. The default value is 0. 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.

Mass flow

Menu for configuring the mass flow measurement via PROFINET communication.

The following menus/settings are available:

	Full name	Display name	Web name	Page
⊕	Mass flow unit	—	[Mass flow unit]	[▶ 177]
⊕	Mass flow LRV	—	[Mass flow LRV]	[▶ 178]
⊕	Mass flow URV	—	[Mass flow URV]	[▶ 178]
⊕	Mass flow damping	—	[Mass flow damping]	[▶ 178]

Mass flow unit

⊕ [Device] ▶ [Basic setup] ▶ [Process variables] ▶ [Mass flow] ▶ [Mass flow unit]

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

- *Easy setup wizard* [▶ 151]
- *Basic setup* [▶ 177]
- *Detailed setup* [▶ 197]

Sets the unit for mass flow.

	Value	Description
⊕	g/s	Sets the displayed Mass flow unit. The default value is kg/h. 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	
⊕	Ston/min	
⊕	Ston/h	
⊕	Ston/d	
⊕	Lton/min	
⊕	Lton/h	
⊕	Lton/d	
⊕	lb/s	
⊕	lb/min	
⊕	lb/h	
⊕	lb/d	
⊕	User unit	

Mass flow LRV

Ⓜ [Device] ► [Basic setup] ► [Process variables] ► [Mass flow] ► [Mass flow LRV]

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

- *Easy setup wizard* [▶ 151]
- *Basic setup* [▶ 178]
- *Detailed setup* [▶ 198]

	Value	Description
–	Numeric digits	Default value is 0.0. Settings must satisfy the following conditions: $URV \neq LRV$ $LRV \leq Q_{max}$ $LRV \geq -Q_{max}$ For the Q_{max} value refer to the General Specification (GS) of each product.

Mass flow URV

Ⓜ [Device] ► [Basic setup] ► [Process variables] ► [Mass flow] ► [Mass flow URV]

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

- *Easy setup wizard* [▶ 152]
- *Basic setup* [▶ 178]
- *Detailed setup* [▶ 198]

	Value	Description
–	Numeric digits	Default value is 10.0. Settings must satisfy the following conditions: $URV \leq Q_{max}$ $URV \geq -Q_{max}$ $URV \neq LRV$ For the Q_{max} value refer to the General Specification (GS) of each product.

Mass flow damping

Ⓜ [Device] ► [Basic setup] ► [Process variables] ► [Mass flow] ► [Mass flow damping]

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

- *Easy setup wizard* [▶ 152]
- *Basic setup* [▶ 178]
- *Detailed setup* [▶ 199]

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. The default value is 3.0 s.

Density

Menu for configuring the density measurement via PROFINET communication.



Density measurement is only reliable if there is no gas in the liquid.

The following menus/settings are available:

	Full name	Display name	Web name	Page
Ⓜ	Density unit	—	[Density unit]	[▶ 179]
Ⓜ	Density LRV	—	[Density LRV]	[▶ 179]
Ⓜ	Density URV	—	[Density URV]	[▶ 180]
Ⓜ	Density damping	—	[Density damping]	[▶ 180]

Density unit

Ⓜ [Device] ▶ [Basic setup] ▶ [Process variables] ▶ [Density] ▶ [Density unit]

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

- *Easy setup wizard* [▶ 153]
- *Basic setup* [▶ 179]
- *Detailed setup* [▶ 203]

Sets the unit for density.

	Value	Description
—	g/mL	Sets the displayed Density unit. Default value is g/ml.
—	kg/L	
—	kg/m3	
—	lb/gal	
—	lb/ft3	
—	g/cm3	
—	g/L	
—	User unit	
—	kg/cm3	
—	kg/dm3	
—	g/cc	

Density LRV

Ⓜ [Device] ▶ [Basic setup] ▶ [Process variables] ▶ [Density] ▶ [Density LRV]

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

- *Easy setup wizard* [▶ 153]
- *Basic setup* [▶ 179]
- *Detailed setup* [▶ 203]

Sets the lower range value, 0 %, for the scaling of frequency output during density measurement.

	Value	Description
Ⓜ	Numeric digits	Default value is 0. Setting must satisfy the following condition: URV ≠ LRV

Density URV

Ⓜ [Device] ► [Basic setup] ► [Process variables] ► [Density] ► [Density URV]

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

- *Easy setup wizard* [153]
- *Basic setup* [180]
- *Detailed setup* [204]

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. Settings must satisfy the following condition: URV ≠ LRV

Density damping

Ⓜ [Device] ► [Basic setup] ► [Process variables] ► [Density] ► [Density damping]

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

- *Easy setup wizard* [154]
- *Basic setup* [180]
- *Detailed setup* [204]

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. Setting range: 0.0 – 200.0 s.

Temperature

Temperature is a menu for configuring the temperature measurement via PROFINET communication.

The following overview shows the selectable menu items within the submenu *Temperature*.

Temperature unit

Ⓜ [Device] ► [Basic setup] ► [Process variables] ► [Temperature] ► [Temperature unit]

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

- *Easy setup wizard* [154]
- *Basic setup* [180]
- *Detailed setup* [208]

Sets the unit for temperature.

	Value	Description
Ⓜ	degC	Sets the displayed Temperature unit. Default value is degC.
Ⓜ	degF	
Ⓜ	degR	
Ⓜ	K	

Temperature LRV

Ⓜ [Device] ► [Basic setup] ► [Process variables] ► [Temperature] ► [Temperature LRV]

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

- *Easy setup wizard* [► 155]
- *Basic setup* [► 181]
- *Detailed setup* [► 209]

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. Settings must satisfy the following conditions: URV ≠ LRV LRV ≥ Temperature Lower Limit [► 358] LRV ≤ Temperature Upper Limit [► 358]

Temperature URV

Ⓜ [Device] ► [Basic setup] ► [Process variables] ► [Temperature] ► [Temperature URV]

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

- *Easy setup wizard* [► 155]
- *Basic setup* [► 181]
- *Detailed setup* [► 209]

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. Settings must satisfy the following conditions: URV ≠ LRV URV ≥ Temperature lower limit [► 358] URV ≤ Temperature upper limit [► 358]

Temperature damping

Ⓜ [Device] ► [Basic setup] ► [Process variables] ► [Temperature] ► [Temperature damping]

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

- *Easy setup wizard* [► 155]
- *Basic setup* [► 181]
- *Detailed Setup* [► 210]

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. Default value is 10.0 s.

Volume flow

Volume flow is a menu for configuring the volume flow measurement via PROFINET 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	Web name	Page
Ⓜ	Volume flow unit	—	[Volume flow unit]	[▶ 182]
Ⓜ	Volume flow LRV	—	[Volume flow LRV]	[▶ 183]
Ⓜ	Volume flow URV	—	[Volume flow URV]	[▶ 184]
Ⓜ	Volume flow damping	—	[Volume flow damping]	[▶ 184]

Volume flow unit

Ⓜ [Device] ▶ [Basic setup] ▶ [Process variables] ▶ [Volume flow] ▶ [Volume flow unit]

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

- *Easy setup wizard* [▶ 156]
- *Basic setup* [▶ 182]
- *Detailed setup* [▶ 212]

Sets the unit for volume flow.

	Value	Description
⊕	cm ³ /s	Sets the displayed Volume flow unit. Default value is m ³ /h.
⊕	cm ³ /min	
⊕	cm ³ /h	
⊕	L/s	
⊕	L/min	
⊕	L/h	
⊕	L/d	
⊕	m ³ /s	
⊕	m ³ /min	
⊕	m ³ /h	
⊕	m ³ /d	
⊕	gal/s	
⊕	gal/min	
⊕	gal/h	
⊕	gal/d	
⊕	ft ³ /s	
⊕	ft ³ /min	
⊕	ft ³ /h	
⊕	ft ³ /d	
⊕	bbl/s	
⊕	bbl/min	
⊕	bbl/h	
⊕	bbl/d	
⊕	Impgal/s	
⊕	Impgal/min	
⊕	Impgal/h	
⊕	Impgal/d	
⊕	User unit	

Volume flow LRV

⊕ [Device] ► [Basic setup] ► [Process variables] ► [Volume flow] ► [Volume flow LRV]

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

- *Easy setup wizard* [► 157]
- *Basic setup* [► 183]
- *Detailed Setup* [► 213]

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. Settings must satisfy the following conditions: URV ≠ LRV

Volume flow URV

Ⓜ [Device] ► [Basic setup] ► [Process variables] ► [Volume flow] ►
[Volume flow URV]

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

- *Easy setup wizard* [▶ 158]
- *Basic setup* [▶ 184]
- *Detailed setup* [▶ 214]

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. Settings must satisfy the following conditions: URV ≠ LRV

Volume flow damping

Ⓜ [Device] ► [Basic setup] ► [Process variables] ► [Volume flow] ►
[Volume flow damping]

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

- *Easy setup wizard* [▶ 158]
- *Basic setup* [▶ 184]
- *Detailed setup* [▶ 214]

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. Default value is 3.0 s.

Analog Input

Menu for configuring the Analog Input.

The following menus/settings are available:

	Full name	Display name	Web name	Page
Ⓜ	Analog input 1 – 6 input selector	–	[Analog input 1 – 6 input selector]	[▶ 185]
Ⓜ	Analog input 1 – 6 damping	–	[Analog input 1 – 6 damping]	[▶ 186]

Analog input 1 – 6 input selector

Ⓜ [Device] ▶ [Basic setup] ▶ [Analog Input] ▶ [Analog Input 1 – 6] ▶ [Analog input 1 – 6 input selector]

This parameter is configured to assign the Analog Input 1 – 6 to send process value to host system such as DCS/PLC.

	Value	Description
Ⓜ	Mass flow [Mass flow]	Sets the process value to assign Analog Input 1 – 6. Default value of Analog Input 1: Mass flow Default value of Analog Input 2: Density Default value of Analog Input 3: Temperature Default value of Analog Input 4: Volume flow Default value of Analog Input 5: Reference density Default value of Analog Input 6: Corrected volume flow
Ⓜ	Density [Density]	
Ⓜ	Temperature [Temperature]	
Ⓜ	Pressure [Pressure]	
Ⓜ	Volume flow [Volume flow]	
Ⓜ	Reference density [Reference density]	
Ⓜ	Relative density [Relative density]	
Ⓜ	Corrected volume flow [Corrected volume flow]	
Ⓜ	Concentration [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]	

	Value	Description
Ⓜ Ⓜ	Net corrected volume flow [Net corrected volume flow]	Sets the process value to assign Analog Input 1 – 6. Default value of Analog Input 1: Mass flow Default value of Analog Input 2: Density Default value of Analog Input 3: Temperature Default value of Analog Input 4: Volume flow Default value of Analog Input 5: Reference density Default value of Analog Input 6: Corrected volume flow
Ⓜ Ⓜ	Viscosity [Viscosity]	
Ⓜ Ⓜ	Drive current [Drive current]	
Ⓜ Ⓜ	TuHC change ratio of inlet stiffness [TuHC change ratio of inlet stiffness]	
Ⓜ Ⓜ	TuHC change ratio of outlet stiffness [TuHC change ratio of outlet stiffness]	

Analog input 1 - 6 damping

Ⓜ [Device] ► [Basic setup] ► [Analog Input] ► [Analog Input 1 - 6] ► [Analog input 1 - 6 damping]

This parameter is configured the damping of the Analog Input 1 – 6 .

	Value	Description
Ⓜ	Numeric digits	Setting range: 0 - no check. Default value is 1.0 [sec] except for Analog input 3. Default value for Analog input 3 is 0.0 [sec].

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	Web name	Page
Ⓜ	Total 1 – 3 input selector	–	[Total 1 – 3 input selector]	[▶ 187]
Ⓜ	Total 1 – 3 unit	–	[Total 1 – 3 unit]	[▶ 187]
Ⓜ	Total 1 – 3 failure option	–	[Total 1 – 3 failure option]	[▶ 188]
Ⓜ	Total 1 – 3 option	–	[Total 1 – 3 option]	[▶ 189]
Ⓜ	Total 1 – 3 setting	–	[Total 1 – 3 option setting]	[▶ 189]

Total 1 – 3 input selector

Ⓜ [Device] ► [Basic setup] ► [Totalizer] ► [Totalizer 1-3] ► [Total 1 – 3 input selector]

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

- *Easy setup wizard* [► 151]
- *Basic setup* [► 177]
- *Detailed setup* [► 197]

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 [Mass flow]	Sets the displayed process variables. Default value of Analog Input 1: Mass flow Default value of Analog Input 2: Volume flow Default value of Analog Input 3: Corrected volume flow
Ⓜ	Volume flow [Volume flow]	
Ⓜ	Corrected volume flow [Corrected volume flow]	
Ⓜ	Energy [Energy]	
Ⓜ	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]	

Total 1 – 3 unit

Ⓜ [Device] ► [Basic setup] ► [Totalizer] ► [Totalizer 1 – 3] ► [Total 1 – 3 unit]

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

- *Easy setup wizard* [► 167]
- *Detailed setup* [► 282]

Sets the unit for Total 1 – 3.

	Value	Description
Ⓜ	g	Sets the unit for Total 1 – 3. The default value for Total 1 is kg. The default value for Total 2 is m ³ . The default value for Total 3 is Stdm ³ .
Ⓜ	kg	
Ⓜ	t	
Ⓜ	ton(US)	
Ⓜ	ton(UK)	
Ⓜ	lb	
Ⓜ	cm ³	
Ⓜ	L	
Ⓜ	m ³	
Ⓜ	gal	
Ⓜ	kgal	
Ⓜ	ft ³	
Ⓜ	bbl	
Ⓜ	Impgal	
Ⓜ	kImpgal	
Ⓜ	NL	
Ⓜ	Nm ³	
Ⓜ	SL	
Ⓜ	Sft ³	
Ⓜ	MMsft ³	
Ⓜ	Sm ³	
Ⓜ	MJ	
Ⓜ	Btu	
Ⓜ	User unit	

Total 1 – 3 failure option

Ⓜ [Device] ► [Basic setup] ► [Totalizer] ► [Totalizer 1 – 3] ► [Total 1 – 3 failure option]

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

- *Easy setup wizard* [▶ 167]
- *Detailed setup* [▶ 188]

Defines the behavior of the totalizers when an alarm occurs.

	Value	Description
Ⓜ	Run [Run]	Totalizer accumulates assigned process value anyway. Default value.
Ⓜ	Hold [Hold]	Totalizer stops accumulating the process value.
Ⓜ	Memory [Memory]	Totalizer accumulates the value that was measured before the alarm occurred.

Total 1 – 3 option

Ⓜ [Device] ► [Basic setup] ► [Totalizer] ► [Totalizer 1 – 3] ► [Total 1 – 3 option]

This parameter is configured the totalizer way:

	Value	Description
Ⓜ	Balanced [BALANCED]	Positive and negative incoming values are added to the total.
Ⓜ	Positive only [POS_ONLY]	Default value. Only positive incoming values are added to the total. Negative values are ignored.
Ⓜ	Negative only [NEG_ONLY]	Only negative incoming values are added to the total. Positive values are ignored.

Total 1 – 3 setting

Ⓜ [Device] ► [Basic setup] ► [Totalizer] ► [Totalizer 1 – 3] ► [Total 1 – 3 setting]

This parameter is configured the Totalizer value:

	Value	Description
Ⓜ	Reset [Reset]	Reset Total value.
Ⓜ	Preset [Preset]	Preset Total value.
Ⓜ	Hold [Hold]	Hold Total value.
Ⓜ	Totalize [Totalize]	Resume Total value. Default value.

Display select

Display select is a menu for assigning process variables to display.

**Display select
1 – 4**

Ⓜ [Device] ► [Basic setup] ► [Display select] ► [Display select 1 – 4]

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

- *Easy setup wizard* [▶ 168]
- *Detailed setup* [▶ 314]

Assigns process variables to display lines 1, 2, 3 and 4 of the LCD display. On display, Display measurement mode can be selected and Logging select 1 – 4 can be selected based on the selection of Display measurement mode.

	Value	Description
Ⓜ	None [None]	Sets Display select 1 – 4. The default value for Display select 1 is Mass flow. None is not available for Display select 1. The default value for Display select 2 is Density. The default value for Display select 3 is Temperature. The default value for Display select 4 is Volume flow.
Ⓜ	Mass flow [Mass flow]	
Ⓜ	Density [Dens]	
Ⓜ	Temperature [Temp]	
Ⓜ	Volume flow [Vol flo]	
Ⓜ	Reference density [Reference density]	

	Value	Description
Ⓜ	Relative density [Relative density]	Sets Display select 1 – 4. The default value for Display select 1 is Mass flow. None is not available for Display select 1. The default value for Display select 2 is Density. The default value for Display select 3 is Temperature. The default value for Display select 4 is Volume flow.
Ⓜ	Corrected volume flow [Corrected volume flow]	
Ⓜ	Pressure [Pressure]	
Ⓜ	Totalizer 1 [Totalizer 1]	
Ⓜ	Totalizer 2 [Totalizer 2]	
Ⓜ	Totalizer 3 [Totalizer 3]	
Ⓜ	Mass flow % graph [Mass flow % graph]	
Ⓜ	Volume flow % graph [Volume flow % graph]	
Ⓜ	Corrected volume flow % graph [Corrected volume flow % graph]	
Ⓜ	Tag [Tag]	
Ⓜ	Long tag [Long tag]	
Ⓜ	Velocity [Velocity]	
Ⓜ	Concentration Ⓜ [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]	

	Value	Description
Ⓜ	Drive current [Drive current]	Sets Display select 1 – 4. The default value for Display select 1 is Mass flow. None is not available for Display select 1. The default value for Display select 2 is Density. The default value for Display select 3 is Temperature. The default value for Display select 4 is Volume flow.
Ⓜ	Viscosity [Viscosity]	
Ⓜ	24hours totalizer 1 [24hours totalizer 1]	
Ⓜ	24hours totalizer 2 [24hours totalizer 2]	
Ⓜ	24hours totalizer 3 [24hours totalizer 3]	
Ⓜ	Gas void fraction [Gas void fraction]	
Ⓜ	Display unit mass flow dual [Display unit mass flow dual]	
Ⓜ	Display unit density dual [Display unit density dual]	

Date/Time

The following overview shows the selectable menu items within the submenu *Date/Time*.

	Full name	Display name	Web name	Page
Ⓜ	Current Date	–	[Current Date]	[▶ 192]
Ⓜ	Set current date	–	[Set current date]	[▶ 193]

Current Date

Ⓜ [Device] ▶ [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* [▶ 98]
- *Basic Setup* [▶ 192]

Shows the current date on the device.

	Value	Description
Ⓜ	Date and Time	Shows the actual current date and time, if the date was set correctly when the device started running.

Set current date

Ⓜ [Device] ► [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* [► 171]
- *Detailed setup* [► 340]

Sets the date.

	Value	Description
Ⓜ	Numeric digits	The date format on the LCD is defined in the parameter Display format date. The date format depends on the OS regional setting. If date format is MM/DD/YYYY, the default value is 01/01/2015 00:00:00.000. The last three digits represent time in ms.

5.7.3 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. 28: 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 Web page.
Ⓜ	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	Web name	Page
—	Installation configuration	[Install cfg]	[Installation configuration]	[► 194]
—	Process variables	[Pro var]	[Process variables]	[► 196]
Ⓜ	Analog Input	—	[Analog input]	[► 278]
Ⓜ	Analog Output	—	[Analog Output]	[► 290]
—	Pulse/Frequency output	[Pls/Sts out]	[Pulse/Frequency output]	[► 292]
—	Totalizer	[Ttl]	[Totalizer]	[► 302]
—	Display	[Disp]	[Display]	[► 311]
Ⓜ	Date/Time	[Date/Time]	—	[► 340]
Ⓜ	User access configuration	[Access cfg]	—	[► 340]
—	Sensor constants	[Snsr cnst]	[Sensor constants]	[► 343]
—	Compensation	[Compensation]	[Compensation]	[► 347]
—	Device information	[Dev info]	[Device information]	[► 351]
Ⓜ	Network	—	[Network]	[► 365]
—	Write protect	[Protect]	[Write protect]	[► 368]
—	Others	[Others]	[Others]	[► 370]

Installation configuration

Menu of parameters for configuring the installation information.

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

- *Easy setup wizard* [▶ 147]
- *Basic setup* [▶ 174]
- *Detailed setup* [▶ 194]

The following menus/settings are available:

	Full name	Display name	Web name	Page
–	Installation orientation	[Install orient]	[Installation orientation]	[▶ 194]
–	Density offset orientation	[Dens offset]	[Density offset orientation]	[▶ 194]
–	Flow direction	[Flow dir]	[Flow direction]	[▶ 195]
Ⓜ	Pressure fixed value	–	[Pressure fixed value]	[▶ 195]

Installation orientation

Ⓛ [Detailed setup] ▶ [Install cfg] ▶ [Install orient]

Ⓜ [Device] ▶ [Detailed setup] ▶ [Installation configuration] ▶ [Installation orientation]

Sets the installation orientation of the device.

	Value	Description
–	Vertical [Vertical] [Vertical]	Default value is Vertical.
–	Horizontal bend down [Hrzntl bend down] [Horizontal bend down]	
–	Horizontal bend up [Hrzntl bend up] [Horizontal bend up]	

Density offset orientation

Ⓛ [Detailed setup] ▶ [Install cfg] ▶ [Dens offset]

Ⓜ [Device] ▶ [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. 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

⌚ [Detailed setup] ► [Install cfg] ► [Flow dir]

⊕ [Device] ► [Detailed setup] ► [Installation configuration] ► [Flow direction]

Sets the flow direction of the device.

	Value	Description
–	Forward [Forward]	The direction of flow is the same as the arrow mark on the sensor. Default value.
–	Reverse [Reverse]	Opposite direction.

Pressure fixed value

⊕ [Device] ► [Detailed setup] ► [Installation configuration] ► [Pressure fixed value]

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

- Easy setup wizard [► 149]
- Basic setup [► 176]
- Detailed setup
 - Pressure [► 218]
 - Installation configuration [► 195]

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. Default value is 0. 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.

Process variables

Menu for configuring parameters that are related to process variables.

The following menus/settings are available:

	Full name	Display name	Web name	Page
Ⓜ	Process variables additional parameters	[Pro var add]	—	[▶ 196]
—	Mass flow	[Mass]	[Mass flow]	[▶ 197]
—	Density	[Dens]	[Density]	[▶ 203]
—	Temperature	[Temp]	[Temperature]	[▶ 208]
—	Volume flow	[Vol]	[Volume flow]	[▶ 212]
—	Pressure	[Pres]	[Pressure]	[▶ 217]
—	Reference density	[Ref dens]	[Reference density]	[▶ 221]
—	Relative density	[Rel dens]	[Relative density]	[▶ 225]
—	Corrected volume flow	[Corr vol]	[Corrected volume flow]	[▶ 229]
—	Calorific value	[Cal]	[Calorific value]	[▶ 233]
—	Velocity	[Vel]	[Velocity]	[▶ 234]
Ⓜ	Concentration	[Conc]	[Concentration]	[▶ 235]
Ⓜ	Net mass flow 1 – 2	[Net mass1 – 2]	[Net mass flow 1 – 2]	[▶ 260]
Ⓜ	Net volume flow 1 – 2	[Net vol1 – 2]	[Net volume flow 1 – 2]	[▶ 264]
Ⓜ	Net corrected volume flow	[Net corr vol]	[Net corrected volume flow]	[▶ 268]
Ⓜ	Viscosity	[Visc]	[Viscosity]	[▶ 272]
—	Drive current	[Drv curr]	[Drive current]	[▶ 276]
—	External function	—	[External function]	[▶ 277]

Process variables additional parameters

Ⓜ [Detailed setup] ▶ [Pro var] ▶ [Pro var add]

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 [Apply] [Apply]	The menu for Additional parameters of each process variable is enabled.
—	Not Apply [Not apply] [Not Apply]	The menu for Additional parameters of each process variable is disabled. Default value.

Mass flow

Menu for configuring the mass flow measurement.

The following menus/settings are available:

	Full name	Display name	Web name	Page
–	Mass flow unit	[Unit]	[Mass flow unit]	[▶ 197]
–	Mass flow LRV	[LRV]	[Mass flow LRV]	[▶ 198]
–	Mass flow URV	[URV]	[Mass flow URV]	[▶ 198]
–	Mass flow damping	[Damp]	[Mass flow damping]	[▶ 199]
–	Additional function	[Add func]	[Additional function]	[▶ 199]

Mass flow unit

⌚ [Detailed setup] ▶ [Pro var] ▶ [Mass] ▶ [Unit]

⊕ [Device] ▶ [Detailed setup] ▶ [Process variables] ▶ [Mass flow] ▶ [Mass flow unit]

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

- *Easy setup wizard* [▶ 151]
- *Basic setup* [▶ 177]
- *Detailed setup* [▶ 197]

Sets the unit for mass flow.

	Value	Description
–	g/s	Sets the displayed Mass flow unit. Default value is t/h.
–	g/min	
–	g/h	
–	kg/s	
–	kg/min	
–	kg/h	
–	kg/d	
–	t/min	
–	t/h	
–	t/d	
–	STon/min	
–	STon/h	
–	STon/d	
–	LTon/min	
–	LTon/h	
–	LTon/d	
–	lb/s	
–	lb/min	
–	lb/h	
–	lb/d	
–	User unit	

**Mass flow
LRV**

Ⓐ [Detailed setup] ► [Pro var] ► [Mass] ► [LRV]

Ⓜ [Device] ► [Detailed setup] ► [Process variables] ► [Mass flow] ►
[Mass flow LRV]

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

- *Easy setup wizard* [▶ 151]
- *Basic setup* [▶ 178]
- *Detailed setup* [▶ 198]

Sets the lower range value, 0 %, for scaling the frequency and pulse outputs during mass flow measurement.

	Value	Description
–	Numeric digits	Default value is 0.0. Settings must satisfy the following conditions: $URV \neq LRV$ $LRV \leq Q_{max}$ $LRV \geq -Q_{max}$ For the Q_{max} value refer to the General Specification (GS) of each product.

**Mass flow
URV**

Ⓐ [Detailed setup] ► [Pro var] ► [Mass] ► [URV]

Ⓜ [Device] ► [Detailed setup] ► [Process variables] ► [Mass flow] ►
[Mass flow URV]

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

- *Easy setup wizard* [▶ 152]
- *Basic setup* [▶ 178]
- *Detailed setup* [▶ 198]

Sets the upper range value, 100 %, for scaling the frequency and pulse outputs during mass flow measurement.

	Value	Description
–	Numeric digits	Default value is 10.0. Settings must satisfy the following conditions: $URV \leq Q_{max}$ $URV \geq -Q_{max}$ $URV \neq LRV$ For the Q_{max} value refer to the General Specification (GS) of each product.

Mass flow damping

① [Detailed setup] ► [Pro var] ► [Mass] ► [Damp]

② [Device] ► [Detailed setup] ► [Process variables] ► [Mass flow] ► [Mass flow damping]

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

- *Easy setup wizard* [► 152]
- *Basic setup* [► 178]
- *Detailed setup* [► 199]

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
②	Numeric digits	Setting range: 0.0 – 200.0 s. The default value is 3.0 s.

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* [► 196].

The following menus/settings are available:

	Full name	Display name	Web name	Page
–	Mass flow low cut	[Lowcut]	[Mass flow lowcut]	[► 199]
–	Mass flow user unit	[User unit]	[Mass flow user unit]	[► 200]
–	Mass flow user unit conversion factor	[Conv factor]	[Mass flow user unit conversion factor]	[► 200]
–	Mass flow damping pulse/total	[Damp pls/ttl]	[Mass flow damping pulse/total]	[► 200]
–	Mass flow trim select	[Trim sel]	[Mass flow trim select]	[► 200]
–	Mass flow trim offset	[Trim offset]	[Mass flow trim offset]	[► 201]
–	Mass flow trim gain	[Trim gain]	[Mass flow trim gain]	[► 201]
–	Display unit mass flow dual	[Display Unit dual]	[Display unit mass flow dual]	[► 202]

Mass flow low cut

① [Detailed setup] ► [Pro var] ► [Mass] ► [Add func] ► [Lowcut]

② [Device] ► [Detailed setup] ► [Process variables] ► [Mass flow] ► [Additional function] ► [Mass flow lowcut]

Sets the mass flow low cut-off.

	Value	Description
–	Numeric digits	Selects the mass flow value below which output is set to zero, to prevent the Totalizer from accumulating values when the valves are closed. Settings must satisfy the following condition: $ \text{Mass flow low cut} \leq Q_{\text{nom}} * 0.2$ For the value of Q_{nom} , refer to the General Specifications (GS) of the particular product.

**Mass flow
user unit**

Ⓐ [Detailed setup] ► [Pro var] ► [Mass] ► [Add func] ► [User unit]

Ⓜ [Device] ► [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] ► [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
damping
pulse/total**

Ⓐ [Detailed setup] ► [Pro var] ► [Mass] ► [Add func] ► [Damp pls/ttl]

Ⓜ [Device] ► [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. Default value is 0.0 s.

**Mass flow
trim select**

Ⓐ [Detailed setup] ► [Pro var] ► [Mass] ► [Add func] ► [Trim sel]

Ⓜ [Device] ► [Detailed setup] ► [Process variables] ► [Mass flow] ►
[Additional function] ► [Mass flow trim select]

Enables or disables the mass flow trim.

	Value	Description
–	Inhibit [Inhibit] [Inhibit]	Disables the mass flow trim. Default value.
–	Enable [Enable] [Enable]	Enables the mass flow trim.

**Mass flow
trim offset**

① [Detailed setup] ► [Pro var] ► [Mass] ► [Add func] ► [Trim offset]

Ⓜ [Device] ► [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. Default value is 0.000e+000.

**Mass flow
trim gain**

① [Detailed setup] ► [Pro var] ► [Mass] ► [Add func] ► [Trim gain]

Ⓜ [Device] ► [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. Default value is 1.000.

Display unit mass flow dual

⌚ [Detailed setup] ► [Pro var] ► [Mass] ► [Add func] ► [Display Unit dual]

Ⓜ [Device] ► [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.

Value	Description
– g/s	Sets the displayed Mass flow unit. Default value is t/h.
– g/min	
– g/h	
– kg/s	
– kg/min	
– kg/h	
– kg/d	
– t/min	
– t/h	
– t/d	
– STon/min	
– STon/h	
– STon/d	
– LTon/min	
– LTon/h	
– LTon/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	Web name	Page
–	Density unit	[Unit]	[Density unit]	[▶ 203]
–	Density LRV	[LRV]	[Density LRV]	[▶ 203]
–	Density URV	[URV]	[Density URV]	[▶ 204]
–	Density damping	[Damp]	[Density damping]	[▶ 204]
–	Additional function	[Add func]	[Additional function]	[▶ 204]

Density unit

⌚ [Detailed setup] ▶ [Pro var] ▶ [Dens] ▶ [Unit]

⊕ [Device] ▶ [Detailed setup] ▶ [Process variables] ▶ [Density] ▶ [Density unit]

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

- *Easy setup wizard* [▶ 153]
- *Basic setup* [▶ 179]
- *Detailed setup* [▶ 203]

Sets the unit for density.

	Value	Description
–	g/mL	Sets the displayed Density unit. Default value is g/ml.
–	kg/L	
–	kg/m3	
–	lb/gal	
–	lb/ft3	
–	g/cm3	
–	g/L	
–	User unit	
–	kg/cm3	
–	kg/dm3	
–	g/cc	

Density LRV

⌚ [Detailed setup] ▶ [Pro var] ▶ [Dens] ▶ [LRV]

⊕ [Device] ▶ [Detailed setup] ▶ [Process variables] ▶ [Density] ▶ [Density LRV]

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

- *Easy setup wizard* [▶ 153]
- *Basic setup* [▶ 179]
- *Detailed setup* [▶ 203]

Sets the lower range value, 0 %, for the scaling of frequency output during density measurement.

	Value	Description
ⓔ	Numeric digits	Default value is 0. Setting must satisfy the following condition: URV $\neq$ LRV

Density URV

Ⓛ [Detailed setup] ► [Pro var] ► [Dens] ► [URV]

Ⓜ [Device] ► [Detailed setup] ► [Process variables] ► [Density] ► [Density URV]

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

- *Easy setup wizard* [► 153]
- *Basic setup* [► 180]
- *Detailed setup* [► 204]

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. Settings must satisfy the following condition: URV $\neq$ LRV

Density damping

Ⓛ [Detailed setup] ► [Pro var] ► [Dens] ► [Damp]

Ⓜ [Device] ► [Detailed setup] ► [Process variables] ► [Density] ► [Density damping]

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

- *Easy setup wizard* [► 154]
- *Basic setup* [► 180]
- *Detailed setup* [► 204]

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. 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* [► 196].

The following menus/settings are available:

	Full name	Display name	Web name	Page
–	Density low cut	[Lowcut]	[Density lowcut]	[▶ 205]
–	Density user unit	[User unit]	[Density user unit]	[▶ 205]
–	Density user unit conversion factor	[Conv factor]	[Density user unit conversion factor]	[▶ 205]
–	Density value select	[Val sel]	[Density value select]	[▶ 206]
–	Density fixed value	[Fix val]	[Density fixed value]	[▶ 206]
–	Density trim select	[Trim sel]	[Density trim select]	[▶ 207]
–	Density trim offset	[Trim offset]	[Density trim offset]	[▶ 207]
–	Density trim gain	[Trim gain]	[Density trim gain]	[▶ 207]
–	Display unit density dual	[Display Unit dual]	[Display unit density dual]	[▶ 208]

Density lowcut

① [Detailed setup] ▶ [Pro var] ▶ [Dens] ▶ [Add func] ▶ [Lowcut]

② [Device] ▶ [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. Settings must satisfy the following conditions: Density low cut ≤ 0.5kg/l

Density user unit

① [Detailed setup] ▶ [Pro var] ▶ [Dens] ▶ [Add func] ▶ [User unit]

② [Device] ▶ [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]

② [Device] ▶ [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. Default value is 1.

Density
value select

Ⓛ [Detailed setup] ► [Pro var] ► [Dens] ► [Add func] ► [Val sel]

Ⓜ [Device] ► [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.

–	Measured value [Meas val] [Measured value]	Measured density value is used. Default value.
–	Fixed value [Fix val] [Fixed value]	Preset fixed density value is used.
–	Calculated value [Calc val] [Calculated value]	Available for gas measurement only and Liquid gas select [► 354] must be set to Gas. Calculated value ρ_m is calculated from the following formula. $\rho_m = \rho_{comp} \times \frac{(273.15 + t_{comp})}{(273.15 + t_m)} \times \frac{P_m}{P_{comp}}$ The following parameters have to be appropriately configured to use this function. The pressure value must be the absolute pressure. ▪ ρ_{comp}: Reference density fixed value [► 224] ▪ t_{comp}: Reference temperature [► 222] ▪ t_m: Measured temperature of fluid ▪ P_{comp}: Reference pressure (abs) [► 224] ▪ P_m: Pressure of fluid (abs) – If the External function is set to Pressure compensation and the Absolute/Gauge selection [► 219] is set to Absolute, this is the measured pressure value of the fluid. – If not, it is the value of the gas density pressure [► 219]

Density
fixed value

Ⓛ [Detailed setup] ► [Pro var] ► [Dens] ► [Add func] ► [Fix val]

Ⓜ [Device] ► [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* [► 205] 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] ► [Detailed setup] ► [Process variables] ► [Density] ► [Additional function] ► [Density trim select]

Enables or disables the density trim.

	Value	Description
–	[Inhibit] [Inhibit]	Disables density trim. Default value.
–	[Enable] [Enable]	Enables density trim.

Density trim offset

① [Detailed setup] ► [Pro var] ► [Dens] ► [Add func] ► [Trim offset]

② [Device] ► [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. Default value is 0.000e+000.

Density trim gain

① [Detailed setup] ► [Pro var] ► [Dens] ► [Add func] ► [Trim gain]

② [Device] ► [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. Default value is 1.000.

Display unit density dual

Ⓛ [Detailed setup] ► [Pro var] ► [Dens] ► [Add func] ► [Display Unit dual]

Ⓜ [Device] ► [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.

Value	Description
– g/ml	Sets the displayed Density unit. Default value is kg/L.
– g/cm ³	
– g/cc	
– g/L	
– kg/L	
– kg/cm ³	
– kg/dm ³	
– kg/m ³	
– lb/gal	
– lb/ft ³	
– User unit	

Temperature

Menu for configuring the temperature measurement.

The following menus/settings are available:

	Full name	Display name	Web name	Page
–	Temperature unit	[Unit]	[Temperature unit]	[208]
–	Temperature LRV	[LRV]	[Temperature LRV]	[209]
–	Temperature URV	[URV]	[Temperature URV]	[209]
–	Temperature damping	[Damp]	[Temperature damping]	[210]
–	Additional function	[Add func]	[Additional function]	[210]

Temperature unit

Ⓛ [Detailed setup] ► [Pro var] ► [Temp] ► [Unit]

Ⓜ [Device] ► [Detailed setup] ► [Process variables] ► [Temperature] ► [Temperature unit]

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

- Easy setup wizard [154]
- Basic setup [180]
- Detailed setup [208]

Sets the unit for temperature.

Value	Description
– degC	Sets the displayed Temperature unit. Default value is degC.
– degF	
– degR	
– K	

**Temperature
LRV**

⌚ [Detailed setup] ► [Pro var] ► [Temp] ► [LRV]

Ⓜ [Device] ► [Detailed setup] ► [Process variables] ► [Temperature] ► [Temperature LRV]

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

- *Easy setup wizard* [► 155]
- *Basic setup* [► 181]
- *Detailed setup* [► 209]

Sets the lower range value, 0 %, for scaling the analog and frequency output during temperature measurement.

Sets the lower range value, 0 %, for scaling the frequency output during temperature measurement.

	Value	Description
–	Numeric digits	Default value is 0.0. Settings must satisfy the following conditions: URV ≠ LRV LRV ≥ Temperature Lower Limit [► 358] LRV ≤ Temperature Upper Limit [► 358]

**Temperature
URV**

⌚ [Detailed setup] ► [Pro var] ► [Temp] ► [URV]

Ⓜ [Device] ► [Detailed setup] ► [Process variables] ► [Temperature] ► [Temperature URV]

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

- *Easy setup wizard* [► 155]
- *Basic setup* [► 181]
- *Detailed setup* [► 209]

Sets the upper range value, 100 %, for scaling the analog and frequency output during temperature measurement.

Sets the upper range value, 100 %, for scaling the frequency output during temperature measurement.

	Value	Description
–	Numeric digits	Default value is 150.0. Settings must satisfy the following conditions: URV ≠ LRV URV ≥ Temperature lower limit [► 358] URV ≤ Temperature upper limit [► 358]

Temperature damping

Ⓛ [Detailed setup] ► [Pro var] ► [Temp] ► [Damp]

Ⓜ [Device] ► [Detailed setup] ► [Process variables] ► [Temperature] ► [Temperature damping]

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

- *Easy setup wizard* [► 155]
- *Basic setup* [► 181]
- *Detailed Setup* [► 210]

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. 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* [► 196].

The following menus/settings are available:

	Full name	Display name	Web name	Page
–	Temperature function select	[Func sel]	[Temperature function select]	[► 210]
–	Temperature fixed value	[Fix val]	[Temperature fixed value]	[► 211]
–	Temperature trim select	[Trim sel]	[Temperature trim select]	[► 211]
–	Temperature trim offset	[Trim offset]	[Temperature trim offset]	[► 211]
–	Temperature trim gain	[Trim gain]	[Temperature trim gain]	[► 212]

Temperature function select

Ⓛ [Detailed setup] ► [Pro var] ► [Temp] ► [Add func] ► [Func sel]

Ⓜ [Device] ► [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 [Inter val] [Internal value]	Measured temperature value is used.
–	Fixed value [Fix val] [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] ► [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. Default value is 30 °C.

Temperature trim select

① [Detailed setup] ► [Pro var] ► [Temp] ► [Add func] ► [Trim sel]

Ⓜ [Device] ► [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 [Inhibit] [Inhibit]	Disables the temperature trim. Default value.
–	Enable [Enable] [Enable]	Enables the temperature trim.

Temperature trim offset

① [Detailed setup] ► [Pro var] ► [Temp] ► [Add func] ► [Trim offset]

Ⓜ [Device] ► [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. Default value is 0.000e+000.

Temperature trim gain

Ⓛ [Detailed setup] ► [Pro var] ► [Temp] ► [Add func] ► [Trim gain]

Ⓜ [Device] ► [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. 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	Web name	Page
–	Volume flow unit	[Unit]	[Volume flow unit]	[212]
–	Volume flow LRV	[LRV]	[Volume flow LRV]	[213]
–	Volume flow URV	[URV]	[Volume flow URV]	[214]
–	Volume flow damping	[Damp]	[Volume flow damping]	[214]
–	Additional function	[Add func]	[Additional function]	[215]

Volume flow unit

Ⓛ [Detailed setup] ► [Pro var] ► [Vol] ► [Unit]

Ⓜ [Device] ► [Detailed setup] ► [Process variables] ► [Volume flow] ► [Volume flow unit]

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

- *Easy setup wizard* [156]
- *Basic setup* [182]
- *Detailed setup* [212]

Sets the unit for volume flow.

	Value	Description
–	cm ³ /s	Sets the displayed Volume flow unit. Default value is m ³ /h.
–	cm ³ /min	
–	cm ³ /h	
–	L/s	
–	L/min	
–	L/h	
–	L/d	
–	m ³ /s	
–	m ³ /min	
–	m ³ /h	
–	m ³ /d	
–	gal/s	
–	gal/min	
–	gal/h	
–	gal/d	
–	ft ³ /s	
–	ft ³ /min	
–	ft ³ /h	
–	ft ³ /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] ► [Detailed setup] ► [Process variables] ► [Volume flow] ► [Volume flow LRV]

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

- *Easy setup wizard* [► 157]
- *Basic setup* [► 183]
- *Detailed Setup* [► 213]

Sets the lower range value, 0 %, for scaling the analog, frequency and pulse output during volume flow measurement.

Sets the lower range value, 0 %, for scaling the frequency and pulse output during volume flow measurement.

	Value	Description
–	Numeric digits	Default value is 0. Settings must satisfy the following conditions: URV ≠ LRV

**Volume flow
URV**

Ⓛ [Detailed setup] ► [Pro var] ► [Vol] ► [URV]

Ⓜ [Device] ► [Detailed setup] ► [Process variables] ► [Volume flow] ►
[Volume flow URV]

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

- *Easy setup wizard* [▶ 158]
- *Basic setup* [▶ 184]
- *Detailed setup* [▶ 214]

Sets the upper range value, 100 %, for scaling the analog, frequency and pulse output during volume flow measurement.

Sets the upper range value, 100 %, for scaling the frequency and pulse output during volume flow measurement.

	Value	Description
–	Numeric digits	Default value is 10. Settings must satisfy the following conditions: URV ≠ LRV

**Volume flow
damping**

Ⓛ [Detailed setup] ► [Pro var] ► [Vol] ► [Damp]

Ⓜ [Device] ► [Detailed setup] ► [Process variables] ► [Volume flow] ►
[Volume flow damping]

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

- *Easy setup wizard* [▶ 158]
- *Basic setup* [▶ 184]
- *Detailed setup* [▶ 214]

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. 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* [▶ 196].

The following menus/settings are available:

	Full name	Display name	Web name	Page
–	Volume flow low cut	[Lowcut]	[Volume flow lowcut]	[▶ 215]
–	Volume flow user unit	[User unit]	[Volume flow user unit]	[▶ 215]
–	Volume flow user unit conversion factor	[Conv factor]	[Volume flow user unit conversion factor]	[▶ 215]
–	Volume flow damping pulse/total	[Damp pls/ttl]	[Volume flow damping pulse/total]	[▶ 216]
–	Volume flow trim select	[Trim sel]	[Volume flow trim select]	[▶ 216]
–	Volume flow trim offset	[Trim offset]	[Volume flow trim offset]	[▶ 216]
–	Volume flow trim gain	[Trim gain]	[Volume flow trim gain]	[▶ 216]

Volume flow low cut

⌚ [Detailed setup] ▶ [Pro var] ▶ [Vol] ▶ [Add func] ▶ [Lowcut]

Ⓜ [Device] ▶ [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] ▶ [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] ▶ [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	Conversion factor for calculating the user-defined unit from the standard unit (m3/h). Default value is 1.

**Volume flow
damping
pulse/total**

Ⓛ [Detailed setup] ► [Pro var] ► [Vol] ► [Add func] ► [Damp pls/ttl]

Ⓜ [Device] ► [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. Default value is 0.0 s.

**Volume flow
trim select**

Ⓛ [Detailed setup] ► [Pro var] ► [Vol] ► [Add func] ► [Trim sel]

Ⓜ [Device] ► [Detailed setup] ► [Process variables] ► [Volume flow] ►
[Additional function] ► [Volume flow trim select]

Enables or disables the volume flow trim.

	Value	Description
–	Inhibit [Inhibit] [Inhibit]	Disables the volume flow trim. Default value.
–	Enable [Enable] [Enable]	Enables the volume flow trim.

**Volume flow
trim offset**

Ⓛ [Detailed setup] ► [Pro var] ► [Vol] ► [Add func] ► [Trim offset]

Ⓜ [Device] ► [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. Default value is 0.000e+000.

**Volume flow
trim gain**

Ⓛ [Detailed setup] ► [Pro var] ► [Vol] ► [Add func] ► [Trim gain]

Ⓜ [Device] ► [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. Default value is 1.000.

Pressure

Menu for configuring the pressure measurement.

The following menus/settings are available:

	Full name	Display name	Web name	Page
–	Pressure unit	[Unit]	[Pressure unit]	[▶ 217]
–	Pressure LRV	[LRV]	[Pressure LRV]	[▶ 217]
–	Pressure URV	[URV]	[Pressure URV]	[▶ 218]
–	Pressure damping	[Damp]	[Pressure damping]	[▶ 218]
–	Pressure fixed value	[Fix val]	[Pressure fixed value]	[▶ 218]
–	Additional function	[Add func]	[Additional function]	[▶ 219]

Pressure unit

🕒 [Detailed setup] ▶ [Pro var] ▶ [Pres] ▶ [Unit]

📁 [Device] ▶ [Detailed setup] ▶ [Process variables] ▶ [Pressure] ▶ [Pressure unit]

Sets the pressure unit.

	Value	Description
–	inH2O(68°F)	Sets the displayed Pressure unit. Default value is bar.
–	inHg	
–	ftH2O(68°F)	
–	mmH2O(68°F)	
–	mmHg	
–	psi	
–	bar	
–	mbar	
–	g/cm ²	
–	kg/cm ²	
–	Pa	
–	kPa	
–	torr	
–	atm	
–	MPa	
–	inH2O	
–	mmH2O	
–	ftH2O	
–	hPa	

Pressure LRV

🕒 [Detailed setup] ▶ [Pro var] ▶ [Pres] ▶ [LRV]

📁 [Device] ▶ [Detailed setup] ▶ [Process variables] ▶ [Pressure] ▶ [Pressure LRV]

Sets the lower range value, 0 %, for scaling the frequency output during pressure measurement.

	Value	Description
Ⓔ	Numeric digits	Default value is 0. Setting must satisfy the following condition: URV ≠ LRV

Pressure URV

Ⓔ [Detailed setup] ► [Pro var] ► [Pres] ► [URV]

Ⓕ [Device] ► [Detailed setup] ► [Process variables] ► [Pressure] ► [Pressure URV]

Sets the upper range value, 100 %, for scaling the frequency output during pressure measurement.

	Value	Description
–	Numeric digits	Default value is 200 bar. Settings must satisfy the following conditions: URV ≠ LRV

Pressure damping

Ⓔ [Detailed setup] ► [Pro var] ► [Pres] ► [Damp]

Ⓕ [Device] ► [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. Default value is 3.0 s.

Pressure fixed value

Ⓔ [Detailed setup] ► [Pro var] ► [Pres] ► [Fix val]

Ⓕ [Device] ► [Detailed setup] ► [Process variables] ► [Pressure] ► [Pressure fixed value]

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

- *Easy setup wizard* [► 149]
- *Basic setup* [► 176]
- Detailed setup
 - *Pressure* [► 218]
 - *Installation configuration* [► 195]

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. Default value is 0. 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* [▶ 196].

The following menus/settings are available:

	Full name	Display name	Web name	Page
–	Absolute/Gauge select	[Abs/Gauge sel]	[Absolute/Gauge select]	[▶ 219]
–	Gas density pressure	[Gas dens pres]	[Gas density pressure]	[▶ 219]
–	Pressure trim select	[Trim sel]	[Pressure trim select]	[▶ 220]
–	Pressure trim offset	[Trim offset]	[Pressure trim offset]	[▶ 220]
–	Pressure trim gain	[Trim gain]	[Pressure trim gain]	[▶ 220]

Absolute/Gauge select

⌚ [Detailed setup] ▶ [Pro var] ▶ [Pres] ▶ [Add func] ▶ [Abs/Gauge sel]

⊕ [Device] ▶ [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 [Gauge] [Gauge]	Selects gauge pressure. Default value.
–	Absolute [Abs] [Absolute]	Selects absolute pressure.

Gas density pressure

⌚ [Detailed setup] ▶ [Pro var] ▶ [Pres] ▶ [Add func] ▶ [Gas dens pres]

⊕ [Device] ▶ [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. If the External function is set to "Pressure compensation" and the Absolute/Gauge select is set to "Absolute", measured value of the pressure transmitter is applied.

	Value	Description
–	Numeric digits	Default value is 1.01325 bar abs.

Pressure trim select

Ⓛ [Detailed setup] ► [Pro var] ► [Pres] ► [Add func] ► [Trim sel]

Ⓜ [Device] ► [Detailed setup] ► [Process variables] ► [Pressure] ► [Additional function] ► [Pressure trim select]

Enables or disables the pressure offset.

	Value	Description
–	Inhibit [Inhibit] [Inhibit]	Disables the pressure trim. Default value.
–	Enable [Enable] [Enable]	Enables the pressure trim.

Pressure trim gain

Ⓛ [Detailed setup] ► [Pro var] ► [Pres] ► [Add func] ► [Trim gain]

Ⓜ [Device] ► [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. Default value is 1.000.

Pressure trim offset

Ⓛ [Detailed setup] ► [Pro var] ► [Pres] ► [Add func] ► [Trim offset]

Ⓜ [Device] ► [Detailed setup] ► [Process variables] ► [Pressure] ► [Additional function] ► [Pressure trim offset]

Sets the pressure zero offset value.

Only effective if Pressure trim select is set to Enable.

	Value	Description
–	Numeric digits	Value that is added to the pressure. Default value is 0.000e+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:

$$\rho_{\text{ref}} = \rho / (1 + A (t - t_{\text{ref}}) + B (t - t_{\text{ref}})^2)$$

ρ_{ref} : density at reference temperature

ρ : 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	Web name	Page
–	Reference density LRV	[LRV]	[Reference density LRV]	[▶ 221]
–	Reference density URV	[URV]	[Reference density URV]	[▶ 221]
–	Reference density damping	[Damp]	[Reference density damping]	[▶ 222]
–	Reference temperature	[Ref temp]	[Reference temperature]	[▶ 222]
–	Temperature coefficient A	[Temp coeff A]	[Temperature coeff A]	[▶ 222]
–	Temperature coefficient B	[Temp coeff B]	[Temperature coeff B]	[▶ 222]
–	Additional function	[Add func]	[Additional function]	[▶ 223]

Reference density LRV

① [Detailed setup] ▶ [Pro var] ▶ [Ref dens] ▶ [LRV]

② [Device] ▶ [Detailed setup] ▶ [Process variables] ▶ [Reference density] ▶ [Reference density LRV]

	Value	Description
–	Numeric digits	Default value is 0. Settings must satisfy the following condition: URV ≠ LRV

Reference density URV

① [Detailed setup] ▶ [Pro var] ▶ [Ref dens] ▶ [URV]

② [Device] ▶ [Detailed setup] ▶ [Process variables] ▶ [Reference density] ▶ [Reference density URV]

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

⌚ [Detailed setup] ► [Pro var] ► [Ref dens] ► [Damp]

Ⓜ [Device] ► [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. Default value is 3.0 s.

Reference temperature

⌚ [Detailed setup] ► [Pro var] ► [Ref dens] ► [Ref temp]

Ⓜ [Device] ► [Detailed setup] ► [Process variables] ► [Reference density] ► [Reference temperature]

Sets the reference temperature.

	Value	Description
–	Numeric digits	Temperature at which the reference density is determined. Default value is 25.0 degC.

Temperature coefficient A

⌚ [Detailed setup] ► [Pro var] ► [Ref dens] ► [Temp coeff A]

Ⓜ [Device] ► [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

⌚ [Detailed setup] ► [Pro var] ► [Ref dens] ► [Temp coeff B]

Ⓜ [Device] ► [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* [▶ 196].

The following menus/settings are available:

	Full name	Display name	Web name	Page
–	Reference density low cut	[Lowcut]	[Reference density lowcut]	[▶ 223]
–	Reference density value select	[Val sel]	[Reference density value select]	[▶ 223]
–	Reference density fixed value	[Fix val]	[Reference density fixed value]	[▶ 224]
–	Reference pressure	[Ref pres]	[Reference pressure]	[▶ 224]
–	Reference density trim select	[Trim sel]	[Reference density trim select]	[▶ 224]
–	Reference density trim offset	[Trim offset]	[Reference density trim offset]	[▶ 225]
–	Reference density trim gain	[Trim gain]	[Reference density trim gain]	[▶ 225]

Reference density low cut

① [Detailed setup] ▶ [Pro var] ▶ [Ref dens] ▶ [Add func] ▶ [Lowcut]

② [Device] ▶ [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. Settings must satisfy the following condition: Reference density low cut $\leq 0.5\text{kg/l}$

Reference density value select

① [Detailed setup] ▶ [Pro var] ▶ [Ref dens] ▶ [Add func] ▶ [Val sel]

② [Device] ▶ [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* [▶ 206] is applied.

	Value	Description
–	Measured value [Meas val] [Measured value]	A reference density value calculated from the measured density is used. Temperature coefficient A or Temperature coefficient B must be set to a value other than 0.
–	Fixed value [Fix val] [Fixed value]	Preset fixed reference density value is used. Default value.

Reference density fixed value

Ⓛ [Detailed setup] ► [Pro var] ► [Ref dens] ► [Add func] ► [Fix val]

Ⓜ [Device] ► [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* [▶ 223] 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

Ⓛ [Detailed setup] ► [Pro var] ► [Ref dens] ► [Add func] ► [Ref pres]

Ⓜ [Device] ► [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

Ⓛ [Detailed setup] ► [Pro var] ► [Ref dens] ► [Add func] ► [Trim sel]

Ⓜ [Device] ► [Detailed setup] ► [Process variables] ► [Reference density] ► [Additional function] ► [Reference density trim select]

Enables or disables the reference density offset.

	Value	Description
–	Inhibit [Inhibit] [Inhibit]	Disables the reference density trim. Default value.
–	Enable [Enable] [Enable]	Enables the reference density trim.

Reference density trim offset

① [Detailed setup] ► [Pro var] ► [Ref dens] ► [Add func] ► [Trim offset]

Ⓜ [Device] ► [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

① [Detailed setup] ► [Pro var] ► [Ref dens] ► [Add func] ► [Trim gain]

Ⓜ [Device] ► [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. 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	Web name	Page
–	Relative density indication/equation select	[Disp ind & equ sel]	[Relative density indication/equation select]	[▶ 226]
–	Relative density LRV	[LRV]	[Relative density LRV]	[▶ 227]
–	Relative density URV	[URV]	[Relative density URV]	[▶ 227]
–	Relative density damping	[Damp]	[Relative density damping]	[▶ 228]
–	Relative density reference select	[Ref sel]	[Relative density reference select]	[▶ 228]
–	Additional function	[Add func]	[Additional function]	[▶ 228]

Relative density indication/equation select

Ⓛ [Detailed setup] ► [Pro var] ► [Rel dens] ► [Disp ind & equ sel]

Ⓜ [Device] ► [Detailed setup] ► [Process variables] ► [Relative density] ► [Relative density indication/equation select]

Sets the unit of measure for relative density.

	Relative density reference select		Reference density value select is set to Measured value and Reference temperature		
Relative density indication/equation select	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 [No func] [No function]	Do not measure relative density. Value of relative density is zero.
–	SG 4 °C Specific gravity [sg 4 °c] [SG 4 degC]	Specific gravity relative to 4 °C water. Dimensionless Default value.
–	SG 15 °C Specific gravity [sg 15 °c] [SG 15 degC]	Specific gravity relative to 15 °C water. Dimensionless
–	SG 20 °C Specific gravity [sg 20 °c] [SG 20 degC]	Specific gravity relative to 20 °C water. Dimensionless
–	SG 60 °F Specific gravity [sg 60 °F] [SG 60degF]	Specific gravity relative to 60 °F (15.56 °C) water. Dimensionless

	Value	Description
–	°API [°API] [degAPI]	°API units are used for quantifying the mass densities of mineral oils. $^{\circ}\text{API} = 141.5 / \text{SG} (60 / 60^{\circ}\text{F}) - 131.5$ Dimensionless
–	°Baumé heavy [°Bé hv] [degBaum hv]	°Baumé heavy is used for liquids heavier than water. $^{\circ}\text{Bé hv} = 145 - 145 / (\text{SG} (60 / 60^{\circ}\text{F}))$ Dimensionless.
–	°Baumé light [°Bé lt] [degBaum lt]	$^{\circ}\text{Bé lt} = 140 / (\text{SG} (60 / 60^{\circ}\text{F})) - 130$ Dimensionless
–	°Baumé heavy for JIS [Bh] [Bh]	°Baumé heavy for JIS Z 8804:2012 $\text{Bh} = 144.3 - 144.3 / (\text{SG} (15 / 4^{\circ}\text{C}))$ Dimensionless
–	°Baumé light for JIS [Bl] [Bl]	°Baumé light for JIS Z 8804:2012 $\text{Bl} = 144.3 / (\text{SG} (15 / 4^{\circ}\text{C})) - 134.3$ Dimensionless
–	°Sake [°Sake] [degSake]	°Sake units are used for quantifying the mass densities of sake. $^{\circ}\text{Sake} = 1443 / (\text{SG} (15 / 4^{\circ}\text{C})) - 1443$ Dimensionless

Relative density LRV

① [Detailed setup] ► [Pro var] ► [Rel dens] ► [LRV]

② [Device] ► [Detailed setup] ► [Process variables] ► [Relative density] ► [Relative density LRV]

Sets the reference density to the lower range value, 0 %, for the scaling of the frequency output for relative density measurement.

	Value	Description
–	Numeric digits	Default value is 0. Settings must satisfy the following condition: $\text{URV} \neq \text{LRV}$

Relative density URV

① [Detailed setup] ► [Pro var] ► [Rel dens] ► [URV]

② [Device] ► [Detailed setup] ► [Process variables] ► [Relative density] ► [Relative density URV]

Sets the upper range value, 100 %, for the scaling of the frequency output for relative density measurement.

	Value	Description
–	Numeric digits	Default value is 100. Settings must satisfy the following conditions: $\text{URV} \neq \text{LRV}$

Relative density damping

Ⓛ [Detailed setup] ► [Pro var] ► [Rel dens] ► [Damp]

Ⓜ [Device] ► [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. Default value is 3.0 s.

Relative density reference select

Ⓛ [Detailed setup] ► [Pro var] ► [Rel dens] ► [Ref sel]

Ⓜ [Device] ► [Detailed setup] ► [Process variables] ► [Relative density] ► [Relative density reference select]

Sets Relative Density.

	Value	Description
–	Actual density [Actual dens] [Actual density]	Relative Density is calculated using the Actual density. Default value.
–	Reference density [Ref dens] [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* [► 196].

The following menus/settings are available:

	Full name	Display name	Web name	Page
–	Relative density trim select	[Trim sel]	[Relative density trim select]	[► 228]
–	Relative density trim offset	[Trim offset]	[Relative density trim offset]	[► 229]
–	Relative density trim gain	[Trim gain]	[Relative density trim gain]	[► 229]

Relative density trim select

Ⓛ [Detailed setup] ► [Pro var] ► [Rel dens] ► [Add func] ► [Trim sel]

Ⓜ [Device] ► [Detailed setup] ► [Process variables] ► [Relative density] ► [Additional function] ► [Relative density trim select]

Enables or disables the relative density offset.

	Value	Description
–	[Inhibit] [Inhibit]	Disables Relative density trim. Default value.
–	[Enable] [Enable]	Enables Relative density trim.

Relative density trim offset

① [Detailed setup] ► [Pro var] ► [Rel dens] ► [Add func] ► [Trim offset]

Ⓜ [Device] ► [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. Default value is 0.000e+000.

Relative density trim gain

① [Detailed setup] ► [Pro var] ► [Rel dens] ► [Add func] ► [Trim gain]

Ⓜ [Device] ► [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. 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	Web name	Page
–	Corrected volume flow unit	[Unit]	[Corrected volume flow unit]	[▶ 230]
–	Corrected volume flow LRV	[LRV]	[Corrected volume flow LRV]	[▶ 230]
–	Corrected volume flow URV	[URV]	[Corrected volume flow URV]	[▶ 231]
–	Corrected volume flow damping	[Damp]	[Corrected volume flow damping]	[▶ 231]
–	Additional function	[Add func]	[Additional function]	[▶ 231]

Corrected volume flow unit

⌚ [Detailed setup] ► [Pro var] ► [Corr vol] ► [Unit]

Ⓜ [Device] ► [Detailed setup] ► [Process variables] ► [Corrected volume flow] ► [Corrected volume flow unit]

Sets the corrected reference volume flow unit.

Value	Description
– NL/s	Sets the displayed Corrected volume flow unit. Regardless of the unit selected here, the calculation is performed using the reference density fixed value set in [224]. Default value is Sm ³ /h.
– NL/min	
– NL/h	
– NL/d	
– Nm ³ /s	
– Nm ³ /min	
– Nm ³ /h	
– Nm ³ /d	
– SL/s	
– SL/min	
– SL/h	
– SL/d	
– Sft ³ /s	
– Sft ³ /min	
– Sft ³ /h	
– Sft ³ /d	
– Sm ³ /s	
– Sm ³ /min	
– Sm ³ /h	
– Sm ³ /d	
– mmscfh	
– mmscfd	
– User Unit	

Corrected volume flow LRV

⌚ [Detailed setup] ► [Pro var] ► [Corr vol] ► [LRV]

Ⓜ [Device] ► [Detailed setup] ► [Process variables] ► [Corrected volume flow] ► [Corrected volume flow LRV]

Sets the lower range value, 0 %, for the scaling of the frequency and pulse outputs for corrected volume flow measurement.

Value	Description
– Numeric digits	Default value is 0. When measuring reverse flow, a negative value for Corrected volume flow LRV can be set. Settings must satisfy the following condition: URV ≠ LRV

Corrected volume flow URV

⌚ [Detailed setup] ► [Pro var] ► [Corr vol] ► [URV]

Ⓜ [Device] ► [Detailed setup] ► [Process variables] ► [Corrected volume flow] ► [Corrected volume flow URV]

Sets the upper range value, 100 %, for the scaling of the frequency and pulse outputs for corrected volume flow measurement.

	Value	Description
–	Numeric digits	Default value is 10. Settings must satisfy the following condition: URV ≠ LRV

Corrected volume flow damping

⌚ [Detailed setup] ► [Pro var] ► [Corr vol] ► [Damp]

Ⓜ [Device] ► [Detailed setup] ► [Process variables] ► [Corrected volume flow] ► [Corrected volume flow damping]

Sets the damping time constant in seconds for measurement value 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. Default value is 3.0s

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* [► 196].

The following menus/settings are available:

	Full name	Display name	Web name	Page
–	Corrected volume flow low cut	[Lowcut]	[Corrected volume flow lowcut]	[► 232]
–	Corrected volume flow user unit	[User unit]	[Corrected volume flow user unit]	[► 232]
–	Corrected volume flow user unit conversion factor	[Conv factor]	[Corrected volume flow user unit conversion factor]	[► 232]
–	Corrected volume flow damping pulse/total	[Damp pls/ttl]	[Corrected volume flow damping pulse/total]	[► 232]
–	Corrected volume trim select	[Trim sel]	[Corrected volume trim select]	[► 233]
–	Corrected volume flow trim offset	[Trim offset]	[Corrected volume flow trim offset]	[► 233]
–	Corrected volume flow trim gain	[Trim gain]	[Corrected volume flow trim gain]	[► 233]

Corrected volume flow lowcut

Ⓐ [Detailed setup] ► [Pro var] ► [Corr vol] ► [Add func] ► [Lowcut]

Ⓜ [Device] ► [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] ► [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] ► [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 damping pulse/total

Ⓐ [Detailed setup] ► [Pro var] ► [Corr vol] ► [Add func] ► [Damp pls/ttl]

Ⓜ [Device] ► [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. Default value is 0.0 s.

Corrected volume flow trim select

① [Detailed setup] ► [Pro var] ► [Corr vol] ► [Add func] ► [Trim sel]

② [Device] ► [Detailed setup] ► [Process variables] ► [Corrected volume flow] ► [Additional function] ► [Corrected volume trim select]

Enables or disables the corrected volume flow offset.

	Value	Description
–	Inhibit [Inhibit] [Inhibit]	Disables the corrected volume flow trim. Default value.
–	Enable [Enable] [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] ► [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] ► [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. Default value is 1.000.

Calorific value

Menu for configuring the calorific value measurement.

The following menus/settings are available:

	Full name	Display name	Web name	Page
–	Calorific unit	[Unit]	[Calorific unit]	[► 234]
–	Calorific damping	[Damp]	[Calorific damping]	[► 234]
–	Calorific fixed value	[Fix val]	[Calorific fixed value]	[► 234]

Calorific unit

Ⓐ [Detailed setup] ► [Pro var] ► [Cal] ► [Unit]

Ⓜ [Device] ► [Detailed setup] ► [Process variables] ► [Calorific value] ► [Calorific unit]

Sets the calorific unit.

	Value	Description
–	MJ/kg	Sets the displayed Calorific unit. Default value is MJ/kg.
–	Btu/lb	
–	MJ/m ³	
–	Btu/gal	
–	MJ/Nm ³	
–	Btu/Sft ³	

Calorific damping

Ⓐ [Detailed setup] ► [Pro var] ► [Cal] ► [Damp]

Ⓜ [Device] ► [Detailed setup] ► [Process variables] ► [Calorific value] ► [Calorific damping]

Sets the damping time constant in seconds for calorific value 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. Default value is 0.0 s.

Calorific fixed value

Ⓐ [Detailed setup] ► [Pro var] ► [Cal] ► [Fix val]

Ⓜ [Device] ► [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 AO function block to a remote terminal and External function has been set to Calorific value.

	Value	Description
–	Numeric digits	Default value is 0.

Velocity

Menu for configuring the Velocity measurement of fluid.

Velocity unit

Ⓐ [Detailed setup] ► [Pro var] ► [Vel] ► [Unit]

Ⓜ [Device] ► [Detailed setup] ► [Process variables] ► [Velocity] ► [Velocity unit]

Sets the unit for velocity.

	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	Web name	Page
ⓔ	Selected concentration set	[Set]	[Selected concentration set]	[▶ 235]
ⓔ	Select concentration set manual	[Set man]	[Select concentration set manual]	[▶ 236]
ⓔ	Concentration measurement unit set 1 – 4	[Unit set1 – 4]	[Concentration measurement unit set 1 – 4]	[▶ 237]
ⓔ	Concentration measurement LRV set 1 – 4	[LRV set1 – 4]	[Concentration measurement LRV set 1 – 4]	[▶ 238]
ⓔ	Concentration measurement URV set 1 – 4	[URV set1 – 4]	[Concentration measurement URV set 1 – 4]	[▶ 238]
ⓔ	Concentration damping	[Damp]	[Concentration damping]	[▶ 238]
ⓔ	Additional function	[Add func]	[Additional function]	[▶ 240]
ⓔ	Standard concentration set 1 – 4	[Std conc set1 – 4]	[Standard concentration set 1 – 4]	[▶ 236]
ⓗ ⓔ	Advanced concentration set 1 – 4	–	[Advanced concentration set 1 – 4]	[▶ 242]
ⓔ	NOC	[NOC]	[NOC]	[▶ 252]

Selected concentration set

① [Detailed setup] ▶ [Pro var] ▶ [Conc] ▶ [Set]

ⓗ [Device] ▶ [Detailed setup] ▶ [Process variables] ▶ [Concentration] ▶ [Selected concentration set]

Shows the selected configuration set to be used for concentration measurement.

	Value	Description
ⓔ	Set1 [Set1] [Set1]	4 configuration sets can be defined on the device and one of them can be selected for concentration measurement.
ⓔ	Set2 [Set2] [Set 2]	
ⓔ	Set3 [Set3] [Set3]	
ⓔ	Set4 [Set4] [Set4]	

Select concentration set manual

Ⓐ [Detailed setup] ► [Pro var] ► [Conc] ► [Set man]

Ⓜ [Device] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [Select concentration set manual]

Sets the concentration configuration set to be used.

	Value	Description
Ⓔ [Set1]	Set1 [Set1]	Default value is Set1.
Ⓔ [Set2]	Set2 [Set2]	
Ⓔ [Set3]	Set3 [Set3]	
Ⓔ [Set4]	Set4 [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 or by Status input.

The following menus/settings are available:

	Full name	Display name	Web name	Page
Ⓔ	Concentration measurement unit set 1 – 4	[Unit set1 – 4]	[Concentration measurement unit set 1 – 4]	[237]
Ⓔ	Concentration measurement LRV set 1 – 4	[LRV set1 – 4]	[Concentration measurement LRV set 1 – 4]	[238]
Ⓔ	Concentration measurement URV set 1 – 4	[URV set1 – 4]	[Concentration measurement URV set 1 – 4]	[238]
Ⓔ	Concentration damping	[Damp]	[Concentration damping]	[238]
Ⓔ	Concentration reference temperature set 1 – 4	[Ref temp]	[Concentration reference temperature set 1 – 4]	[238]
Ⓔ	Concentration reference density carrier set 1 – 4	[Ref dens car]	[Concentration reference density carrier set 1 – 4]	[239]
Ⓔ	Concentration temperature coefficient A carrier set 1 – 4	[Temp A car]	[Concentration temperature coefficient A carrier set 1 – 4]	[239]
Ⓔ	Concentration temperature coefficient B carrier set 1 – 4	[Temp B car]	[Concentration temperature coefficient B carrier set 1 – 4]	[239]

ⓔ	Concentration reference density product set 1 – 4	[Ref dens pro]	[Concentration reference density product set 1 – 4]	[▶ 239]
ⓔ	Concentration temperature coefficient A product set 1 – 4	[Temp A pro]	[Concentration temperature coefficient A product set 1 – 4]	[▶ 240]
ⓔ	Concentration temperature coefficient B product set 1 – 4	[Temp B pro]	[Concentration temperature coefficient B product set 1 – 4]	[▶ 240]
ⓔ	Additional function	[Add func]	[Additional function]	[▶ 240]
ⓔ	NOC	[NOC]	[NOC]	[▶ 252]

Concentration measurement unit set 1 – 4

① [Detailed setup] ▶ [Pro var] ▶ [Conc] ▶ [Std conc set1 – 4] ▶ [Unit set1 – 4]

ⓔ [Device] ▶ [Process variables] ▶ [Concentration] ▶ [Concentration measurement unit set 1 – 4]

Sets the unit for the concentration measurement Set 1 – 4.

	Value	Description
ⓔ	degBrix [°Brix] [degBrix]	Default value is Wt %.
ⓔ	Wt % sol [Wt% sol] [% sol-wt]	
ⓔ	Vol % sol [Vol% sol] [% sol-vol]	
ⓔ	Wt % [Wt%] [%]	
ⓔ	Vol % [Vol %] [Vol %]	
ⓔ	Wt % user unit [User unit(Wt%)] [Wt % User unit]	
ⓔ	Vol % user unit [User unit(Vol%)] [Vol % User unit]	

Concentration measurement LRV set 1 – 4

Ⓐ [Detailed setup] ► [Pro var] ► [Conc] ► [Std conc set1 – 4] ► [LRV set1 – 4]

Ⓜ [Device] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [Concentration measurement LRV set 1 – 4]

Sets the lower range value, 0%, for scaling the frequency output during Concentration measurement set 1 – 4.

	Value	Description
Ⓜ	Numeric digits	Setting range: 0.0 – 110.0. Default value is 0.0. Settings must satisfy the following condition: URV ≠ LRV

Concentration measurement URV set 1 – 4

Ⓐ [Detailed setup] ► [Pro var] ► [Conc] ► [Std conc set1 – 4] ► [URV set1 – 4]

Ⓜ [Device] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [Concentration measurement URV set 1 – 4]

Sets the upper range value, 100%, for scaling the frequency output during Concentration measurement set 1 – 4.

	Value	Description
Ⓜ	Numeric digits	Setting range: 0.0 – 110.0. Default value is 100.0. Settings must satisfy the following condition: URV ≠ LRV

Concentration damping

Ⓐ [Detailed setup] ► [Pro var] ► [Conc] ► [Std conc set1 – 4] ► [Damp]

Ⓜ [Device] ► [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. Default value is 3.0 s.

Concentration reference temperature set 1 – 4

Ⓐ [Detailed setup] ► [Pro var] ► [Conc] ► [Std conc set1 – 4] ► [Ref temp]

Ⓜ [Device] ► [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**

① [Detailed setup] ► [Pro var] ► [Conc] ► [Std conc set1 – 4] ► [Ref dens car]

② [Device] ► [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
②	Numeric digits	Default value is 0.997.

**Concentration
temperature
coefficient A
carrier set 1 – 4**

① [Detailed setup] ► [Pro var] ► [Conc] ► [Std conc set1 – 4] ► [Temp A car]

② [Device] ► [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
②	Numeric digits	Default value is -2.610×10^{-4} .

**Concentration
temperature
coefficient B
carrier set 1 – 4**

① [Detailed setup] ► [Pro var] ► [Conc] ► [Std conc set1 – 4] ► [Temp B car]

② [Device] ► [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
②	Numeric digits	Default value is -3.600×10^{-6} .

**Concentration
reference density
product set 1 – 4**

① [Detailed setup] ► [Pro var] ► [Conc] ► [Std conc set1 – 4] ► [Ref dens pro]

② [Device] ► [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
②	Numeric digits	Default value is 0.0.

Concentration temperature coefficient A product set 1 – 4

Ⓐ [Detailed setup] ► [Pro var] ► [Conc] ► [Std conc set1 – 4] ► [Temp A pro]

Ⓜ [Device] ► [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

Ⓐ [Detailed setup] ► [Pro var] ► [Conc] ► [Std conc set1 – 4] ► [Temp B pro]

Ⓜ [Device] ► [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* [p. 196] has been set to Apply.

The following menus/settings are available:

	Full name	Display name	Web name	Page
Ⓜ	Concentration name set 1 – 4	[Name set1 – 4]	[Concentration name set 1 – 4]	[p. 240]
Ⓜ	Concentration measurement user unit set 1 – 4	[User unit set1 – 4]	[Concentration measurement user unit set 1 – 4]	[p. 241]
Ⓜ	Concentration trim select	[Trim sel]	[Concentration trim select]	[p. 241]
Ⓜ	Concentration trim offset	[Trim offset]	[Concentration trim offset]	[p. 241]
Ⓜ	Concentration trim gain	[Trim gain]	[Concentration trim gain]	[p. 241]

Concentration name set 1 – 4

Ⓐ [Detailed setup] ► [Pro var] ► [Conc] ► [Std conc set1 – 4] ► [Add func] ► [Name set1 – 4]

Ⓜ [Device] ► [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. Default value is Set 1 – 4.

Concentration measurement user unit set 1 – 4

① [Detailed setup] ► [Pro var] ► [Conc] ► [Std conc set1 – 4] ► [Add func] ► [User unit set1 – 4]

Ⓜ [Device] ► [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. Default value is blank.

Concentration trim select

① [Detailed setup] ► [Pro var] ► [Conc] ► [Std conc set1 – 4] ► [Add func] ► [Trim sel]

Ⓜ [Device] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [Additional function] ► [Concentration trim select]

Enables or disables the trim function for concentration measurement.

	Value	Description
Ⓜ	Inhibit [Inhibit] [Inhibit]	Disables the concentration trim. Default value.
Ⓜ	Enable [Enable] [Enable]	Enables the concentration trim.

Concentration trim gain

① [Detailed setup] ► [Pro var] ► [Conc] ► [Std conc set1 – 4] ► [Add func] ► [Trim gain]

Ⓜ [Device] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [Additional function] ► [Concentration trim gain]

Sets the gain for trimming the concentration measurement.

	Value	Description
Ⓜ	Numeric digits	Default value is 1.000.

Concentration trim offset

① [Detailed setup] ► [Pro var] ► [Conc] ► [Std conc set1 – 4] ► [Add func] ► [Trim offset]

Ⓜ [Device] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [Additional function] ► [Concentration trim offset]

Sets the offset for trimming the concentration measurement.

	Value	Description
Ⓜ	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 or by Status input.

The following menus/settings are available:

	Full name	Display name	Web name	Page
Ⓜ Ⓢ	Concentration temperature set 1 – 4 number	–	[Concentration temperature set 1 – 4 number]	[▶ 244]
Ⓜ Ⓢ	Concentration temperature 1 set 1 – 4	–	[Concentration temperature 1 set 1 – 4]	[▶ 244]
Ⓜ Ⓢ	Concentration A 1 set 1 – 4	–	[Concentration A 1 set 1 – 4]	[▶ 244]
Ⓜ Ⓢ	Concentration B 1 set 1 – 4	–	[Concentration B 1 set 1 – 4]	[▶ 244]
Ⓜ Ⓢ	Concentration C 1 set 1 – 4	–	[Concentration C 1 set 1 – 4]	[▶ 244]
Ⓜ Ⓢ	Concentration D 1 set 1 – 4	–	[Concentration D 1 set 1 – 4]	[▶ 245]
Ⓜ Ⓢ	Concentration temperature 2 set 1 – 4	–	[Concentration temperature 2 set 1 – 4]	[▶ 245]
Ⓜ Ⓢ	Concentration A 2 set 1 – 4	–	[Concentration A 2 set 1 – 4]	[▶ 245]
Ⓜ Ⓢ	Concentration B 2 set 1 – 4	–	[Concentration B 2 set 1 – 4]	[▶ 245]
Ⓜ Ⓢ	Concentration C 2 set 1 – 4	–	[Concentration C 2 set 1 – 4]	[▶ 245]
Ⓜ Ⓢ	Concentration D 2 set 1 – 4	–	[Concentration D 2 set 1 – 4]	[▶ 246]
Ⓜ Ⓢ	Concentration temperature 3 set 1 – 4	–	[Concentration temperature 3 set 1 – 4]	[▶ 246]
Ⓜ Ⓢ	Concentration A 3 set 1 – 4	–	[Concentration A 3 set 1 – 4]	[▶ 246]
Ⓜ Ⓢ	Concentration B 3 set 1 – 4	–	[Concentration B 3 set 1 – 4]	[▶ 246]
Ⓜ Ⓢ	Concentration C 3 set 1 – 4	–	[Concentration C 3 set 1 – 4]	[▶ 246]
Ⓜ Ⓢ	Concentration D 3 set 1 – 4	–	[Concentration D 3 set 1 – 4]	[▶ 247]
Ⓜ Ⓢ	Concentration temperature 4 set 1 – 4	–	[Concentration temperature 4 set 1 – 4]	[▶ 247]
Ⓜ Ⓢ	Concentration A 4 set 1 – 4	–	[Concentration A 4 set 1 – 4]	[▶ 247]
Ⓜ Ⓢ	Concentration B 4 set 1 – 4	–	[Concentration B 4 set 1 – 4]	[▶ 247]

Ⓜ Ⓜ	Concentration C 4 set 1 – 4	–	[Concentration C 4 set 1 – 4]	[▶ 247]
Ⓜ Ⓜ	Concentration D 4 set 1 – 4	–	[Concentration D 4 set 1 – 4]	[▶ 248]
Ⓜ Ⓜ	Concentration temperature 5 set 1 – 4	–	[Concentration temperature 5 set 1 – 4]	[▶ 248]
Ⓜ Ⓜ	Concentration A 5 set 1 – 4	–	[Concentration A 5 set 1 – 4]	[▶ 248]
Ⓜ Ⓜ	Concentration B 5 set 1 – 4	–	[Concentration B 5 set 1 – 4]	[▶ 248]
Ⓜ Ⓜ	Concentration C 5 set 1 – 4	–	[Concentration C 5 set 1 – 4]	[▶ 248]
Ⓜ Ⓜ	Concentration D 5 set 1 – 4	–	[Concentration D 5 set 1 – 4]	[▶ 249]
Ⓜ Ⓜ	Concentration temperature 6 set 1 – 4	–	[Concentration temperature 6 set 1 – 4]	[▶ 249]
Ⓜ Ⓜ	Concentration A 6 set 1 – 4	–	[Concentration A 6 set 1 – 4]	[▶ 249]
Ⓜ Ⓜ	Concentration B 6 set 1 – 4	–	[Concentration B 6 set 1 – 4]	[▶ 249]
Ⓜ Ⓜ	Concentration C 6 set 1 – 4	–	[Concentration C 6 set 1 – 4]	[▶ 249]
Ⓜ Ⓜ	Concentration D 6 set 1 – 4	–	[Concentration D 6 set 1 – 4]	[▶ 250]
Ⓜ Ⓜ	Concentration temperature 7 set 1 – 4	–	[Concentration temperature 7 set 1 – 4]	[▶ 250]
Ⓜ Ⓜ	Concentration A 7 set 1 – 4	–	[Concentration A 7 set 1 – 4]	[▶ 250]
Ⓜ Ⓜ	Concentration B 7 set 1 – 4	–	[Concentration B 7 set 1 – 4]	[▶ 250]
Ⓜ Ⓜ	Concentration C 7 set 1 – 4	–	[Concentration C 7 set 1 – 4]	[▶ 250]
Ⓜ Ⓜ	Concentration D 7 set 1 – 4	–	[Concentration D 7 set 1 – 4]	[▶ 251]
Ⓜ Ⓜ	Concentration temperature 8 set 1 – 4	–	[Concentration temperature 8 set 1 – 4]	[▶ 251]
Ⓜ Ⓜ	Concentration A 8 set 1 – 4	–	[Concentration A 8 set 1 – 4]	[▶ 251]
Ⓜ Ⓜ	Concentration B 8 set 1 – 4	–	[Concentration B 8 set 1 – 4]	[▶ 251]
Ⓜ Ⓜ	Concentration C 8 set 1 – 4	–	[Concentration C 8 set 1 – 4]	[▶ 251]
Ⓜ Ⓜ	Concentration D 8 set 1 – 4	–	[Concentration D 8 set 1 – 4]	[▶ 252]

Concentration temperature set 1 – 4 number

Ⓜ [Device] ► [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] ► [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] ► [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] ► [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] ► [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] ► [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] ► [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] ► [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] ► [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] ► [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] ► [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
Ⓜ ⓔ	Numeric digits	Default value is 0.

**Concentration
temperature 3
set 1 – 4**

Ⓜ [Device] ► [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
Ⓜ ⓔ	Numeric digits	Default value is 0.

**Concentration A 3
set 1 – 4**

Ⓜ [Device] ► [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
Ⓜ ⓔ	Numeric digits	Default value is 0.

**Concentration B 3
set 1 – 4**

Ⓜ [Device] ► [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
Ⓜ ⓔ	Numeric digits	Default value is 0.

**Concentration C 3
set 1 – 4**

Ⓜ [Device] ► [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
Ⓜ ⓔ	Numeric digits	Default value is 0.

**Concentration D 3
set 1 – 4**

Ⓜ [Device] ► [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] ► [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] ► [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] ► [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] ► [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] ► [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
Ⓜ ⓔ	Numeric digits	Default value is 0.

**Concentration
temperature 5
set 1 – 4**

Ⓜ [Device] ► [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
Ⓜ ⓔ	Numeric digits	Default value is 0.

**Concentration A 5
set 1 – 4**

Ⓜ [Device] ► [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
Ⓜ ⓔ	Numeric digits	Default value is 0.

**Concentration B 5
set 1 – 4**

Ⓜ [Device] ► [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
Ⓜ ⓔ	Numeric digits	Default value is 0.0.

**Concentration C 5
set 1 – 4**

Ⓜ [Device] ► [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
Ⓜ ⓔ	Numeric digits	Default value is 0.

**Concentration D 5
set 1 – 4**

Ⓜ [Device] ► [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
Ⓜ ⓔ	Numeric digits	Default value is 0.

**Concentration
temperature 6
set 1 – 4**

Ⓜ [Device] ► [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
Ⓜ ⓔ	Numeric digits	Default value is 0.

**Concentration A 6
set 1 – 4**

Ⓜ [Device] ► [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
Ⓜ ⓔ	Numeric digits	Default value is 0.

**Concentration B 6
set 1 – 4**

Ⓜ [Device] ► [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
Ⓜ ⓔ	Numeric digits	Default value is 0.

**Concentration C 6
set 1 – 4**

Ⓜ [Device] ► [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
Ⓜ ⓔ	Numeric digits	Default value is 0.

**Concentration D 6
set 1 – 4**

Ⓜ [Device] ► [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
Ⓜ ⓔ	Numeric digits	Default value is 0.

**Concentration
temperature 7
set 1 – 4**

Ⓜ [Device] ► [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
Ⓜ ⓔ	Numeric digits	Default value is 0.

**Concentration A 7
set 1 – 4**

Ⓜ [Device] ► [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
Ⓜ ⓔ	Numeric digits	Default value is 0.

**Concentration B 7
set 1 – 4**

Ⓜ [Device] ► [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
Ⓜ ⓔ	Numeric digits	Default value is 0.

**Concentration C 7
set 1 – 4**

Ⓜ [Device] ► [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
Ⓜ ⓔ	Numeric digits	Default value is 0.

**Concentration D 7
set 1 – 4**

Ⓜ [Device] ► [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] ► [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] ► [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] ► [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] ► [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

④ [Device] ► [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
④ ⑤	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	Web name	Page
④	Oil density	[Oil dens]	[Oil density]	[252]
④	Water density	[Water dens]	[Water density]	[253]
④	Mass concentration value	[Mass conc]	[Mass concentration value]	[253]
④	Volume concentration value	[Vol conc]	[Volume concentration value]	[253]
④	Water cut value	[Water cut]	[Water cut value]	[253]
④	Gas void fraction	[GVF]	[Gas void fraction]	[253]
④	Current thermal expansion factor	–	[Current thermal expansion factor]	[254]
④	Current K0 coefficient	–	[Current K0 coefficient]	[254]
④	Current K1 coefficient	–	[Current K1 coefficient]	[254]
④	Current K2 coefficient	–	[Current K2 coefficient]	[254]
④	Concentration select	[Conc sel]	[Concentration select]	[254]
④	GVF select	[GVF sel]	[GVF select]	
④	NOC pressure fixed value	[NOC pres fix]	[NOC pressure fixed value]	[255]
④	NOC density hysteresis	[NOC dens hys]	[NOC density hysteresis]	[255]
④	GVF density hysteresis	[GVF dens hys]	[GVF density hysteresis]	[255]

Oil density

④ [Detailed setup] ► [Pro var] ► [NOC] ► [Oil dens]

④ [Device] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [NOC] ► [Oil density]

Shows the density of oil at alternate conditions.

	Value	Description
④	Numeric digits	Default value is 0.0 [kg/L].

Water density

① [Detailed setup] ► [Pro var] ► [NOC] ► [Water dens]

② [Device] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [NOC] ► [Water density]

Shows the density of water at alternate conditions.

	Value	Description
②	Numeric digits	Default value is 0.0 [kg/L].

Mass concentration value

① [Detailed setup] ► [Pro var] ► [NOC] ► [Mass conc]

② [Device] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [NOC] ► [Mass concentration value]

Shows the concentration value of the mass flow.

	Value	Description
②	Numeric digits	Default value is 0.0%

Volume concentration value

① [Detailed setup] ► [Pro var] ► [NOC] ► [Vol conc]

② [Device] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [NOC] ► [Volume concentration value]

Shows the concentration value of the volume flow.

	Value	Description
②	Numeric digits	Default value is 0.0%

Water cut value

① [Detailed setup] ► [Pro var] ► [NOC] ► [Water cut]

② [Device] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [NOC] ► [Water cut value]

Shows the water cut value.

	Value	Description
②	Numeric digits	Default value is 0.0%

Gas void fraction

① [Detailed setup] ► [Pro var] ► [NOC] ► [GVF]

② [Device] ► [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
②	Numeric digits	Default value is 0.0%

Current thermal expansion factor

Ⓜ [Device] ► [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] ► [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] ► [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] ► [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] ► [Detailed setup] ► [Process variables] ► [Concentration] ► [NOC] ► [Concentration select]

Selects the output value for Concentration value and relevant Analog output/Frequency if assigned.

	Value	Description
Ⓜ	Oil conc mass	Concentration configuration error alarm is set to On when Concentration unit except for degBrix, WT-% sol, WT-% or WT-% User unit is selected.
Ⓜ	Oil conc vol	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] ► [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] ► [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] ► [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	Web name	Page
Ⓢ	Reference oil density set 1 – 4	[Ref oil dens]	[Reference oil density set 1 – 4]	[256]
Ⓢ	Reference water density set 1 – 4	[Ref water dens]	[Reference water density set 1 – 4]	[256]
Ⓢ	Oil density calculator set 1 – 4	[Oil dens calc]	[Oil density calculator set 1 – 4]	[257]
Ⓢ	Thermal expansion factor set 1 – 4	[Thermal factor]	[Thermal expansion factor set 1 – 4]	[257]
Ⓢ	K0 coefficient set 1 – 4	[K0]	[K0 coefficient set 1 – 4]	[257]
Ⓢ	K1 coefficient set 1 – 4	[K1]	[K1 coefficient set 1 – 4]	[258]
Ⓢ	K2 coefficient set 1 – 4	[K2]	[K2 coefficient set 1 – 4]	[258]
Ⓢ	Water density calculator set 1 – 4	[Water dens calc]	[Water density calculator set 1 – 4]	[258]
Ⓢ	Water density UNESCO1980 set 1 – 4	[Water dens UNESCO]	[Water density UNESCO1980 set 1 – 4]	[259]
Ⓢ	Reference temperature set 1 – 4	[Ref temp]	[Reference temperature set 1 – 4]	[259]
Ⓢ	Salinity ppt set 1 – 4	[Salinity]	[Salinity ppt set 1 – 4]	[259]
Ⓢ	Salinity fixed value set 1 – 4	[Salinity fix]	[Salinity fixed value set 1 – 4]	[259]

Reference oil density set 1 – 4

Ⓛ [Detailed setup] ► [Pro var] ► [NOC] ► [Set1 – 4] ► [Ref oil dens]

Ⓜ [Device] ► [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) ρ60.

	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] ► [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]

④ [Device] ► [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
⑥	Off [off] [Off]	No correction. Oil density is calculated as Reference oil density.
⑥	Crude oil [Crude oil] [Crude oil]	The temperature coefficient α_{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.
⑥	Products [Products] [Products]	
⑥	Lubricating oil [Lubricating oil] [Lubricating oil]	
⑥	Fixed thermal exp factor [Fix therm fact] [Fixed thermal exp factor]	A temperature coefficient α_{60} has to be specified in Thermal expansion factor set 1 – 4. This value is used for NOC calculations.
⑥	Other [other] [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]

④ [Device] ► [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
⑥	Numeric digits	Default value is 0.00075.

K0 coefficient set 1 – 4

① [Detailed setup] ► [Pro var] ► [NOC] ► [Set1 – 4] ► [K0]

④ [Device] ► [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] ► [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] ► [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] ► [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] [SMOW]	Standard Mean Ocean Water (SMOW)
Ⓔ	UNESCO1980	
Ⓔ	[UNESCO1980] [UNESCO1980]	Density by UNESCO1980
Ⓔ	Fresh water	
Ⓔ	[Fresh water] [Fresh water]	Fresh Water Density by API MPMS 11.4
Ⓔ	Produced water	
Ⓔ	[Produced water] [Produced water]	Produced Water Density by API MPMS 20.1 Appendix A.2
Ⓔ	Brine water	
Ⓔ	[Brine water] [Brine water]	Brine water density by El-Dessouky, Ettouy (2002)
Ⓔ	STD formula	
Ⓔ	[Std formula] [STD formula]	Same as Standard concentration formula

**Water density
UNESCO1980
set 1 – 4**

① [Detailed setup] ► [Pro var] ► [NOC] ► [Set1 – 4] ► [Water dens UNESCO]

② [Device] ► [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
②	SMOW [SMOW] [SMOW]	Standard Mean Ocean Water (SMOW)
②	VSMOW [VSMOW] [VSMOW]	Density by UNESCO1980

**Reference
temperature
set 1 – 4**

① [Detailed setup] ► [Pro var] ► [NOC] ► [Set1 – 4] ► [Ref temp]

② [Device] ► [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
②	Numeric digits	Default value is 15.0 [degC].

**Salinity ppt
set 1 – 4**

① [Detailed setup] ► [Pro var] ► [NOC] ► [Set1 – 4] ► [Salinity]

② [Device] ► [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
②	Numeric digits	Default value is 100.0 [ppt (parts par thousands)].

**Salinity fixed value
set 1 – 4**

① [Detailed setup] ► [Pro var] ► [NOC] ► [Set1 – 4] ► [Salinity fix]

② [Device] ► [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
②	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	Web name	Page
Ⓔ	Net mass flow 1 – 2 unit	[Unit]	[Net mass flow 1 – 2 unit]	[▶ 260]
Ⓔ	Net mass flow 1 – 2 LRV	[LRV]	[Net mass flow 1 – 2 LRV]	[▶ 261]
Ⓔ	Net mass flow 1 – 2 URV	[URV]	[Net mass flow 1 – 2 URV]	[▶ 261]
Ⓔ	Net mass flow 1 – 2 damping	[Damp]	[Net mass flow 1 – 2 damping]	[▶ 261]
Ⓔ	Additional function	[Add func]	[Additional function]	[▶ 262]

**Net mass flow
1 – 2 unit**

Ⓔ [Detailed setup] ▶ [Pro var] ▶ [Net mass1 – 2] ▶ [Unit]

Ⓔ [Device] ▶ [Detailed setup] ▶ [Process variables] ▶ [Net mass flow 1 – 2] ▶ [Net mass flow 1 – 2 unit]

Sets the unit for net mass flow 1 – 2.

	Value	Description
Ⓔ	g/s	Sets the displayed Net mass flow 1 – 2 unit. Default value is t/h.
Ⓔ	g/min	
Ⓔ	g/h	
Ⓔ	kg/s	
Ⓔ	kg/min	
Ⓔ	kg/h	
Ⓔ	kg/d	
Ⓔ	t/min	
Ⓔ	t/h	
Ⓔ	t/d	
Ⓔ	STon/min	
Ⓔ	STon/h	
Ⓔ	STon/d	
Ⓔ	LTon/min	
Ⓔ	LTon/h	
Ⓔ	LTon/d	
Ⓔ	lb/s	
Ⓔ	lb/min	
Ⓔ	lb/h	
Ⓔ	lb/d	
Ⓔ	User unit	

**Net mass flow
1 – 2 LRV**

① [Detailed setup] ► [Pro var] ► [Net mass1 – 2] ► [LRV]

⑧ [Device] ► [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 frequency and pulse outputs for net mass flow 1 – 2 measurement.

	Value	Description
–	Numeric digits	Default value is 0.0. Settings must satisfy the following conditions: $URV \neq LRV$ $LRV \leq Q_{max}$ $LRV \geq -Q_{max}$ For the Q_{max} value refer to the General Specification (GS) of each product.

**Net mass flow
1 – 2 URV**

① [Detailed setup] ► [Pro var] ► [Net mass1 – 2] ► [URV]

⑧ [Device] ► [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 frequency and pulse outputs for net mass flow 1 – 2 measurement.

	Value	Description
–	Numeric digits	Default value is 10.0. Settings must satisfy the following conditions: $URV \leq Q_{max}$ $URV \geq -Q_{max}$ $URV \neq LRV$ For the Q_{max} value refer to the General Specification (GS) of each product.

**Net mass flow
1 – 2 damping**

① [Detailed setup] ► [Pro var] ► [Net mass1 – 2] ► [Damp]

⑧ [Device] ► [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	Setting range: 0.0 – 200.0 s. Default value is 3.0 s.

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* [▶ 196] has been set to Apply.

The following menus/settings are available:

	Full name	Display name	Web name	Page
Ⓔ	Net mass flow 1 – 2 low cut	[Lowcut]	[Net mass flow 1 – 2 lowcut]	[▶ 262]
Ⓔ	Net mass flow 1 – 2 user unit	[User unit]	[Net mass flow 1 – 2 user unit]	[▶ 262]
Ⓔ	Net mass flow 1 – 2 user unit conversion factor	[Conv factor]	[Net mass flow 1 – 2 user unit conversion factor]	[▶ 263]
Ⓔ	Net mass flow 1 – 2 damping pulse/total	[Damp pls/ttl]	[Net mass flow 1 – 2 damping pulse/total]	[▶ 263]
Ⓔ	Net mass flow 1 – 2 trim select	[Trim sel]	[Net mass flow 1 – 2 trim select]	[▶ 263]
Ⓔ	Net mass flow 1 – 2 trim offset	[Trim offset]	[Net mass flow 1 – 2 trim offset]	[▶ 264]
Ⓔ	Net mass flow 1 – 2 trim gain	[Trim gain]	[Net mass flow 1 – 2 trim gain]	[▶ 264]

**Net mass flow
1 – 2 lowcut**

Ⓔ [Detailed setup] ▶ [Pro var] ▶ [Net mass1 – 2] ▶ [Add func] ▶ [Lowcut]

Ⓕ [Device] ▶ [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: $ \text{Net mass flow 1 – 2 low cut} \leq Q_{\text{nom}} * 0.2$ For the value of Q_{max} , refer to the General Specifications (GS) of the particular product.

**Net mass flow
1 – 2 user unit**

Ⓔ [Detailed setup] ▶ [Pro var] ▶ [Net mass1 – 2] ▶ [Add func] ▶ [User unit]

Ⓕ [Device] ▶ [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. Default value is blank.

**Net mass flow
1 – 2 user unit
conversion factor**

① [Detailed setup] ► [Pro var] ► [Net mass1 – 2] ► [Add func] ► [Conv factor]

② [Device] ► [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
②	Numeric digits	Reference unit is kg/h. Default value is 1.0. Measured value at user-defined unit = measured net mass flow value at kg/h * conversion factor from kg/h.

**Net mass flow
1 – 2 damping
pulse/total**

① [Detailed setup] ► [Pro var] ► [Net mass1 – 2] ► [Add func] ► [Damp pls/ttl]

② [Device] ► [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
②	Numeric digits	Setting range: 0.0 – 200.0 s. Default value is 0.0 s.

**Net mass flow
1 – 2 trim select**

① [Detailed setup] ► [Pro var] ► [Net mass1 – 2] ► [Add func] ► [Trim sel]

② [Device] ► [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
②	Inhibit [Inhibit]	Trim function during net mass flow 1 – 2 measurement is disabled. Default value.
②	Enable [Enable]	Trim function during net mass flow 1 – 2 measurement is enabled. Net mass flow value is linearly trimmed using Net mass flow trim offset and Net mass flow trim gain. Trimmed net mass flow value = gain * net mass flow value + offset

**Net mass flow
1 – 2 trim offset**

Ⓐ [Detailed setup] ► [Pro var] ► [Net mass1 – 2] ► [Add func] ► [Trim offset]

Ⓜ [Device] ► [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 mass1 – 2] ► [Add func] ► [Trim gain]

Ⓜ [Device] ► [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	Web name	Page
Ⓜ	Net volume flow 1 – 2 unit	[Unit]	[Net volume flow 1 – 2 unit]	[▶ 265]
Ⓜ	Net volume flow 1 – 2 LRV	[LRV]	[Net volume flow 1 – 2 LRV]	[▶ 265]
Ⓜ	Net volume flow 1 – 2 URV	[URV]	[Net volume flow 1 – 2 URV]	[▶ 266]
Ⓜ	Net volume flow 1 – 2 damping	[Damp]	[Net volume flow 1 – 2 damping]	[▶ 266]
Ⓜ	Additional function	[Add func]	[Additional function]	[▶ 266]

**Net volume flow
1 – 2 unit**

① [Detailed setup] ► [Pro var] ► [Net vol1 – 2] ► [Unit]

② [Device] ► [Detailed setup] ► [Process variables] ► [Net volume flow
1 – 2] ► [Net volume flow 1 – 2 unit]

Sets the unit for net volume flow 1 – 2.

	Value	Description
Ⓕ	L/s	Sets the displayed Net volume flow 1 – 2 unit. Default value is m ³ /h.
Ⓕ	L/min	
Ⓕ	L/h	
Ⓕ	L/d	
Ⓕ	cm ³ /s	
Ⓕ	cm ³ /min	
Ⓕ	cm ³ /h	
Ⓕ	m ³ /s	
Ⓕ	m ³ /min	
Ⓕ	m ³ /h	
Ⓕ	m ³ /d	
Ⓕ	gal/s	
Ⓕ	gal/min	
Ⓕ	gal/h	
Ⓕ	gal/d	
Ⓕ	ft ³ /s	
Ⓕ	ft ³ /min	
Ⓕ	ft ³ /h	
Ⓕ	ft ³ /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 vol1 – 2] ► [LRV]

② [Device] ► [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 frequency and pulse outputs for the net volume flow 1 – 2 measurement.

	Value	Description
Ⓕ	Numeric digits	Default value is 0.0. Settings must satisfy the following condition: URV ≠ LRV

**Net volume flow
1 – 2 URV**

Ⓐ [Detailed setup] ► [Pro var] ► [Net vol1 – 2] ► [URV]

Ⓜ [Device] ► [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 frequency and pulse outputs for the net volume flow 1 – 2 measurement.

	Value	Description
Ⓜ	Numeric digits	Default value is 10.0.

**Net volume flow
1 – 2 damping**

Ⓐ [Detailed setup] ► [Pro var] ► [Net vol1 – 2] ► [Damp]

Ⓜ [Device] ► [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
Ⓜ	Numeric digits	Setting range: 0.0 – 200.0 s. 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* [▶ 196] has been set in Apply.

The following menus/settings are available:

	Full name	Display name	Web name	Page
Ⓜ	Net volume flow 1 – 2 low cut	[Lowcut]	[Net volume flow 1 – 2 lowcut]	[▶ 267]
Ⓜ	Net volume flow 1 – 2 user unit	[User unit]	[Net volume flow 1 – 2 user unit]	[▶ 267]
Ⓜ	Net volume flow 1 – 2 user unit conversion factor	[Conv factor]	[Net volume flow 1 – 2 user unit conversion factor]	[▶ 263]
Ⓜ	Net volume flow 1 – 2 damping pulse/total	[Damp pls/ttl]	[Net volume flow 1 – 2 damping pulse/total]	[▶ 267]
Ⓜ	Net volume flow 1 – 2 trim select	[Trim sel]	[Net volume flow 1 – 2 trim select]	[▶ 268]
Ⓜ	Net volume flow 1 – 2 trim offset	[Trim offset]	[Net volume flow 1 – 2 trim offset]	[▶ 268]
Ⓜ	Net volume flow 1 – 2 trim gain	[Trim gain]	[Net volume flow 1 – 2 trim gain]	[▶ 268]

**Net volume flow
1 – 2 low cut**

① [Detailed setup] ► [Pro var] ► [Net vol1 – 2] ► [Add func] ► [Lowcut]

④ [Device] ► [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
⑤	Numeric digits	

**Net volume flow
1 – 2 user unit**

① [Detailed setup] ► [Pro var] ► [Net vol1 – 2] ► [Add func] ► [User unit]

④ [Device] ► [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. Default value is blank.

**Net volume flow
1 – 2 user unit
conversion factor**

① [Detailed setup] ► [Pro var] ► [Net vol1 – 2] ► [Add func] ► [Conv factor]

④ [Device] ► [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
⑤	Numeric digits	Reference unit is m ³ /h. Default value is 1.0. Measured value at user-defined unit = measured net volume flow value at m ³ /h * conversion factor from m ³ /h.

**Net volume flow
1 – 2 damping
pulse/total**

① [Detailed setup] ► [Pro var] ► [Net vol1 – 2] ► [Add func] ► [Damp pls/
ttl]

④ [Device] ► [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
⑤	Numeric digits	Setting range: 0.0 – 200.0 s. Default value is 0.0 s.

**Net volume flow
1 – 2 trim select**

Ⓐ [Detailed setup] ► [Pro var] ► [Net vol1 – 2] ► [Add func] ► [Trim sel]

Ⓜ [Device] ► [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]	Inhibit [Inhibit]	Trim function during net volume flow 1 – 2 measurement is disabled. Default value.
Ⓜ [Enable]	Enable [Enable]	Trim function during net volume flow 1 – 2 measurement is enabled.

**Net volume flow
1 – 2 trim offset**

Ⓐ [Detailed setup] ► [Pro var] ► [Net vol1 – 2] ► [Add func] ► [Trim offset]

Ⓜ [Device] ► [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]	Numeric digits	Default value is 0.000e+000.

**Net volume flow
1 – 2 trim gain**

Ⓐ [Detailed setup] ► [Pro var] ► [Net vol1 – 2] ► [Add func] ► [Trim gain]

Ⓜ [Device] ► [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]	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	Web name	Page
Ⓜ [Unit]	Net corrected volume flow unit	[Unit]	[Net corrected volume flow unit]	[▶ 269]
Ⓜ [LRV]	Net corrected volume flow LRV	[LRV]	[Net corrected volume flow LRV]	[▶ 269]
Ⓜ [URV]	Net corrected volume flow URV	[URV]	[Net corrected volume flow URV]	[▶ 269]
Ⓜ [Damp]	Net corrected volume flow damping	[Damp]	[Net corrected volume flow damping]	[▶ 270]
Ⓜ [Add func]	Additional function	[Add func]	[Additional function]	[▶ 270]

Net corrected volume flow unit

① [Detailed setup] ► [Pro var] ► [Net corr vol] ► [Unit]

② [Device] ► [Detailed setup] ► [Process variables] ► [Net corrected volume flow] ► [Net corrected volume flow unit]

Sets the unit for the net corrected volume flow.

	Value	Description
Ⓔ	NL/s	Setting of indicated Net corrected volume flow unit. Default value is Sm ³ /h.
Ⓔ	NL/min	
Ⓔ	NL/h	
Ⓔ	NL/d	
Ⓔ	Nm ³ /s	
Ⓔ	Nm ³ /min	
Ⓔ	Nm ³ /h	
Ⓔ	Nm ³ /d	
Ⓔ	SL/s	
Ⓔ	SL/min	
Ⓔ	SL/h	
Ⓔ	SL/d	
Ⓔ	Sft ³ /s	
Ⓔ	Sft ³ /min	
Ⓔ	Sft ³ /h	
Ⓔ	Sft ³ /d	
Ⓔ	Sm ³ /s	
Ⓔ	Sm ³ /min	
Ⓔ	Sm ³ /h	
Ⓔ	Sm ³ /d	
Ⓔ	User unit	

Net corrected volume flow LRV

① [Detailed setup] ► [Pro var] ► [Net corr vol] ► [LRV]

② [Device] ► [Detailed setup] ► [Process variables] ► [Net corrected volume flow] ► [Net corrected volume flow LRV]

Sets the lower range value, 0 %, for the scaling of the frequency and pulse outputs for the net corrected volume flow measurement.

	Value	Description
Ⓔ	Numeric digits	Default value is 0. Settings must satisfy the following condition: URV ≠ LRV

Net corrected volume flow URV

① [Detailed setup] ► [Pro var] ► [Net corr vol] ► [URV]

② [Device] ► [Detailed setup] ► [Process variables] ► [Net corrected volume flow] ► [Net corrected volume flow URV]

Sets the upper range value, 100 %, for the scaling of the 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

Ⓖ [Detailed setup] ► [Pro var] ► [Net corr vol] ► [Damp]

Ⓗ [Device] ► [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
Ⓔ	Numeric digits	Setting range: 0.0 – 200.0 s. 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* [► 196] has been set to Apply.

The following menus/settings are available:

	Full name	Display name	Web name	Page
Ⓔ	Net corrected volume flow low cut	[Lowcut]	[Net corrected volume flow lowcut]	[► 270]
Ⓔ	Net corrected volume flow user unit	[User unit]	[Net corrected volume flow user unit]	[► 271]
Ⓔ	Net corrected volume flow user unit conversion factor	[Conv factor]	[Net corrected volume flow user unit conversion factor]	[► 271]
Ⓔ	Net corrected volume flow damping pulse/total	[Damp pls/ttl]	[Net corrected volume flow damping pulse/total]	[► 271]
Ⓔ	Net corrected volume flow trim select	[Trim sel]	[Net corrected volume flow trim select]	[► 272]
Ⓔ	Net corrected volume flow trim offset	[Trim offset]	[Net corrected volume flow trim offset]	[► 272]
Ⓔ	Net corrected volume flow trim gain	[Trim gain]	[Net corrected volume flow trim gain]	[► 272]

Net corrected volume flow low cut

Ⓖ [Detailed setup] ► [Pro var] ► [Net corr vol] ► [Add func] ► [Lowcut]

Ⓗ [Device] ► [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
Ⓔ	Numeric digits	Value below which the net corrected volume flow is set to zero.

Net corrected volume flow user unit

① [Detailed setup] ► [Pro var] ► [Net corr vol] ► [Add func] ► [User unit]

Ⓜ [Device] ► [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. Default value is blank.

Net corrected volume flow user unit conversion factor

① [Detailed setup] ► [Pro var] ► [Net corr vol] ► [Add func] ► [Conv factor]

Ⓜ [Device] ► [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 Sm ³ /h Default value is 1.0. Measured value at user-defined unit = measured net corrected volume flow value at Sm ³ /h * conversion factor from Sm ³ /h.

Net corrected volume flow damping pulse/total

① [Detailed setup] ► [Pro var] ► [Net corr vol] ► [Add func] ► [Damp pls/ttl]

Ⓜ [Device] ► [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
Ⓜ	Numeric digits	Setting range: 0.0 – 200.0 s. Default value is 0.0 s.

Net corrected volume flow trim select

Ⓐ [Detailed setup] ► [Pro var] ► [Net corr vol] ► [Add func] ► [Trim sel]

Ⓜ [Device] ► [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
Ⓜ	Inhibit [Inhibit] [Inhibit]	Trim function during net corrected volume flow measurement is disabled. Default value.
Ⓜ	Enable [Enable] [Enable]	Trim function during net corrected volume flow measurement is enabled.

Net corrected volume flow trim offset

Ⓐ [Detailed setup] ► [Pro var] ► [Net corr vol] ► [Add func] ► [Trim offset]

Ⓜ [Device] ► [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
Ⓜ	Numeric digits	Default value is 0.000e+000.

Net corrected volume flow trim gain

Ⓐ [Detailed setup] ► [Pro var] ► [Net corr vol] ► [Add func] ► [Trim gain]

Ⓜ [Device] ► [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
Ⓜ	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	Web name	Page
Ⓜ	Viscosity unit	[Unit]	[Viscosity unit]	[273]
Ⓜ	Viscosity LRV	[LRV]	[Viscosity LRV]	[273]
Ⓜ	Viscosity URV	[URV]	[Viscosity URV]	[273]
Ⓜ	Viscosity damping	[Damp]	[Viscosity damping]	[273]
Ⓜ	Additional function	[Add func]	[Additional function]	[274]

Viscosity unit

① [Detailed setup] ► [Pro var] ► [Visc] ► [Unit]

② [Device] ► [Detailed setup] ► [Process variables] ► [Viscosity] ► [Viscosity unit]

Sets the unit for Viscosity.

	Value	Description
ⓔ	mPas	Setting of indicated Viscosity unit. Default value is mPas.
ⓔ	Pas	
ⓔ	cP	
ⓔ	Ns/m ²	
ⓔ	kg/ms	
ⓔ	User unit (dynamic)	
ⓔ	cSt	
ⓔ	St	
ⓔ	mm ² /s	
ⓔ	cm ² /s	
ⓔ	dm ² /s	
ⓔ	m ² /s	
ⓔ	User unit (kinematic)	

Viscosity LRV

① [Detailed setup] ► [Pro var] ► [Visc] ► [LRV]

② [Device] ► [Detailed setup] ► [Process variables] ► [Viscosity] ► [Viscosity LRV]

Sets the lower range value, 0 %, for the scaling of the frequency for the Viscosity.

	Value	Description
ⓔ	Numeric digits	Default value is 0. Setting must satisfy the following condition: URV ≠ LRV

Viscosity URV

① [Detailed setup] ► [Pro var] ► [Visc] ► [URV]

② [Device] ► [Detailed setup] ► [Process variables] ► [Viscosity] ► [Viscosity URV]

Sets the upper range value, 100 %, for the scaling of the frequency for the Viscosity.

	Value	Description
ⓔ	Numeric digits	Default value is 100.0.

Viscosity damping

① [Detailed setup] ► [Pro var] ► [Visc] ► [Damp]

② [Device] ► [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
ⓔ	Numeric digits	Setting range: 0.0 – 200.0 s. 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* [▶ 196] has been set to Apply.

The following menus/settings are available:

	Full name	Display name	Web name	Page
ⓔ	Viscosity user unit dynamic	[User unit (d)]	[Viscosity user unit dynamic]	[▶ 274]
ⓔ	Viscosity user unit kinematic	[User unit (k)]	[Viscosity user unit kinematic]	[▶ 274]
ⓔ	Viscosity user unit dynamic conversion factor	[Conv factor(d)]	[Viscosity user unit dynamic conversion factor]	[▶ 275]
ⓔ	Viscosity user unit kinematic conversion factor	[Conv factor(k)]	[Viscosity user unit kinematic conversion factor]	[▶ 275]
ⓔ	Viscosity trim select	[Trim sel]	[Viscosity trim select]	[▶ 275]
ⓔ	Viscosity trim offset	[Trim offset]	[Viscosity trim offset]	[▶ 275]
ⓔ	Viscosity trim gain	[Trim gain]	[Viscosity trim gain]	[▶ 276]

Viscosity user unit dynamic

Ⓛ [Detailed setup] ▶ [Pro var] ▶ [Visc] ▶ [Add func] ▶ [User unit (d)]

ⓗ [Device] ▶ [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. Default value is blank.

Viscosity user unit kinematic

Ⓛ [Detailed setup] ▶ [Pro var] ▶ [Visc] ▶ [Add func] ▶ [User unit (k)]

ⓗ [Device] ▶ [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. Default value is blank.

Viscosity user unit dynamic conversion factor

① [Detailed setup] ► [Pro var] ► [Visc] ► [Add func] ► [Conv factor(d)]

② [Device] ► [Detailed setup] ► [Process variables] ► [Viscosity] ► [Additional function] ► [Viscosity user unit conversion factor (Dynamic)]

Sets the conversion factor for the user-defined unit.

	Value	Description
②	Numeic digits	Reference unit is mPas. Default value is 1.0. Measured value at user-defined unit = Viscosity value at mPas * conversion factor from mPas.

Viscosity user unit kinematic conversion factor

① [Detailed setup] ► [Pro var] ► [Visc] ► [Add func] ► [Conv factor(k)]

② [Device] ► [Detailed setup] ► [Process variables] ► [Viscosity] ► [Additional function] ► [Viscosity user unit conversion factor (Kinematic)]

Sets the conversion factor for the user-defined unit.

	Value	Description
②	Numeric digits	Reference unit is cSt. Default value is 1.0. Measured value at user-defined unit = Viscosity value at cSt * conversion factor from cSt.

Viscosity trim select

① [Detailed setup] ► [Pro var] ► [Visc] ► [Add func] ► [Trim sel]

② [Device] ► [Detailed setup] ► [Process variables] ► [Viscosity] ► [Additional function] ► [Viscosity trim select]

Enables or disables the trim function during Viscosity.

	Value	Description
②	Inhibit [Inhibit]	Trim function during Viscosity is disabled. Default value.
②	Enable [Enable]	Trim function during Viscosity is enabled.

Viscosity trim offset

① [Detailed setup] ► [Pro var] ► [Visc] ► [Add func] ► [Trim offset]

② [Device] ► [Detailed setup] ► [Process variables] ► [Viscosity] ► [Additional function] ► [Viscosity trim offset]

Sets the offset for trimming the Viscosity.

	Value	Description
②	Numeric digits	Default value is 0.000e+000.

Viscosity trim gain

Ⓐ [Detailed setup] ► [Pro var] ► [Visc] ► [Add func] ► [Trim gain]

Ⓜ [Device] ► [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	Web name	Page
–	Drive current LRV	[LRV]	[Drive current LRV]	[276]
–	Drive current URV	[URV]	[Drive current URV]	[276]
–	Drive current damping	[Damp]	[Drive current damping]	[277]

Drive current LRV

Ⓐ [Detailed setup] ► [Pro var] ► [Drv curr] ► [LRV]

Ⓜ [Device] ► [Detailed setup] ► [Process variables] ► [Drive current] ► [Drive current LRV]

Sets the lower range value, 0 %, for the scaling of the frequency for the Viscosity.

	Value	Description
Ⓜ	Numeric digits	Default value is 0. Setting must satisfy the following condition: URV ≠ LRV

Drive current URV

Ⓐ [Detailed setup] ► [Pro var] ► [Drv curr] ► [URV]

Ⓜ [Device] ► [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 300.0.

Drive current damping

① [Detailed setup] ► [Pro var] ► [Drv curr] ► [Drv curr damp]

⑧ [Device] ► [Detailed setup] ► [Process variables] ► [Drive current] ► [Drive current damping]

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

- *Diag/Service* [► 395]

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
⑥	Numeric digits	Setting range: 0.0 – 200.0 s. Default value is 3.0 s.

External function

Menu for the Block mode, Channel, unit and range parameters.

The following menus/settings are available:

	Full name	Display name	Web name	Page
–	External function	–	[External function]	[► 277]

External Function

⑧ [Device] ► [Detailed setup] ► [Process variables] ► [External Function] ► [External Function]

Sets the purpose of the External function.

	Value	Description
–	None [None] [None]	Does nothing. Default value.
–	Pressure compensation [Pres comp] [Pressure compensation]	Set this value if a pressure sensor is attached to the Analog Output Function Block; used for dynamic pressure compensation.
–	Temperature compensation [Temp comp] [Temperature compensation]	Set this value if an external thermometer is to be used for temperature compensation.
⑥	Sensor pressure alarm [Snsr pres alm] [Sensor pressure alarm]	Set this value if an external pressure sensor is attached to the Rotamass and is to be used for the tube leakage alarm.
⑥	Calorific value [Ca1] [Calorific value]	Set this value if an external thermometer is used for the measurement of the calorific value. Used for cooling applications.

	Value	Description
Ⓢ	Viscosity delta pressure [Visc] [Viscosity delta pressure]	Set this value if an external differential pressure is used for the Viscosity calculation. It is only available when Viscosity option (/VM) is valid.
Ⓢ	Pressure compensation and NOC [Pres comp/NOC] [Pressure compensation and NOC]	An Analog Output Function Block is used as pressure compensation and NOC. It is only available when NOC option (/C52) is valid.
Ⓢ	Pressure NOC [NOC pres] [Pressure NOC]	An Analog Output Function Block is used as pressure compensation and NOC. It is only available when NOC option (/C52) is valid.

Analog Input

Menu for configuring the Analog Input.

The following menus/settings are available:

	Full name	Display name	Web name	Page
Ⓢ	Analog input 1 – 6 input selector	–	[Analog input 1 – 6 input selector]	[▶ 278]
Ⓢ	Analog input 1 – 6 damping	–	[Analog input 1 – 6 damping]	[▶ 279]

Analog input 1 – 6 input selector

Ⓢ [Device] ▶ [Detailed setup] ▶ [Analog Input] ▶ [Analog Input 1 – 6] ▶ [Analog input 1 – 6 input selector]

This parameter is configured to assign the Analog Input 1 – 6 to send process value to host system such as DCS/PLC.

	Value	Description
Ⓜ	Mass flow [Mass flow]	Sets the process value to assign Analog Input 1 – 6. Default value of Analog Input 1: Mass flow Default value of Analog Input 2: Density Default value of Analog Input 3: Temperature Default value of Analog Input 4: Volume flow Default value of Analog Input 5: Reference density Default value of Analog Input 6: Corrected volume flow
Ⓜ	Density [Density]	
Ⓜ	Temperature [Temperature]	
Ⓜ	Pressure [Pressure]	
Ⓜ	Volume flow [Volume flow]	
Ⓜ	Reference density [Reference density]	
Ⓜ	Relative density [Relative density]	
Ⓜ	Corrected volume flow [Corrected volume flow]	
Ⓜ	Concentration [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 [Viscosity]	
Ⓜ	Drive current [Drive current]	

Analog input 1 - 6 damping

Ⓜ [Device] ► [Detailed setup] ► [Analog Input] ► [Analog Input 1 - 6] ► [Analog input 1 - 6 damping]

This parameter is configured the damping of the Analog Input 1 – 6 .

	Value	Description
Ⓜ	Numeric digits	Setting range: 0 - no check. Default value is 1.0 [sec].

Simulation

This parameter is configured to set the simulation of the Analog Input 1 – 6.

The following menus/settings are available:

	Full name	Display name	Web name	Page
Ⓜ	Analog input 1 – 6 simulation enable	–	[Analog input 1 – 6 simulation enable]	[▶ 280]
Ⓜ	Analog input 1 – 6 simulation value	–	[Analog input 1 – 6 simulation value]	[▶ 280]
Ⓜ	Analog input 1 – 6 simulation status	–	[Analog input 1 – 6 simulation status]	[▶ 280]

Analog input 1 – 6 simulation enable

Ⓜ [Device] ▶ [Detailed setup] ▶ [Analog Input] ▶ [Analog Input 1 – 6] ▶ [Simulation] ▶ [Analog input 1 – 6 simulation enable]

This parameter is configured to simulate the Analog Input 1 – 6 to send value and status.

	Value	Description
Ⓜ	Disabled [Disabled]	Simulation is disabled. Default value.
Ⓜ	Enabled [Enabled]	Simulation is enabled.

Analog input 1 – 6 simulation value

Ⓜ [Device] ▶ [Detailed setup] ▶ [Analog Input] ▶ [Analog Input 1 – 6] ▶ [Simulation] ▶ [Analog input 1 – 6 simulation value]

This parameter is configured the simulation value of the Analog Input 1 – 6.

This value is available when Analog Input 1 – 6 simulation enable is enabled.

	Value	Description
Ⓜ	Numeric digits	Float value.

Analog input 1 – 6 simulation status

Ⓜ [Device] ▶ [Detailed setup] ▶ [Analog Input] ▶ [Analog Input 1 – 6] ▶ [Simulation] ▶ [Analog input 1 – 6 simulation status]

This parameter is configured the simulation status of the Analog Input 1 – 6.

This value is available when Analog Input 1 – 6 simulation enable is enabled.

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*.

The following menus/settings are available:

	Full name	Display name	Web name	Page
Ⓜ	Total 1 – 3 input selector	–	[Total 1 – 3 input selector]	[▶ 281]
Ⓜ	Total 1 – 3 unit	–	[Total 1 – 3 unit]	[▶ 282]
Ⓜ	Total 1 – 3 failure option	–	[Total 1 – 3 failure option]	[▶ 283]
Ⓜ	Total 1 – 3 option	–	[Total 1 – 3 option]	[▶ 283]
Ⓜ	Total 1 – 3 setting	–	[Total 1 – 3 option setting]	[▶ 283]

**Total 1 – 3
input selector**

Ⓜ [Device] ▶ [Detailed setup] ▶ [Totalizer] ▶ [Totalizer 1 – 3] ▶ [Total 1 – 3 input selector]

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

- *Easy setup wizard* [▶ 166]

Sets the process value for Totalizer 1 – 3.

	Value	Description
Ⓜ	Mass flow [Mass flow]	Sets the displayed process variables for Total 1 – 3. Default value for Total 1 is Mass flow. Default value for Total 2 is Volume flow. Default value for Total 3 is Corrected volume flow.
Ⓜ	Volume flow [Volume flow]	
Ⓜ	Corrected volume flow [Corrected volume flow]	
Ⓜ	Energy [Energy]	

	Value	Description
Ⓜ	Net mass flow 1	Sets the displayed process variables for Total 1 – 3. Default value for Total 1 is Mass flow. Default value for Total 2 is Volume flow. Default value for Total 3 is Corrected volume flow.
Ⓜ	[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]	

Total 1 – 3 unit

Ⓜ [Device] ► [Detailed setup] ► [Totalizer] ► [Totalizer 1 – 3] ► [Total 1 – 3 unit]

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

- *Easy setup wizard* [▶ 167]

Sets the unit for Total 1 – 3.

	Value	Description
Ⓜ	g	Sets the unit for Total 1 – 3 . Default value for Total 1 is kg. Default value for Total 2 is m ³ Default value for Total 3 is m ³ (standard)
Ⓜ	kg	
Ⓜ	t	
Ⓜ	ton(US)	
Ⓜ	ton(UK)	
Ⓜ	lb	
Ⓜ	cm ³	
Ⓜ	L	
Ⓜ	m ³	
Ⓜ	gal	
Ⓜ	kgal	
Ⓜ	ft ³	
Ⓜ	bbl	
Ⓜ	Impgal	
Ⓜ	kImpgal	
Ⓜ	L(Normal)	
Ⓜ	m ³ (Normal)	
Ⓜ	L(standard)	
Ⓜ	ft ³ (standard)	
Ⓜ	MMscuft	
Ⓜ	m ³ (standard)	
Ⓜ	MJ	
Ⓜ	Btu	
Ⓜ	User unit	

Total 1 – 3 failure option

Ⓜ [Device] ► [Basic setup] ► [Totalizer] ► [Totalizer 1 – 3] ► [Total 1 – 3 failure option]

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

- *Easy setup wizard* [► 167]
- *Detailed setup* [► 283]

Defines the behavior of the totalizers when an alarm occurs.

	Value	Description
Ⓜ	Run [Run]	Totalizer accumulates assigned process value anyway. Default value.
Ⓜ	Hold [Hold]	Totalizer stops accumulating the process value.
Ⓜ	Memory [Memory]	Totalizer accumulates the value that was measured before the alarm occurred.

Total 1 – 3 option

Ⓜ [Device] ► [Detailed setup] ► [Totalizer] ► [Totalizer 1 – 3] ► [Total 1 – 3 option]

This parameter is configured the totalizer way:

	Value	Description
Ⓜ	BALANCED [BALANCED]	Totalize both positive and negative value.
Ⓜ	POS ONLY [POS ONLY]	Totalize only positive value. Default value.
Ⓜ	NEG ONLY [NEG ONLY]	Totalize only negative value.

Total 1 – 3 setting

Ⓜ [Device] ► [Detailed setup] ► [Totalizer] ► [Totalizer 1 – 3] ► [Total 1 – 3 setting]

This parameter is configured the totalizer value:

	Value	Description
Ⓜ	RESET [RESET]	Reset Total value.
Ⓜ	PRESET [PRESET]	Preset Total value.
Ⓜ	HOLD [HOLD]	Hold Total value.
Ⓜ	TOTALIZE [TOTALIZE]	Resume Total value. Default value.

Additional function

Menu for configuring the Totalizer in detail. The menu is only available when *Process variables additional parameters*, see *Process variables* [▶ 196] has been set to Apply.

The following menus/settings are available:

	Full name	Web name	Page
Ⓜ	Total 1 – 3 user unit	[Total 1 – 3 user unit]	[▶ 284]
Ⓜ	Total 1 – 3 conversion factor	[Total 1 – 3 conversion factor]	[▶ 284]
Ⓜ	Total 1 – 3 mode total density	[Total 1 – 3 mode total density]	[▶ 284]
Ⓜ	Total 1 – 3 density lower value	[Total 1 – 3 density lower value]	[▶ 285]
Ⓜ	Total 1 – 3 density upper value	[Total 1 – 3 density upper value]	[▶ 286]
Ⓜ	Total 1 – 3 temperature upper value	[Total 1 – 3 temperature upper value]	[▶ 286]
Ⓜ	Total 1 – 3 temperature lower value	[Total 1 – 3 temperature lower value]	[▶ 286]
Ⓜ	Total density hysteresis	[Total density hysteresis]	[▶ 286]
Ⓜ	Total temperature hysteresis	[Total temperature hysteresis]	[▶ 287]
Ⓜ	Total 1 – 3 24 hours	[Total 1 – 3 24 hours]	[▶ 310]

Total 1 – 3 user unit

Ⓜ [Device] ▶ [Detailed setup] ▶ [Totalizer] ▶ [Totalizer 1 – 3] ▶ [Additional function] ▶ [Total 1 – 3 user unit]

Sets the user-defined unit for Totalizer 1 – 3.

	Value	Description
–	ASCII characters	Maximum length is 8 characters. Default value is blank.

Total 1 – 3 conversion factor

Ⓜ [Device] ▶ [Detailed setup] ▶ [Totalizer] ▶ [Totalizer 1 – 3] ▶ [Additional function] ▶ [Total 1 – 3 conversion factor]

Sets the conversion factor for the Total 1 – 3 user-defined unit.

	Value	Description
–	Numeric digits	Default value is 1. Totalizer value at user-defined unit = Totalizer n value * Total n conversion factor 1 – 3.

Total 1 – 3 mode total density

Ⓜ [Device] ▶ [Detailed setup] ▶ [Totalizer] ▶ [Totalizer 1 – 3] ▶ [Additional function] ▶ [Total 1 – 3 mode total density]

Sets the Total mode for density.

	Value	Description
–	Density (Balanced) [Dens (Balanced)] [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 (Positive only) [Dens (Positive)] [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) [Dens (Negative)] [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) [Dens+Temp (Balanced)] [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 (Positive only) [Dens+Temp (Positive)] [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.
–	Density + Temperature (Negative only) [Dens+Temp (Negative)] [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.
–	Off [Off]	Density or Temperature control for totalizer is not available. Total is working based on Total 1 – 3 option. Default value.

Total 1 – 3 density lower value

Ⓜ [Device] ► [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 – Default value is 0.8 [kg/L].

**Total 1 – 3
density upper
value**

Ⓜ [Device] ► [Detailed setup] ► [Totalizer] ► [Totalizer 1 – 3] ►
[Additional function] ► [Total 1 – 3 density upper value]

Setting to perform totalization. This parameter is available when the 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	Setting range: 0.0 – Default value is 1.2 [kg/L].

**Total 1 – 3
temperature lower
value**

Ⓜ [Device] ► [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**

Ⓜ [Device] ► [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**

Ⓜ [Device] ► [Detailed setup] ► [Totalizer] ► [Totalizer 1 – 3] ►
[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.

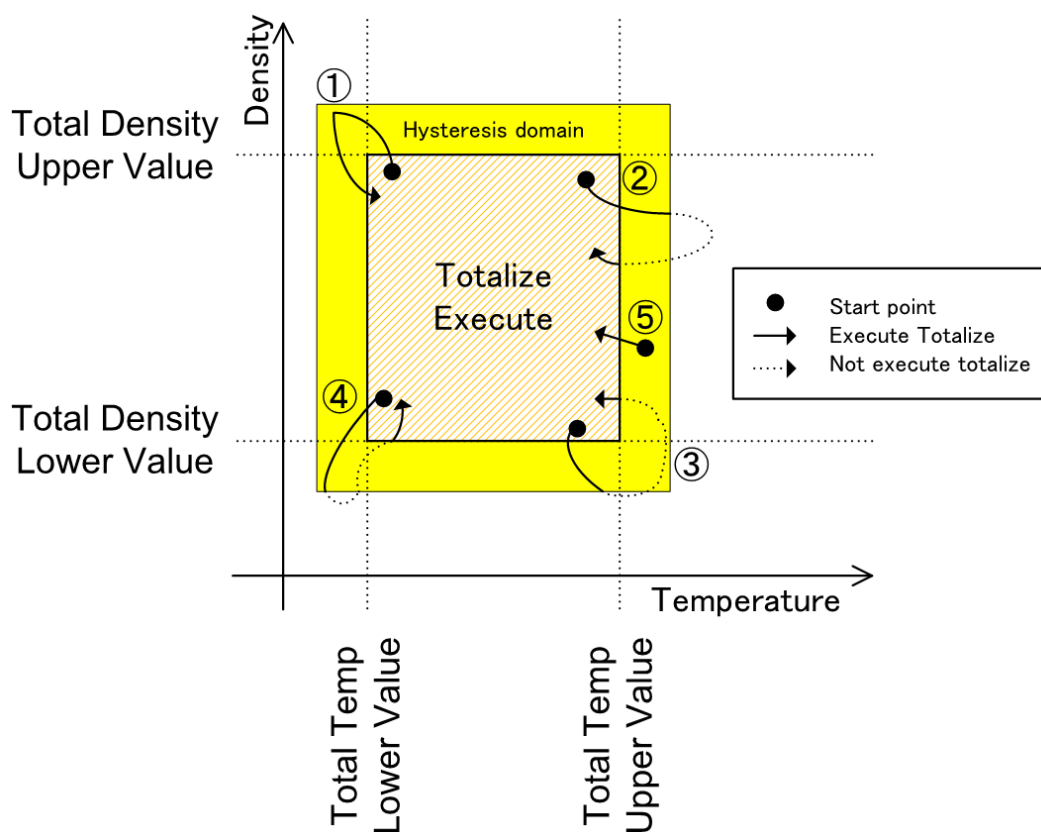
	Value	Description
–	Numeric digits	Setting range: 0.0 – 10.0 Default value is 0.1 %.

Total temperature hysteresis

Ⓜ [Device] ► [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 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	Web name	Page
Ⓜ	Total 1 – 3 24hours value	[24h val]	[Total 1 – 3 24hours value]	[▶ 310]
Ⓜ	Total 1 – 3 24hours start date	[Start date]	[Total 1 – 3 24hours start date]	[▶ 310]
Ⓜ	Total 1 – 3 24hours start operation time	[Start op time]	[Total 1 – 3 24hours start operation time]	[▶ 311]
Ⓜ	Total 1 – 3 24hours last update date	[Last date]	[Total 1 – 3 24hours last update date]	[▶ 311]
Ⓜ	Total 1 – 3 24hours last update operation time	[Last op time]	[Total 1 – 3 24hours last update operation time]	[▶ 311]

Total 1 – 3 24hours value

Ⓜ [Device] ▶ [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

Ⓜ [Device] ▶ [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 operation time

Ⓜ [Device] ▶ [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**

Ⓜ [Device] ► [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 operation
time**

Ⓜ [Device] ► [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.

Simulation

This parameter is configured to set the simulation of the Totalizer 1 - 3.

The following menus/settings are available:

	Full name	Display name	Web name	Page
Ⓜ	Totalizer 1 - 3 simulation enable	–	[Totalizer 1 – 3 simulation enable]	[▶ 289]
Ⓜ	Totalizer 1 - 3 simulation value	–	[Totalizer 1 – 3 simulation value]	[▶ 289]
Ⓜ	Totalizer 1 - 3 simulation status	–	[Totalizer 1 – 3 simulation status]	[▶ 290]

**Totalizer 1 - 3
simulation enable**

Ⓜ [Device] ► [Detailed setup] ► [Totalizer] ► [Totalizer 1 – 3] ► [Additional function] ► [Simulation] ► [Totalizer 1 – 3 simulation enable]

This parameter is configured to simulate the Totalizer 1 - 3 value and status.

	Value	Description
Ⓜ	Disabled [Disabled]	Simulation is disabled. Default value.
Ⓜ	Enabled [Enabled]	Simulation is enabled.

**Totalizer 1 - 3
simulation value**

Ⓜ [Device] ► [Detailed setup] ► [Totalizer] ► [Totalizer 1 – 3] ► [Additional function] ► [Simulation] ► [Totalizer 1 – 3 simulation value]

This parameter is configured the simulation value of the Totalizer 1 - 3.

This value is available when Totalizer 1 - 3 simulation enable is enabled.

	Value	Description
Ⓜ	Numeric digits	Float value.

**Totalizer 1 - 3
simulation status**

Ⓜ [Device] ► [Detailed setup] ► [Totalizer] ► [Totalizer 1 - 3] ►
[Additional function] ► [Simulation] ► [Totalizer 1 - 3 simulation
status]

This parameter is configured the simulation status of the Totalizer 1 - 3.

This status is available when Totalizer 1 - 3 simulation enable is enabled.

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	Web name	Page
Ⓜ	Analog flow units	—	[Analog output flow units]	[▶ 291]
Ⓜ	Analog output low limit	—	[Analog output low limit]	[▶ 291]
Ⓜ	Analog output high limit	—	[Analog output high limit]	[▶ 292]

Analog output flow units

④ [Device] ► [Detailed setup] ► [Analog Output] ► [Analog output flow units]

Unit of this parameter is configured to receive the value from external device via Analog Output Block.

Value	Description
– inH20(68°F)	Sets the unit for external device. Default value is bar. Pressure, temperature and calorific value unit can be set. If the external function is set to NONE, Analog output flow units set to bar.
– inHg	
– ftH20(68°F)	
– mmH20(68°F)	
– mmHg	
– psi	
– bar	
– mbar	
– g/cm ²	
– kg/cm ²	
– Pa	
– kPa	
– torr	
– atm	
– MPa	
– inH20	
– mmH20	
– ftH20	
– hPa	
– degC	
– degF	
– degR	
– K	
– MJ/kg	
– Btu/lb	
– MJ/m ³	
– Btu/gal	
– MJ/Nml m ³	
– Btu/Std ft ³	

Analog output low limit

④ [Device] ► [Detailed setup] ► [Analog Output] ► [Analog output low limit]

This parameter is configured the low limit value to receive the value from external device via Analog Output Block.

Value	Description
– Numeric digits	The unit for this value is defined in the parameter Analog output flow units. Default value is 0.0.

Analog output high limit

Ⓜ [Device] ► [Detailed setup] ► [Analog Output] ► [Analog output high limit]

This parameter is configured the high limit value to receive the value from external device via Analog Output Block.

	Value	Description
–	Numeric digits	The unit for this value is defined in the parameter Analog output flow units. Default value is 200.0.

Pulse/Frequency Output

Menu for configuring pulse/frequency output.

The following menus/settings are available:

	Full name	Display name	Web name	Page
–	Pulse/Frequency output mode	[Pls/Sts1 mode]	[Pulse/Frequency output mode]	[292]
–	Pulse output	[Pls out1]	[Pulse output]	[293]
–	Frequency output	[Freq out]	[Frequency output]	[299]

Pulse/Frequency output mode

Ⓜ [Detailed setup] ► [Pls/Sts out] ► [Pls/Sts1 mode]

Ⓜ [Device] ► [Detailed setup] ► [Pulse/Frequency output] ► [Pulse/Status output mode]

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

- *Easy setup wizard* [159]

Sets the pulse signal mode of Pulse/Frequency output.

If Pulse/Frequency output mode has just been changed, the output signal of pulse/frequency is not exact.

	Value	Description
–	No function [No func] [No function]	Pulse signal or frequency signal is not available. Default value.
–	Fixed pulse output [Fix pls out] [Fixed pulse output]	Pulse signal with fixed pulse width, duty ratio changes.
–	Frequency output [Freq out] [Frequency output]	Pulse signal with fixed duty ratio, pulse width changes.

Pulse output

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	Web name	Page
–	Pulse output select	[Sel]	[Pulse output select]	[▶ 293]
–	Pulse output unit select	[Unit]	[Pulse output unit select]	[▶ 294]
–	Pulse output width	[Width]	[Pulse output width]	[▶ 297]
–	Pulse output rate	[Rate]	[Pulse output rate]	[▶ 299]
–	Pulse output active mode	[Act mode]	[Pulse output active mode]	[▶ 299]

Pulse output select

⌚ [Detailed setup] ▶ [Pls/Sts out] ▶ [Pls out1] ▶ [Sel]

⊕ [Device] ▶ [Detailed setup] ▶ [Pulse/Frequency output] ▶ [Pulse output] ▶ [Pulse output select]

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

- *Easy setup wizard* [▶ 160]

Assigns a process variable to pulse output.

	Value	Description
–	Mass flow [Mass] [Mass flow]	Sets the Pulse output value. The default value of Pulse output is Mass flow.
–	Volume flow [vol] [Volume flow]	
–	Corrected volume flow [Corr vol] [Corrected volume flow]	
–	Energy [Energy] [Energy]	
Ⓕ	Net mass flow 1 [Net mass1] [Net mass flow 1]	
Ⓕ	Net mass flow 2 [Net mass2] [Net mass flow 2]	
Ⓕ	Net volume flow 1 [Net vol1] [Net volume flow 1]	
Ⓕ	Net volume flow 2 [Net vol2] [Net volume flow 2]	
Ⓕ	Net corrected volume flow [Net corr vol] [Net corrected volume flow]	

Pulse output unit select

Ⓐ [Detailed setup] ► [Pls/Sts out] ► [Pls out1] ► [Unit]

Ⓕ [Device] ► [Detailed setup] ► [Pulse/Frequency output] ► [Pulse output] ► [Pulse output unit select]

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

- *Easy setup wizard* [▶ 160]

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 is kg/P.

	Process variables	Available units
–	For Mass flow: [Mass]: [Mass flow]:	▪ g/P ▪ kg/P ▪ t/P ▪ ton(US)/P ▪ ton(UK)/P ▪ lb/P ▪ P/g ▪ P/kg ▪ P/t ▪ P/ton(US) ▪ P/ton(UK) ▪ P/lb
–	For Net mass flow 1 – 2: [Net mass1] [Net mass flow 1 – 2]:	▪ g/P ▪ kg/P ▪ t/P ▪ ton(US)/P ▪ ton(UK)/P ▪ lb/P ▪ P/g ▪ P/kg ▪ P/t ▪ P/ton(US) ▪ P/ton(UK) ▪ P/lb
–	For Volume flow: [v_{o1}] [Volume flow]:	▪ cm³/P ▪ L/P ▪ m³/P ▪ gal/P ▪ kgal/P ▪ Cuft/P ▪ bbl/P ▪ Impgal/P ▪ kImpgal/P ▪ P/cm³ ▪ P/L ▪ P/m³ ▪ P/gal ▪ P/kgal ▪ P/Cuft ▪ P/bbl ▪ p/Impgal ▪ P/kImpgal

	Process variables	Available units
–	For Net volume flow 1 – 2: [Net vol1] [Net volume flow 1 – 2]:	▪ cm³/P ▪ L/P ▪ m³/P ▪ gal/P ▪ kgal/P ▪ Cuft/P ▪ bbl/P ▪ Impgal/P ▪ kImpgal/P ▪ P/cm³ ▪ P/L ▪ P/m³ ▪ P/gal ▪ P/kgal ▪ P/Cuft ▪ P/bbl ▪ p/Impgal ▪ P/kImpgal
–	For Corrected volume flow: [Corr vol]: [Corrected volume flow]:	▪ NmL/P ▪ NmIm³/P ▪ StdL/P ▪ Scuft/P ▪ Stdm³/P ▪ P/NmL ▪ P/NmIm³ ▪ P/StdL ▪ P/Scuft ▪ P/Stdm³
–	For Net corrected volume flow: [Net corr vol]: [Net corrected volume flow]:	▪ NmL/P ▪ NmIm³/P ▪ StdL/P ▪ Scuft/P ▪ Stdm³/P ▪ P/NmL ▪ P/NmIm³ ▪ P/StdL ▪ P/Scuft ▪ P/Stdm³
–	For Energy: [Energy]: [Energy]:	▪ MJ/P ▪ Btu/P ▪ P/MJ ▪ P/Btu

Pulse output width

⌚ [Detailed setup] ► [Pls/Sts out] ► [Pls out1] ► [width]

Ⓜ [Device] ► [Detailed setup] ► [Pulse/Frequency output] ► [Pulse output] ► [Pulse output width]

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

- *Easy setup wizard* [► 163]

Sets the pulse width, this means the duration of the active state.

	Value	Description
	0.05 ms	Sets the pulse width. Default value of Pulse output 1 – 2 is 1 ms.
–	[0.05ms]	
	[0.05 ms]	
	0.1 ms	
–	[0.1ms]	
	[0.1 ms]	
	0.5 ms	
–	[0.5ms]	
	[0.5 ms]	
	1 ms	
–	[1ms]	
	[1 ms]	
	5 ms	
–	[5ms]	
	[5 ms]	
	10 ms	
–	[10ms]	
	[10 ms]	
	20 ms	
–	[20ms]	
	[20 ms]	
	33 ms	
–	[33ms]	
	[33 ms]	
	50 ms	
–	[50ms]	
	[50 ms]	
	100 ms	
–	[100ms]	
	[100 ms]	
	200 ms	
–	[200ms]	
	[200 ms]	
	330 ms	
–	[330ms]	
	[330 ms]	
	500 ms	
–	[500ms]	
	[500 ms]	
	1000 ms	
–	[1000ms]	
	[1000 ms]	
	2000 ms	
–	[2000ms]	
	[2000 ms]	

Pulse output rate

① [Detailed setup] ► [Pls/Sts out] ► [Pls out1] ► [Rate]

② [Device] ► [Detailed setup] ► [Pulse/Frequency output] ► [Pulse output] ► [Pulse output rate]

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

- *Easy setup wizard* [► 164]

Parameter for defining the number of units of the assigned process variable for 1 pulse of Pulse output.

	Value	Description
–	Numeric digits	Setting range: 0 – no check. Default value is 1.0. The unit for this value is defined in the parameter Pulse output unit. This value depends on the parameter of Pulse output width and on maximum flow.

Pulse output active mode

① [Detailed setup] ► [Pls/Sts out] ► [Pls out1] ► [Act mode]

② [Device] ► [Detailed setup] ► [Pulse/Frequency output] ► [Pulse output] ► [Pulse output active mode]

Sets the active mode of pulse output.

When *Pulse output active mode* has just been changed, the output signal of pulse/frequency is not exact.

	Value	Description
–	Off active [off act] [Off active]	Off state of pulse signal is defined as the active state.
–	On active [on act] [On active]	On state of pulse signal is defined as the active state. Default value.

Frequency output

Set of menus for configuring the frequency signals. These are available when Frequency output has been selected in the parameter Pulse/Frequency output mode.

The following menus/settings are available:

	Full name	Display name	Web name	Page
–	Frequency output select	[Sel]	[Frequency output select]	[► 300]
–	Maximum frequency	[Max freq]	[Max frequency]	[► 301]
–	Minimum frequency	[Min freq]	[Min frequency]	[► 302]

Frequency output select

Ⓐ [Detailed setup] ► [Pls/Sts out] ► [Freq out1] ► [Sel]

Ⓜ [Device] ► [Detailed setup] ► [Pulse/Frequency output] ► [Frequency output] ► [Frequency output select]

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

- *Easy setup wizard* [▶ 164]

Assigns a process variable to Frequency output.

Value	Description
Mass flow – [Mass] [Mass flow]	Sets the process variables for Frequency output. The default value of Frequency output is Mass flow.
Density – [Dens] [Density]	
Temperature – [Temp] [Temperature]	
Pressure – [Pres] [Pressure]	
Volume flow – [Vol] [Volume flow]	
Reference density – [Ref dens] [Reference density]	
Relative density – [Rel dens] [Relative density]	
Corrected volume flow – [Corr vol] [Corrected volume flow]	
Concentration Ⓜ [Conc] [Concentration]	

	Value	Description
Ⓢ	Net mass flow 1 [Net mass1] [Net mass flow 1]	Sets the process variables for Frequency output. Default value of Frequency output is Mass flow.
Ⓢ	Net mass flow 2 [Net mass2] [Net mass flow 2]	
Ⓢ	Net volume flow 1 [Net vol1] [Net volume flow 1]	
Ⓢ	Net volume flow 2 [Net vol2] [Net volume flow 2]	
Ⓢ	Net corrected volume flow [Net corr vol] [Net corrected volume flow]	
Ⓢ	Viscosity [Visc] [Viscosity]	
Ⓢ	Drive current [Drv curr] [Drive current]	

Max frequency

① [Detailed setup] ► [Pls/Sts out] ► [Freq out1] ► [Max freq]

Ⓜ [Device] ► [Detailed setup] ► [Pulse/Frequency output] ► [Frequency output] ► [Max frequency]

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

- *Easy setup wizard* [▶ 165]

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. Default value is 10000.0 Hz.

Min frequency

⌚ [Detailed setup] ► [Pls/Sts out] ► [Freq out1] ► [Min freq]

Ⓜ [Device] ► [Detailed setup] ► [Pulse/Frequency output] ► [Frequency output] ► [Min frequency]

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

- *Easy setup wizard* [▶ 165]

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. Default value is 0.0 Hz.

Totalizer

Menu for configuring totalizer functions.

The following menus/settings are available:

	Full name	Display name	Page
⌚	Totalizer additional parameters	[Tt1 add]	[▶ 302]
⌚	Totalizer 1 – 3	[Tt11 – 3]	[▶ 302]

Totalizer additional parameters

⌚ [Detailed setup] ► [Tt1] ► [Tt1 add]

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 [Not apply] [Not apply]	Menu for additional parameters of the Totalizer is disabled. Default value.
–	Apply [Apply] [Apply]	The menu is enabled.

Totalizer 1 – 3

Set of menus for configuring the totalizers 1 – 3.

The following menus/settings are available:

	Full name	Display name	Page
–	Total 1 – 3 channel	[Channel]	[▶ 303]
–	Total 1 – 3 unit	[Unit]	[▶ 304]
–	Total 1 – 3 failure option	[Fail opt]	[▶ 304]
–	Additional function	[Add func]	[▶ 305]

**Total 1 – 3
channel**

① [Detailed setup] ► [Tt1] ► [Tt11 – 3] ► [Channel]

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

- *Easy setup wizard* [► 166]

Sets the process value for Total 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 – [Mass] [Mass flow]	Sets the displayed process variables for Total 1 – 3. Default value for Total 1 is Mass flow. Default value for Total 2 is Volume flow. Default value for Total 3 is Corrected volume flow.
Volume flow – [Vol] [Volume flow]	
Corrected volume flow – [Corr vol] [Corrected volume flow]	
Energy – [Energy] [Energy]	
Net mass flow 1 Ⓢ [Net mass1] [Net mass flow 1]	
Net mass flow 2 Ⓢ [Net mass2] [Net mass flow 2]	
Net volume flow 1 Ⓢ [Net vol1] [Net volume flow 1]	
Net volume flow 2 Ⓢ [Net vol2] [Net volume flow 2]	
Net corrected volume flow Ⓢ [Net corr vol] [Net corrected volume flow]	
Off – [Off] [Off]	

**Total 1 – 3
unit**

⌚ [Detailed setup] ► [Tt1] ► [Tt11 – 3] ► [Unit]

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

- *Easy setup wizard* [▶ 167]

Sets the unit for Total 1 – 3.

Value	Description
– g	Sets the unit for Total 1 – 3 . Default value for Total 1 is kg. Default value for Total 2 is m ³ Default value for Total 3 is m ³
– kg	
– t	
– t(US)	
– t(UK)	
– lb	
– cm ³	
– L	
– m ³	
– gal	
– kgal	
– ft ³	
– bbl	
– Impgal	
– kImpgal	
– NL	
– Nm ³	
– SL	
– Sft ³	
– MMSft ³	
– Sm ³	
– MJ	
– Btu	
– User unit	

**Total 1 – 3
failure option**

⌚ [Detailed setup] ► [Tt1] ► [Tt11 – 3] ► [Fail opt]

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

- *Easy setup wizard* [▶ 167]
- *Basic setup* [▶ 283]

Defines the behavior of the totalizers when an alarm occurs.

Value	Description
Run – [Run] [Run]	Totalizer accumulates the assigned process value anyway. Default value.
Hold – [Hold] [Hold]	Totalizer stops accumulating the process value.

	Value	Description
–	Last Valid Value [Last valid val] [Last valid value]	Totalizer accumulates the value that was measured before the alarm occurred.

Additional function

Menu for configuring the Totalizer in detail. The menu is only available when *Process variables additional parameters*, see *Process variables* [▶ 196] has been set to Apply.

The following menus/settings are available:

	Full name	Display name	Page
⌚	Total 1 – 3 preset value	[Preset val]	[▶ 305]
⌚	Total 1 – 3 reset/preset	[Reset/Preset]	[▶ 305]
⌚	Total 1 – 3 option	[Opt]	[▶ 306]
⌚	Total 1 – 3 user unit	[User unit]	[▶ 306]
⌚	Total 1 – 3 conversion factor	[Conv factor]	[▶ 307]
⌚	Total 1 – 3 temperature lower value	[Temp lo lim]	[▶ 307]
⌚	Total 1 – 3 temperature upper value	[Temp hi lim]	[▶ 308]
⌚	Total 1 – 3 density lower value	[Dens lo lim]	[▶ 307]
⌚	Total 1 – 3 density upper value	[Dens hi lim]	[▶ 307]
⌚	Total temperature hysteresis	[Temp hys]	[▶ 309]
⌚	Total density hysteresis	[Dens hys]	[▶ 308]
⌚	Total 1 – 3 24 hours	[24h]	[▶ 310]

Total 1 – 3 preset value

⌚ [Detailed setup] ▶ [Ttl] ▶ [Ttl1 – 3] ▶ [Add func] ▶ [Preset val]

Sets the value of the totalizer when preset has been selected and set in Total 1 – 3 reset/preset.

	Value	Description
–	Numeric digits	Default value is 0.

Total 1 – 3 reset/preset

⌚ [Detailed setup] ▶ [Ttl] ▶ [Ttl1 – 3] ▶ [Add func] ▶ [Reset/Preset]

Resets or presets Totalizer.

	Value	Description
–	Not Execute [Not exe] [Not Execute]	Do nothing. Default value.
–	Reset [Reset] [Reset]	Resets the value of the totalizer to 0. Value returns automatically to Not Execute after each operation.

	Value	Description
–	Preset [Preset] [Preset]	Sets the value of the totalizer to the value defined in the parameter Total 1 – 3 Preset Value. Value returns automatically to Not Execute after each operation.

Total 1 – 3 option

⌚ [Detailed setup] ► [Tt1] ► [Tt11 – 3] ► [Add func] ► [Opt]

Sets the totalization mode of Totalizer 1 – 3.

	Value	Description
–	Balanced [Balanced] [Balanced]	Positive and negative incoming values are added to the total.
–	Positive only [Positive only] [Positive only]	Default value. Only positive incoming values are added to the total. Negative values are ignored.
–	Negative only [Negative only] [Negative only]	Only negative incoming values are added to the total. Positive values are ignored.
–	Hold [Hold] [Hold]	Value of the total is held, not changed.
–	Density (Balanced) [Dens (Balanced)] [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 (Positive only) [Dens (Positive)] [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) [Dens (Negative)] [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.

Total 1 – 3 user unit

⌚ [Detailed setup] ► [Tt1] ► [Tt11 – 3] ► [Add func] ► [User unit]

Sets the user-defined unit for Totalizer 1 – 3.

	Value	Description
–	ASCII characters	Maximum length is 8 characters. Default value is blank.

**Total 1 – 3
conversion factor**

① [Detailed setup] ► [Tt1] ► [Tt11 – 3] ► [Add func] ► [Conv factor]

Sets the conversion factor for the Total 1 – 3 user-defined unit.

	Value	Description
–	Numeric digits	Default value is 1. Totalizer value at user-defined unit = Totalizer n value * Total n conversion factor 1 – 3.

**Total 1 – 3
density lower
value**

① [Detailed setup] ► [Tt1] ► [Tt11 – 3] ► [Add func] ► [Dens lo lim]

Setting to perform totalization. This parameter is available when the Total option parameter is set to "Density(Balanced)", "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 – Default value is 0.8 [kg/L].

**Total 1 – 3
density upper
value**

① [Detailed setup] ► [Tt1] ► [Tt11 – 3] ► [Add func] ► [Dens hi lim]

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 – Default value is 1.2 [kg/L].

**Total 1 – 3
temperature lower
value**

① [Detailed setup] ► [Tt1] ► [Tt11 – 3] ► [Add func] ► [Temp lo lim]

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**

⌚ [Detailed setup] ► [Tt1] ► [Tt11 – 3] ► [Add func] ► [Temp hi lim]

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**

⌚ [Detailed setup] ► [Tt1] ► [Tt11 – 3] ► [Add func] ► [Dens hys]

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.

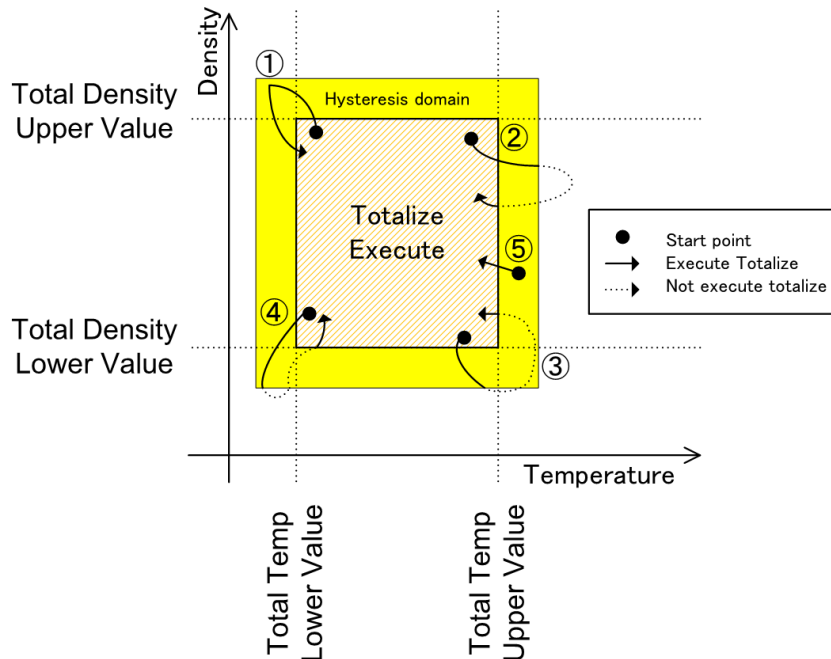
	Value	Description
–	Numeric digits	Setting range: 0.0 – 10.0 Default value is 0.1 %.

Total temperature hysteresis

① [Detailed setup] ► [Ttl] ► [Ttl1 - 6] ► [Add func] ► [Temp hys]

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 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	Page
①	Total 1 – 3 24hours value	[24h val]	[▶ 310]
①	Total 1 – 3 24hours start date	[Start date]	[▶ 310]
①	Total 1 – 3 24hours start time	[Start time]	[▶ 310]
①	Total 1 – 3 24hours start operation time	[Start op time]	[▶ 311]
①	Total 1 – 3 24hours last update date	[Last date]	[▶ 311]
①	Total 1 – 3 24hours last update time	[Last time]	[▶ 311]
①	Total 1 – 3 24hours last update operation time	[Last op time]	[▶ 311]

**Total 1 – 3
24hours value**

① [Detailed setup] ▶ [Tt1] ▶ [Tt11 – 3] ▶ [Add func] ▶ [24h] ▶ [24h val]

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] ▶ [Tt1] ▶ [Tt11 – 3] ▶ [Add func] ▶ [24h] ▶ [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] ▶ [Tt1] ▶ [Tt11 – 3] ▶ [Add func] ▶ [24h] ▶ [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] ► [Ttl1 – 3] ► [Add func] ► [24h] ► [Start op 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**

① [Detailed setup] ► [Ttl] ► [Ttl1 – 3] ► [Add func] ► [24h] ► [Last date]

	Value	Description
–	Date	Shows the date when last 24hours totalizer was updated.

**Total 1 – 3
24hours last
update time**

① [Detailed setup] ► [Ttl] ► [Ttl1 – 3] ► [Add func] ► [24h] ► [Last time]

	Value	Description
–	Time	Shows the time when last 24hours totalizer was updated.

**Total 1 – 3
24hours last
update operation
time**

① [Detailed setup] ► [Ttl] ► [Ttl1 – 3] ► [Add func] ► [24h] ► [Last op time]

	Value	Description
–	Numeric digits	Default value is 1.

Display

Menu for configuring display or process variables and other information.

The following menus/settings are available:

	Full name	Display name	Web name	Page
–	Display additional parameters	[Disp add]	–	[▶ 311]
Ⓜ	Display unit selection	–	[Display unit selection]	[▶ 312]
–	Display select	[Disp sel]	[Display select]	[▶ 313]
–	Display format	[Disp format]	[Display format]	[▶ 320]
–	Display operation configura- tion	[Disp op cfg]	[Display operation configuration]	[▶ 331]

**Display additional
parameters**

① [Detailed setup] ► [Disp] ► [Disp add]

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 [Not apply] [Not apply]	Menu for additional parameters of the Display is disabled. Default value.
–	Apply [Apply] [Apply]	The menu is enabled.

Display unit selection

Ⓐ [Detailed setup] ► [Disp] ► [Disp op cfg] ► [Add func] ► [Unit sel]

Ⓜ [Device] ► [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* [603] 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] [Metric]	Metric units. Default value.
–	US [us] [US]	Units mainly used in the USA.
–	UK [uk] [UK]	Units mainly used in the UK.
–	Russia [Russia] [Russia]	Units in Russia. Available only for language package 2.
–	Japan [Japan] [Japan]	Units for Japan to comply with the Japanese measurement law. Available only for language package 1.

Display select

Menu for assigning process variables to be displayed.

**Display
measurement
mode**

⌚ [Detailed setup] ► [Disp] ► [Disp sel] ► [Meas mode]

⊕ [Device] ► [Detailed setup] ► [Display] ► [Display operation configuration] ► [Additional function] ► [Display measurement mode]

▪ *Maintenance* [► 418]

Sets the display mode for logging data on the LCD display of the Indicator.

	Value	Description
–	Normal [Normal] [Normal]	Normal display mode. Default value.
–	Trend online [Trend] [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.

**Display select
1 – 4**

Ⓐ [Detailed setup] ► [Disp] ► [Disp sel] ► [Sel1 – 4]

Ⓜ [Device] ► [Detailed setup] ► [Display] ► [Display select] ► [Display select 1 – 4]

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

- *Easy setup wizard* [▶ 168]
- *Basic setup* [▶ 190]

Assigns process variables to display lines 1, 2, 3 and 4 of the LCD display. On display, Display measurement mode can be selected and Logging select 1 – 4 can be selected based on the selection of Display measurement mode.

	Value	Description
–	None [None] [None]	Sets Display select 1 – 4. The default value for Display select 1 is Mass flow. None is not available for Display select 1. The default value for Display select 2 is Density. The default value for Display select 3 is Temperature. The default value for Display select 4 is Volume flow.
–	Mass flow [Mass] [Mass flow]	
–	Density [Dens] [Dens]	
–	Temperature [Temp] [Temp]	
–	Volume flow [Vol] [Vol flo]	
–	Reference density [Ref dens] [Reference density]	
–	Relative density [Rel dens] [Relative density]	
–	Corrected volume flow [Corr vol] [Corrected volume flow]	
–	Pressure [Pres] [Pressure]	
–	Totalizer 1 [Tt11] [Totalizer 1]	

	Value	Description
	Totalizer 2	Sets Display select 1 – 4. The default value for Display select 1 is Mass flow. None is not available for Display select 1. The default value for Display select 2 is Density. The default value for Display select 3 is Temperature. The default value for Display select 4 is Volume flow.
–	[Tt12] [Totalizer 2]	
	Totalizer 3	
–	[Tt13] [Totalizer 3]	
	Mass flow % graph	
–	[Mass %] [Mass flow % graph]	
	Volume flow % graph	
–	[Vol %] [Volume flow % graph]	
	Corrected volume flow % graph	
–	[Corr vol %] [Corrected volume flow % graph]	
	Tag	
–	[Tag] [Tag]	
	Long tag	
–	[Long tag] [Long tag]	
	Velocity	
–	[ve1] [Velocity]	
	Concentration	
Ⓕ	[Conc] [Concentration]	
	Net mass flow 1	
Ⓕ	[Net mass1] [Net mass flow 1]	
	Net mass flow 2	
Ⓕ	[Net mass2] [Net mass flow 2]	
	Net volume flow 1	
Ⓕ	[Net vol1] [Net volume flow 1]	
	Net volume flow 2	
Ⓕ	[Net vol2] [Net volume flow 2]	

	Value	Description
Ⓔ	Net corrected volume flow [Net corr vol] [Net corrected volume flow]	Sets Display select 1 – 4. The default value for Display select 1 is Mass flow. None is not available for Display select 1. The default value for Display select 2 is Density. The default value for Display select 3 is Temperature. The default value for Display select 4 is Volume flow.
Ⓔ	Viscosity [Visc] [Viscosity]	
–	Drive current [Drv curr] [Drive current]	
–	24hours totalizer 1 [24h tt11] [24hours totalizer 1]	
–	24hours totalizer 2 [24h tt12] [24hours totalizer 2]	
–	24hours totalizer 3 [24h tt13] [24hours totalizer 3]	
Ⓔ	Gas void fraction [GVF] [Gas void fraction]	
–	Display unit mass flow dual [Mass flow (dual)] [Display unit mass flow dual]	
–	Display unit density dual [Dens (dual)] [Display unit density dual]	

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**

① [Detailed setup] ► [Disp] ► [Disp sel] ► [Add func] ► [Sel 5 – 20]

② [Device] ► [Detailed setup] ► [Display] ► [Display select] ► [Display select 5 – 20]

Assigns process variables to display lines 5 – 20 of the LCD display.

	Value	Description
–	None [None] [None]	Sets the unit for Display select 5 – 20. Default value for Display select 5 is Reference density. Default value for Display select 6 is Corrected volume flow. Default value for Display select 7 is Pressure. Default value for Display select 8 is Totalizer 1. Default value for Display select 9 is Totalizer 2. Default value for Display select 10 is Totalizer 3. Default value for Display select 11 is Totalizer 1. Default value for Display select 12 is Totalizer 2. Default value for Display select 13 is Totalizer 3. Default value for Display select 14 is Mass flow % graph. Default value for Display select 15 is Volume flow % graph. Default value for Display select 16 is Corrected volume flow % graph. Default value for Display select 17 is Tag. Default value for Display select 18 is Long tag. Default value for Display select 19 is Velocity. Default value for Display select 20 is Drive current. Sets the unit for Display select 5 – 20.
–	Mass flow [Mass] [Mass flow]	
–	Density [Dens] [Dens]	
–	Temperature [Temp] [Temp]	
–	Volume flow [Vol] [Vol flo]	
–	Pressure [Pres] [Pressure]	
–	Reference density [Ref dens] [Reference density]	
–	Relative density [Rel dens] [Relative density]	
–	Corrected volume flow [Corr vol] [Corrected volume flow]	
–	Velocity [Vel] [Velocity]	
–	Totalizer 1 [Tt11] [Totalizer 1]	

	Value	Description
–	Totalizer 2 [Tt12] [Totalizer 2]	Sets the unit for Display select 5 – 20. Default value for Display select 5 is Reference density. Default value for Display select 6 is Corrected volume flow. Default value for Display select 7 is Pressure. Default value for Display select 8 is Totalizer 1. Default value for Display select 9 is Totalizer 2. Default value for Display select 10 is Totalizer 3. Default value for Display select 11 is Totalizer 1. Default value for Display select 12 is Totalizer 2. Default value for Display select 13 is Totalizer 3. Default value for Display select 14 is Mass flow % graph. Default value for Display select 15 is Volume flow % graph. Default value for Display select 16 is Corrected volume flow % graph. Default value for Display select 17 is Tag. Default value for Display select 18 is Long tag. Default value for Display select 19 is Velocity. Default value for Display select 20 is Drive current. Sets the unit for Display select 5 – 20.
–	Totalizer 3 [Tt13] [Totalizer 3]	
–	Mass flow % graph [Mass %] [Mass flow % graph]	
–	Volume flow % graph [Vol %] [Volume flow % graph]	
–	Corrected volume flow % graph [Corr vol %] [Corrected volume flow % graph]	
–	Tag [Tag] [Tag]	
–	Long tag [Long tag] [Long tag]	

	Value	Description
Ⓔ	Concentration [Conc] [Concentration]	Sets the unit for Display select 5 – 20. Default value for Display select 5 is Reference density. Default value for Display select 6 is Corrected volume flow. Default value for Display select 7 is Pressure. Default value for Display select 8 is Totalizer 1. Default value for Display select 9 is Totalizer 2. Default value for Display select 10 is Totalizer 3. Default value for Display select 11 is Totalizer 1. Default value for Display select 12 is Totalizer 2. Default value for Display select 13 is Totalizer 3. Default value for Display select 14 is Mass flow % graph. Default value for Display select 15 is Volume flow % graph. Default value for Display select 16 is Corrected volume flow % graph. Default value for Display select 17 is Tag. Default value for Display select 18 is Long tag. Default value for Display select 19 is Velocity. Default value for Display select 20 is Drive current. Sets the unit for Display select 5 – 20.
Ⓔ	Net mass flow 1 [Net mass1] [Net mass flow 1]	
Ⓔ	Net mass flow 2 [Net mass2] [Net mass flow 2]	
Ⓔ	Net volume flow 1 [Net vol1] [Net volume flow 1]	
Ⓔ	Net volume flow 2 [Net vol2] [Net volume flow 2]	
Ⓔ	Net corrected volume flow [Net corr vol] [Net corrected volume flow]	
Ⓔ	Viscosity [Visc]	
–	Drive current [Drv curr] [Drive current]	
Ⓔ	Gas void fraction [GVF] [Gas void fraction]	
–	24hours totalizer 1 [24h tt11] [24hours totalizer 1]	
–	24hours totalizer 2 [24h tt12] [24hours totalizer 2]	
–	24hours totalizer 3 [24h tt13] [24hours totalizer 3]	

	Value	Description
–	Display unit mass flow dual [Mass flow (dual)] [Display unit mass flow dual]	Sets the unit for Display select 5 – 20. Default value for Display select 5 is Reference density. Default value for Display select 6 is Corrected volume flow. Default value for Display select 7 is Pressure. Default value for Display select 8 is Totalizer 1. Default value for Display select 9 is Totalizer 2. Default value for Display select 10 is Totalizer 3. Default value for Display select 11 is Totalizer 1. Default value for Display select 12 is Totalizer 2. Default value for Display select 13 is Totalizer 3. Default value for Display select 14 is Mass flow % graph. Default value for Display select 15 is Volume flow % graph. Default value for Display select 16 is Corrected volume flow % graph. Default value for Display select 17 is Tag. Default value for Display select 18 is Long tag. Default value for Display select 19 is Velocity. Default value for Display select 20 is Drive current. Sets the unit for Display select 5 – 20.
–	Display unit density dual [Dens (dual)] [Display unit density dual]	

Display format

Menu for configuring the Display format.

The following menus/settings are available:

	Full name	Display name	Web name	Page
–	Display format mass flow	[Format mass]	[Display format mass flow]	[▶ 320]
–	Display format density	[Format dens]	[Display format density]	[▶ 321]
–	Display format temperature	[Format temp]	[Display format temperature]	[▶ 322]
–	Display format volume flow	[Format vol]	[Display format volume flow]	[▶ 323]
–	Display format total 1 – 3	[Format tt11 – 3]	[Display format total 1 – 3]	[▶ 326]
–	Additional function	[Add func]	[Additional function]	[▶ 327]

Display format mass flow

① [Detailed setup] ▶ [Disp] ▶ [Disp format] ▶ [Format mass]

② [Device] ▶ [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	
–	[Auto] [Auto]	Position is automatically adjusted according to the value. Default value.
	0 digit	
–	[0digit] [0 digit]	0 digits from right.
	1 digit	
–	[1digit] [1 digit]	1 digit from right.
	2 digit	
–	[2digit] [2 digit]	2 digits from right.
	3 digit	
–	[3digit] [3 digit]	3 digits from right.
	4 digit	
–	[4digit] [4 digit]	4 digits from right.
	5 digit	
–	[5digit] [5 digit]	5 digits from right.

Display format density

① [Detailed setup] ► [Disp] ► [Disp format] ► [Format dens]

④ [Device] ► [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] [Auto]	Position is automatically adjusted according to the value. Default value.
	0 digit	
–	[0digit] [0 digit]	0 digits from right.
	1 digit	
–	[1digit] [1 digit]	1 digit from right.
	2 digit	
–	[2digit] [2 digit]	2 digits from right.

	Value	Description
	3 digit	
–	[3digit] [3 digit]	3 digits from right.
	4 digit	
–	[4digit] [4 digit]	4 digits from right.
	5 digit	
–	[5digit] [5 digit]	5 digits from right.

Display format temperature

Ⓐ [Detailed setup] ► [Disp] ► [Disp format] ► [Format temp]

Ⓜ [Device] ► [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] [Auto]	Position is automatically adjusted according to the value.
	0 digit	
–	[0digit] [0 digit]	0 digits from right.
	1 digit	
–	[1digit] [1 digit]	1 digit from right. Default value.
	2 digit	
–	[2digit] [2 digit]	2 digits from right.
	3 digit	
–	[3digit] [3 digit]	3 digits from right.
	4 digit	
–	[4digit] [4 digit]	4 digits from right.
	5 digit	
–	[5digit] [5 digit]	5 digits from right.

**Display format
volume flow**

① [Detailed setup] ► [Disp] ► [Disp format] ► [Format vol]

② [Device] ► [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] [Auto]	Position is automatically adjusted according to the value. Default value.
	0 digit	
–	[0digit] [0 digit]	0 digits from right.
	1 digit	
–	[1digit] [1 digit]	1 digit from right.
	2 digit	
–	[2digit] [2 digit]	2 digits from right.
	3 digit	
–	[3digit] [3 digit]	3 digits from right.
	4 digit	
–	[4digit] [4 digit]	4 digits from right.
	5 digit	
–	[5digit] [5 digit]	5 digits from right.

**Display format
pressure**

① [Detailed setup] ► [Disp] ► [Disp format] ► [Format pres]

② [Device] ► [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] [Auto]	Position is automatically adjusted according to the value. Default value.
	0 digit	
–	[0digit] [0 digit]	0 digits from right.

	Value	Description
	1 digit	
–	[1digit] [1 digit]	1 digit from right.
	2 digit	
–	[2digit] [2 digit]	2 digits from right.
	3 digit	
–	[3digit] [3 digit]	3 digits from right.
	4 digit	
–	[4digit] [4 digit]	4 digits from right.
	5 digit	
–	[5digit] [5 digit]	5 digits from right.

Display format reference density

① [Detailed setup] ► [Disp] ► [Disp format] ► [Format ref dens]

② [Device] ► [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] [Auto]	Position is automatically adjusted according to the value. Default value.
	0 digit	
–	[0digit] [0 digit]	0 digits from right.
	1 digit	
–	[1digit] [1 digit]	1 digit from right.
	2 digit	
–	[2digit] [2 digit]	2 digits from right.
	3 digit	
–	[3digit] [3 digit]	3 digits from right.
	4 digit	
–	[4digit] [4 digit]	4 digits from right.

	Value	Description
	5 digit	
–	[5digit] [5 digit]	5 digits from right.

**Display format
relative density**

① [Detailed setup] ► [Disp] ► [Disp format] ► [Format rel dens]

Ⓜ [Device] ► [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] [Auto]	Position is automatically adjusted according to the value. Default value.
	0 digit	
–	[0digit] [0 digit]	0 digits from right.
	1 digit	
–	[1digit] [1 digit]	1 digit from right.
	2 digit	
–	[2digit] [2 digit]	2 digits from right.
	3 digit	
–	[3digit] [3 digit]	3 digits from right.
	4 digit	
–	[4digit] [4 digit]	4 digits from right.
	5 digit	
–	[5digit] [5 digit]	5 digits from right.

**Display format
corrected volume
flow**

① [Detailed setup] ► [Disp] ► [Disp format] ► [Format corr vol]

Ⓜ [Device] ► [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] [Auto]	Position is automatically adjusted according to the value. Default value.
	0 digit	
–	[0digit] [0 digit]	0 digits from right.
	1 digit	
–	[1digit] [1 digit]	1 digit from right.
	2 digit	
–	[2digit] [2 digit]	2 digits from right.
	3 digit	
–	[3digit] [3 digit]	3 digits from right.
	4 digit	
–	[4digit] [4 digit]	4 digits from right.
	5 digit	
–	[5digit] [5 digit]	5 digits from right.

Display format total 1 – 3

① [Detailed setup] ► [Disp] ► [Disp format] ► [Format tt11 – 3]

② [Device] ► [Detailed setup] ► [Display] ► [Display format] ►
[Additional function] ► [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] [Auto]	Position is automatically adjusted according to the value. Default value.
	0 digit	
–	[0digit] [0 digit]	0 digits from right.
	1 digit	
–	[1digit] [1 digit]	1 digit from right.
	2 digit	
–	[2digit] [2 digit]	2 digits from right.

	Value	Description
	3 digit	
–	[3digit] [3 digit]	3 digits from right.
	4 digit	
–	[4digit] [4 digit]	4 digits from right.
	5 digit	
–	[5digit] [5 digit]	5 digits from right.
	6 digit	
–	[6digit] [6 digit]	6 digits from right.
	7 digit	
–	[7digit] [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	Web name	Page
Ⓔ	Display format concentration	[Format conc]	[Display format concentration]	[▶ 327]
Ⓔ	Display format net mass flow 1 – 2	[Format net mass1]	[Display format net mass flow 1 – 2]	[▶ 328]
Ⓔ	Display format net volume flow 1 – 2	[Format net vol1]	[Display format net volume flow 1 – 2]	[▶ 329]
Ⓔ	Display format net corrected volume flow	[Format net corr vol]	[Display format net corrected volume flow]	[▶ 330]
Ⓔ	Display format viscosity	[Visc]	[Display format viscosity]	[▶ 330]

Display format concentration

① [Detailed setup] ▶ [Disp] ▶ [Disp format] ▶ [Add func] ▶ [Format conc]

Ⓕ [Device] ▶ [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	
Ⓔ	[Auto] [Auto]	Position is automatically adjusted according to value. Default value.

	Value	Description
⑥	0 digit [0digit] [0 digit]	0 digit from right.
⑥	1 digit [1digit] [1 digit]	1 digit from right.
⑥	2 digit [2digit] [2 digit]	2 digits from right.
⑥	3 digit [3digit] [3 digit]	3 digits from right.
⑥	4 digit [4digit] [4 digit]	4 digits from right.
⑥	5 digit [5digit] [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] ► [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
⑥	Auto [Auto] [Auto]	Position is automatically adjusted according to value. Default value.
⑥	0 digit [0digit] [0 digit]	0 digit from right.
⑥	1 digit [1digit] [1 digit]	1 digit from right.
⑥	2 digit [2digit] [2 digit]	2 digits from right.
⑥	3 digit [3digit] [3 digit]	3 digits from right.

	Value	Description
④	4 digit [4digit] [4 digit]	4 digits from right.
⑤	5 digit [5digit] [5 digit]	5 digits from right.

Display format net volume flow 1 – 2

④ [Detailed setup] ► [Disp] ► [Disp format] ► [Add func] ► [Format net vol1 – 2]

⑧ [Device] ► [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
④	Auto [Auto] [Auto]	Position is automatically adjusted according to value. Default value.
④	0 digit [0digit] [0 digit]	0 digit from right.
④	1 digit [1digit] [1 digit]	1 digit from right.
④	2 digit [2digit] [2 digit]	2 digits from right.
④	3 digit [3digit] [3 digit]	3 digits from right.
④	4 digit [4digit] [4 digit]	4 digits from right.
④	5 digit [5digit] [5 digit]	5 digits from right.

Display format net corrected volume flow

④ [Detailed setup] ► [Disp] ► [Disp format] ► [Add func] ► [Format net corr vol]

⑤ [Device] ► [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
⑤	Auto [Auto] [Auto]	Position is automatically adjusted according to value. Default value.
⑤	0 digit [0digit] [0 digit]	0 digit from right.
⑤	1 digit [1digit] [1 digit]	1 digit from right.
⑤	2 digit [2digit] [2 digit]	2 digits from right.
⑤	3 digit [3digit] [3 digit]	3 digits from right.
⑤	4 digit [4digit] [4 digit]	4 digits from right.
⑤	5 digit [5digit] [5 digit]	5 digits from right.

Display format viscosity

④ [Detailed setup] ► [Disp] ► [Disp format] ► [Add func] ► [Visc]

⑤ [Device] ► [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
⑤	Auto [Auto] [Auto]	Position is automatically adjusted according to value. Default value.
⑤	0 digit [0digit] [0 digit]	0 digit from right.

	Value	Description
⑥	1 digit [1digit] [1 digit]	1 digit from right.
⑥	2 digit [2digit] [2 digit]	2 digits from right.
⑥	3 digit [3digit] [3 digit]	3 digits from right.
⑥	4 digit [4digit] [4 digit]	4 digits from right.
⑥	5 digit [5digit] [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	Web name	Page
–	Display contrast	[Contrast]	[Display contrast]	[▶ 331]
–	Display line	[Line]	[Display line]	[▶ 332]
–	Display period	[Period]	[Display period]	[▶ 333]
–	Additional function	[Add func]	[Additional function]	[▶ 334]

Display contrast

① [Detailed setup] ▶ [Disp] ▶ [Disp op cfg] ▶ [Contrast]

⑧ [Device] ▶ [Detailed setup] ▶ [Display] ▶ [Display operation configuration] ▶ [Display contrast]

Sets the contrast of the LCD.

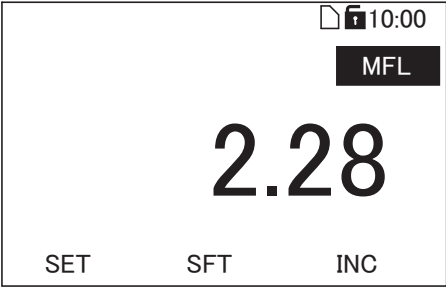
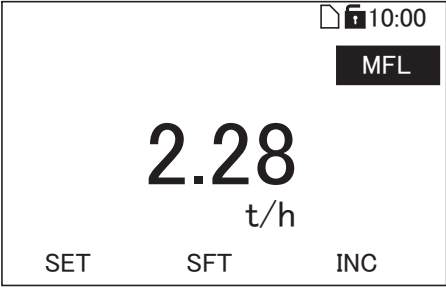
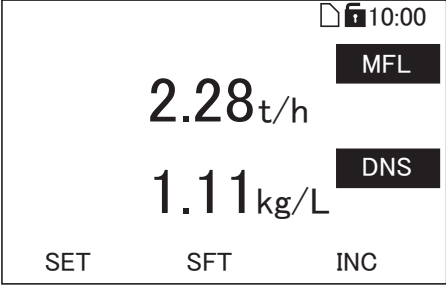
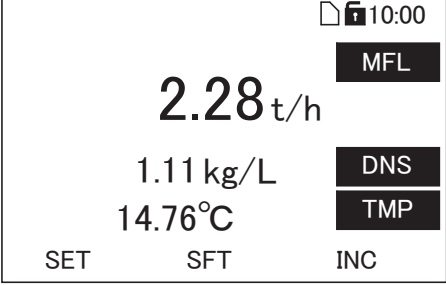
	Value	Description
–	-5	-5 ≡ bright to +5 ≡ dark Default value is 0.
–	-4	
–	-3	
–	-2	
–	-1	
–	0	
–	1	
–	2	
–	3	
–	4	
–	5	

Display line

⌚ [Detailed setup] ▶ [Disp] ▶ [Disp op cfg] ▶ [Line]

Ⓜ [Device] ▶ [Detailed setup] ▶ [Display] ▶ [Display operation configuration] ▶ [Display line]

Sets the number of display lines on the LCD.

Value	Description
1line (big) – [1line (big)] [1line (big)]	1line display big font, without unit. 
1line – [1line] [1line]	1line display of value with unit. 
2line – [2line] [2line]	2line display of values with units. 
3line – [3line] [3line]	3line display of values with units. 

	Value	Description
	4line	4line display of values with units.
–	[4line]	
	[4line]	

Display period

⌚ [Detailed setup] ► [Disp] ► [Disp op cfg] ► [Period]

⊕ [Device] ► [Detailed setup] ► [Display] ► [Display operation configuration] ► [Display period]

Sets the refresh rate of the display.

	Value	Description
	0.2s	
–	[0.2s]	Refresh rate is 0.2 seconds.
	[0.2 s]	
	0.4s	
–	[0.4s]	Refresh rate is 0.4 seconds.
	[0.4 s]	
	1.0s	
–	[1.0s]	Refresh rate is 1.0 seconds.
	[1.0 s]	Default value.
	2.0s	
–	[2.0s]	Refresh rate is 2.0 seconds.
	[2.0 s]	
	4.0s	
–	[4.0s]	Refresh rate is 4.0 seconds.
	[4.0 s]	
	8.0s	
–	[8.0s]	Refresh rate is 8.0 seconds.
	[8.0 s]	

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	Web name	Page
–	Display NE 107	[NE107 disp]	[Display NE 107]	[▶ 334]
–	Display alarm	[Alarm disp]	[Display alarm]	[▶ 334]
Ⓜ	IRSW operation	–	[IRSW operation]	[▶ 335]
–	Display scroll	[Scroll]	[Display scroll]	[▶ 335]
–	Display damping	[Disp damp]	[Display damping]	[▶ 336]
–	Display format date	[Date format]	[Display format date]	[▶ 336]
Ⓜ	Language	–	[Language]	[▶ 336]
–	Language package	[Lang pack]	[Language package]	[▶ 337]
–	Display unit selection	[Unit sel]	[Display unit selection]	[▶ 337]
–	Display measurement mode	[Meas mode]	[Display measurement mode]	[▶ 338]
–	Trend offline LRV	[Trend offln LRV]	[Trend offline LRV]	[▶ 338]
–	Trend offline URV	[Trend offln URV]	[Trend offline URV]	[▶ 339]
–	Display Rotation	[Rotate]	[Display rotation]	[▶ 339]
–	Display Inversion	[Inversion]	[Display inversion]	[▶ 339]

Display NE 107

Ⓜ [Detailed setup] ▶ [Disp] ▶ [Disp op cfg] ▶ [Add func] ▶ [NE107 disp]

Ⓜ [Device] ▶ [Detailed setup] ▶ [Display] ▶ [Display operation configuration] ▶ [Additional function] ▶ [Display NE 107]

Sets the NE 107 code in an alarm message.

	Value	Description
–	Normal [Normal] [Normal]	Without NE 107 code in the alarm message. Default value.
–	NE 107 [NE107] [NE 107]	With NE 107 code in the alarm message.

Display alarm

Ⓜ [Detailed setup] ▶ [Disp] ▶ [Disp op cfg] ▶ [Add func] ▶ [Alarm disp]

Ⓜ [Device] ▶ [Detailed setup] ▶ [Display] ▶ [Display operation configuration] ▶ [Additional function] ▶ [Display alarm]

Sets the alarm display on the LCD.

	Value	Description
–	Normal [Normal] [Normal]	Alarm information is displayed on one line at the bottom of the LCD. Default value.

	Value	Description
–	Detail [Detail] [Detail]	Alarm information is displayed in the entire LCD display area together with the countermeasure.

IRSW operation

Ⓜ [Device] ► [Detailed setup] ► [Display] ► [Display operation configuration] ► [Additional function] ► [IRSW operation]

Sets the IR switch on the Indicator.

	Value	Description
Ⓜ	Enable [Enable]	IR switches on the Indicator are enabled; this means they can be used.
Ⓜ	Inhibit [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] ► [Detailed setup] ► [Display] ► [Display operation configuration] ► [Additional function] ► [Display scroll]

Sets the scroll mode of the LCD display line.

	Value	Description
–	Off [off] [Off]	Scrolling the display line is disabled; this means it is fixed. Default value.
–	Manual [Man] [Manual]	Display line is manually scrolled using IR switches on the Indicator.
–	Auto(2.0s) [Auto (2.0s)] [Auto (2.0s)]	Display line is scrolled up every 2 seconds automatically.
–	Auto(4.0s) [Auto (4.0s)] [Auto (4.0s)]	Display line is scrolled up every 4 seconds automatically.
–	Auto(8.0s) [Auto (8.0s)] [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] ► [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 measurement, 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. Default value is 3.0 s.

Display format date

Ⓛ [Detailed setup] ► [Disp] ► [Disp format] ► [Add func] ► [Date format]

Ⓜ [Device] ► [Detailed setup] ► [Display] ► [Display operation configuration] ► [Additional function] ► [Display format date]

Sets format to display date.

	Value	Description
–	MM/DD/YYYY [MM/DD/YYYY] [MM/DD/YYYY]	MM ≡ 2-digit month, DD ≡ 2-digit day, YYYY ≡ 4-digit year. Default value.
–	DD/MM/YYYY [DD/MM/YYYY] [DD/MM/YYYY]	DD ≡ 2-digit day, MM ≡ 2-digit month, YYYY ≡ 4-digit year.
–	YYYY/MM/DD [YYYY/MM/DD] [YYYY/MM/DD]	YYYY ≡ 4-digit year, MM ≡ 2-digit month, DD ≡ 2-digit day.

Language

Ⓜ [Device] ► [Detailed setup] ► [Display] ► [Display operation configuration] ► [Additional function] ► [Language]

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

Language [▶ 86]

Only available if the device is equipped with a display.

Sets the language to be used on the LCD display.

	Value	Description
⊕	English [English]	The desired display language can be selected. Available languages depend on the language package that was ordered: <i>Package 1:</i> - English - French - German - Italian - Spanish - Portuguese - Japanese <i>Package 2:</i> - English - German - Russian - Kazakh - Polish <i>Package 3:</i> - English - French - German - Italian - Spanish - Portuguese - Chinese
⊕	French [French]	
⊕	German [German]	
⊕	Italian [Italian]	
⊕	Spanish [Spanish]	
⊕	Portuguese [Portuguese]	
⊕	Russian [Russian]	
⊕	Kazakh [Kazakh]	
⊕	Chinese [Chinese]	
⊕	Japanese [Japanese]	
⊕	Polish [Polish]	

Display unit selection

⌚ [Detailed setup] ► [Disp] ► [Disp op cfg] ► [Add func] ► [Unit sel]

⊕ [Device] ► [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* [▶ 603] 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] [Metric]	Metric units. Default value.
–	US [us] [US]	Units mainly used in the USA.
–	UK [uk] [UK]	Units mainly used in the UK.
–	Russia [Russia] [Russia]	Units in Russia. Available only for language package 2.
–	Japan [Japan] [Japan]	Units for Japan to comply with the Japanese measurement law. Available only for language package 1.

Display measurement mode

Ⓐ [Detailed setup] ► [Disp] ► [Disp sel] ► [Meas mode]

Ⓜ [Device] ► [Detailed setup] ► [Display] ► [Display operation configuration] ► [Additional function] ► [Display measurement mode]

- *Maintenance* [► 418]

Sets the display mode for logging data on the LCD display of the Indicator.

	Value	Description
–	Normal [Normal] [Normal]	Normal display mode. Default value.
–	Trend online [Trend] [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 offline LRV

Ⓐ [Detailed setup] ► [Disp] ► [Disp op cfg] ► [Add func] ► [Trend offln LRV]

Ⓜ [Device] ► [Detailed setup] ► [Display] ► [Display operation configuration] ► [Additional function] ► [Trend offline LRV]

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

- *Detailed Setup* [► 338]
- *Maintenance* [► 419]

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

① [Detailed setup] ► [Disp] ► [Disp op cfg] ► [Add func] ► [Trend offln URV]

Ⓜ [Device] ► [Detailed setup] ► [Display] ► [Display operation configuration] ► [Additional function] ► [Trend offline URV]

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

- *Detailed Setup* [► 339]
- *Maintenance* [► 419]

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 rotation

① [Detailed setup] ► [Disp] ► [Disp op cfg] ► [Add func] ► [Rotate]

Ⓜ [Device] ► [Detailed setup] ► [Display] ► [Display operation configuration] ► [Additional function] ► [Display rotation]

Sets the vertical configuration (vertical display direction) of the LCD display.

	Value	Description
–	Normal [Normal] [Normal]	Display space close to the YOKOGAWA logo is on top and the other side is the bottom of the display. Default value.
–	Reverse [Reverse] [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]

Ⓜ [Device] ► [Detailed setup] ► [Display] ► [Display operation configuration] ► [Additional function] ► [Display inversion]

Sets the LCD to either normal or inverted display mode.

	Value	Description
–	Normal [Normal] [Normal]	Normal display mode; this means characters/icons are in black. Default value.
–	Invert [Invert] [Invert]	Inverted display mode; this means reverse of normal display mode.

Date/Time

Menu for configuring the date and time on the transmitter.

The following menus/settings are available:

	Full name	Display name	Web name	Page
–	Set current date	[Set date]	–	[▶ 340]
⌚	Set current time	[Set time]	–	[▶ 340]

Set current date

⌚ [Detailed setup] ▶ [Date/Time] ▶ [Set date]

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

- *Easy setup wizard* [▶ 171]
- *Basic setup* [▶ 193]

Sets the date.

	Value	Description
–	Date	The date format on the LCD is defined in the parameter Display format date. The format is MM/DD/YYYY. Default value is 01/01/2015.

Set current time

⌚ [Detailed setup] ▶ [Date/Time] ▶ [Set time]

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

- *Easy setup wizard* [▶ 171]

Sets the time.

	Value	Description
–	Time	Time format is hh:mm:ss. Default value is 00:00.00.

User access configuration

Configures user access or the user role.

The following menus/settings are available:

	Full name	Display name	Web name	Page
–	Write access status	[Write sts]	[Write access status]	[▶ 341]
–	Write lock setting	[Write lock set]	[Write lock setting]	[▶ 341]
Ⓛ	User role	[User role]	–	[▶ 342]
Ⓛ	Change maintenance code	[Chg Mainte]	–	[▶ 342]
Ⓛ	Change specialist code	[Chg Special]	–	[▶ 342]

Write access status

Ⓛ [Detailed setup] ▶ [Access cfg] ▶ [Write sts]

Ⓜ [Device] ▶ [Query device] ▶ [Maintenance Transducer Block] ▶ [MTB original parameters] ▶ [Write access status]

Shows possible parameter operations when write protect is enabled and status of write protect.

	Value	Description
–	All locked [All locked] [All locked]	Transmitter is read-only and parameter values cannot be changed.
–	Display only [Disp only] [Display only]	Transmitter is read-only and only display-related parameters can be changed.
–	Autozero only [AZ only] [Autozero only]	Transmitter is read-only and only Autozero-related parameters can be changed.
–	Display + Autozero [Disp+AZ] [Display + Autozero]	Transmitter is read-only and display- and Autozero-related parameters can be changed.
–	Not locked [See User role param.] [Not locked]	Transmitter is not read-only.

Write lock setting

Ⓛ [Detailed setup] ▶ [Access cfg] ▶ [Write lock set]

Ⓜ [Device] ▶ [Query device] ▶ [Maintenance Transducer Block] ▶ [MTB original parameters] ▶ [Write lock setting]

Sets possible parameter operations when read-only is enabled.

	Value	Description
–	All locked [All locked] [All locked]	Transmitter is read-only and parameter values cannot be changed. Default value.
–	Display only [Disp only] [Display only]	Transmitter is read-only and only display-related parameters can be changed.

	Value	Description
–	Autozero only [AZ only] [Autozero only]	Transmitter is read-only and only Autozero-related parameters can be changed.
–	Display + Autozero [Disp+AZ] [Display + Autozero]	Transmitter is read-only and display- and Autozero-related parameters can be changed.

User role

Ⓛ [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
Ⓛ	Operator [Operator]	Language and display parameters can be used.
Ⓛ	Maintenance [Maintenance]	In addition to Operator, Basic Setup and Auto Zero parameters can be used.
Ⓛ	Specialist [Specialist]	All customer parameters can be used.

Change maintenance code

Ⓛ [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
Ⓛ	Numeric digits.	Setting range: 0 – 9999 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 Default value is 0.

Proving

Configures automatically some parameters related to Proving.

The following menus/settings are available:

	Full name	Display name	Web name	Page
–	Auto proving setting	[Auto prove]	[Auto proving setting]	[▶ 343]

Proving

⌚ [Detailed setup] ▶ [Proving] ▶ [Auto prove]

Ⓜ [Device] ▶ [Query device] ▶ [Maintenance Transducer Block] ▶ [MTB original parameters] ▶ [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.

- 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 [Not exe] [Not execute]	Automatic parameter setting for proving is not executed.
–	Execute [Exe] [Execute]	Automatic parameter setting for proving is executed. After executing, this value is automatically set to Not execute.
–	Restore [Restore] [Restore]	Automatic parameter setting for proving is restored before executing Proving. After restoring, this value is automatically set to Not execute.

Sensor constants

Menu for defining sensor constants.

The following menus/settings are available:

	Full name	Display name	Web name	Page
–	Mass flow	[Mass]	[Mass flow]	[▶ 344]
–	Density	[Dens]	[Density]	[▶ 346]

Mass flow

Menu for defining sensor constants for mass flow measurement.

The following menus/settings are available:

	Full name	Display name	Web name	Page
–	SK20	[SK20]	[SK20]	[344]
–	SK20 reverse	[SK20 reverse]	[SK20 reverse]	[344]
–	SKT	[SKT]	[SKT]	[344]
–	SKTK	[SKTK]	[SKTK]	[345]
–	Qmax	[Qmax]	[Qmax]	[345]
–	Qnom	[Qnom]	[Qnom]	[345]
Ⓜ	SKT1	–	[SKT1]	[345]
Ⓜ	SKT2	–	[SKT2]	[345]
Ⓜ	SKT3	–	[SKT3]	[345]

SK20

Ⓛ [Detailed setup] ► [Snsr cnst] ► [Mass] ► [SK20]

Ⓜ [Device] ► [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] ► [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] ► [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

⌚ [Detailed setup] ► [Snsr cnst] ► [Mass] ► [SKTK]

⊕ [Device] ► [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

⌚ [Detailed setup] ► [Snsr cnst] ► [Mass] ► [Qmax]

⊕ [Device] ► [Detailed setup] ► [Sensor constants] ► [Mass flow] ► [Qmax]

Shows the upper sensor limit.

	Value	Description
–	Numeric digits	Default value depends on the sensor model.

Qnom

⌚ [Detailed setup] ► [Snsr cnst] ► [Mass] ► [Qnom]

⊕ [Device] ► [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] ► [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] ► [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] ► [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	Web name	Page
–	KD	[KD]	[KD]	[346]
–	FL20	[FL20]	[FL20]	[346]
–	FTC1	[FTC1]	[FTC1]	[346]
–	FTCK	[FTCK]	[FTCK]	[346]
Ⓜ	FT1	–	[FT1]	[347]
Ⓜ	FT2	–	[FT2]	[347]
Ⓜ	FT3	–	[FT3]	[347]

KD

Ⓜ [Detailed setup] ► [Snsr cnst] ► [Dens] ► [KD]

Ⓜ [Device] ► [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] ► [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] ► [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] ► [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] ► [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] ► [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] ► [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.

Compensation

Menu for defining compensation.

The following menus/settings are available:

	Full name	Display name	Web name	Page
–	Gas	–	[Gas]	[▶ 347]
Ⓜ	Reynolds number	–	[Reynolds number]	[▶ 349]

Gas

Menu for defining compensation for gas.

The following menus/settings are available:

	Full name	Display name	Web name	Page
–	Sound velocity at reference temperature	[Snd vel]	[Sound velocity at reference temperature]	[▶ 347]
–	Reference temperature for sound velocity	[Snd vel Ref Temp]	[Reference temperature for sound velocity]	[▶ 348]
–	Sound velocity temperature coefficient	[Snd vel Temp Coeff]	[Sound velocity temperature coefficient]	[▶ 348]

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. Default value is 450 m/s (Methane).

Tab. 29: 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

① [Detailed setup] ► [Compensation] ► [Gas] ► [Snd vel Ref Temp]

② [Device root menu] ► [Detailed setup] ► [Compensation] ► [Gas] ► [Reference temperature for sound velocity]

Sets the reference temperature for sound velocity.

	Value	Description
③	Numeric digits	Default value is 20 degC.

See examples for reference temperature at sound velocity parameter.

Sound velocity temperature coefficient

① [Detailed setup] ► [Compensation] ► [Gas] ► [Snd vel Temp Coeff]

② [Device root menu] ► [Detailed setup] ► [Compensation] ► [Gas] ► [Sound velocity temperature coefficient]

Sets the sound velocity temperature coefficient.

	Value	Description
③	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
α	Sound velocity temperature coefficient [1/K]
T_1	Temperature point 1 [°C]
T_2	Temperature point 2 [°C]

Tab. 30: 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 (α)
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	Web name	Page
Ⓜ	Viscosity fixed value	—	[Viscosity fixed value]	[▶ 349]
Ⓜ	Viscosity value select	—	[Viscosity value select]	[▶ 349]
Ⓜ	Re compensation viscosity value	—	[Re compensation viscosity value]	[▶ 349]
Ⓜ	Re compensation viscosity unit	—	[Re compensation viscosity unit]	[▶ 350]
Ⓜ	Fluid constant	—	[VK0]	[▶ 350]
Ⓜ	Viscosity temperature coefficient 1	—	[VKT1]	[▶ 350]
Ⓜ	Viscosity temperature coefficient 2	—	[VKT2]	[▶ 350]

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. 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. 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

④ [Device root menu] ► [Detailed setup] ► [Compensation] ► [Reynolds number] ► [Re compensation viscosity unit]

Sets the re compensation viscosity unit.

	Value	Description
④	mPas	Sets the viscosity unit for re compensation viscosity value. Default value is mPas.
④	Pas	
④	cP	
④	Ns/m ²	
④	kg/ms	
④	cSt	
④	St	
④	mm ² /s	
④	cm ² /s	
④	dm ² /s	
④	m ² /s	

Fluid constant

④ [Device root menu] ► [Detailed setup] ► [Compensation] ► [Reynolds number] ► [VK0]

Sets the fluid constant. This parameter is used in ASTM D341 calculation.

	Value	Description
④	Numeric digits	Setting range: 0 - no check. 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.

Device information

Menu for showing transmitter information.

The following menus/settings are available:

	Full name	Display name	Web name	Page
–	Order information	[Order info]	[Order information]	[▶ 351]
–	Capability information	[Cpblty info]	[Capability information]	[▶ 358]
–	Version/Number information	[Ver/Num info]	[Version/Number information]	[▶ 359]
①	PROFINET information	[PROFINET info]	[PROFINET specific information]	[▶ 361]

Order information

Menu for showing order information.

The following menus/settings are available:

	Full name	Display name	Web name	Page
①	Tag	[Tag]	[Tag]	[▶ 351]
–	Tag (PROFINET)	[Long tag]	[Tag (PROFINET)]	[▶ 352]
–	MS code 1	[MS code1]	[MS code 1]	[▶ 352]
–	MS code 2	[MS code2]	[MS code 2]	[▶ 352]
–	MS code 3	[MS code3]	[MS code 3]	[▶ 352]
–	Release date	[Rls date]	[Release date]	[▶ 353]
–	Transmitter type	[Trsmtr type]	[Transmitter type]	[▶ 353]
–	Display installation	[Disp install]	[Display installation]	[▶ 353]
–	Liquid gas select	[Liq gas sel]	[Liquid gas select]	[▶ 354]
–	Concentration measurement select	[Conc sel]	[Concentration measurement select]	[▶ 354]
–	Function option code	[Func opt code]	[Function option code]	[▶ 355]
–	Function option status	[Func opt sts]	[Function option status]	[▶ 355]
–	Option activation key	[Opt act key]	[Option activation key]	[▶ 356]
–	Extra number 1	[Extra1]	[Extra number 1]	[▶ 356]
–	Extra number 2	[Extra2]	[Extra number 2]	[▶ 357]
–	SI option	[SI opt]	[SI option]	[▶ 357]

Tag

① [Detailed setup] ▶ [Dev info] ▶ [Order info] ▶ [Tag]

	Value	Description
–	ASCII characters	Maximum length is 8 characters. @, 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, :, ;, <, =, >, ?

Tag (PROFINET)

Ⓛ [Detailed setup] ► [Dev info] ► [Order info] ► [Long tag]

Ⓜ [Device] ► [Detailed setup] ► [Device information] ► [Order information] ► [Tag (PROFINET)]

Sets the long tag number of the transmitter.

	Value	Description
–	ASCII characters	Maximum length is 32 characters.

MS code 1

Ⓛ [Detailed setup] ► [Dev info] ► [Order info] ► [MS code1]

Ⓜ [Device] ► [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

Ⓛ [Detailed setup] ► [Dev info] ► [Order info] ► [MS code2]

Ⓜ [Device] ► [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

Ⓛ [Detailed setup] ► [Dev info] ► [Order info] ► [MS code3]

Ⓜ [Device] ► [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] ► [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> [▶ 336].
Ⓜ	Numeric digits	The date format for LCD display is MM/DD/YYYY. The date format for Web page depends on the OS regional setting. Hour, minutes and seconds are always zero on the Web page.

Transmitter type

① [Detailed setup] ► [Dev info] ► [Order info] ► [Trsmtr type]

Ⓜ [Device] ► [Detailed setup] ► [Device information] ► [Order information] ► [Transmitter type]

Shows the transmitter type.

	Value	Description
–	Essential [Essential] [Essential]	Essential transmitter.
–	Ultimate [Ultimate] [Ultimate]	Ultimate transmitter.

Display installation

① [Detailed setup] ► [Dev info] ► [Order info] ► [Disp install]

Ⓜ [Device] ► [Detailed setup] ► [Device information] ► [Order information] ► [Display installation]

Shows whether or not the transmitter has an LCD display.

	Value	Description
–	No Display [No disp] [No Display]	The transmitter does not have an LCD display.
–	With Display [With disp] [With Display]	The transmitter has an LCD display.

Liquid gas select

Ⓛ [Detailed setup] ► [Dev info] ► [Order info] ► [Liq gas sel]

Ⓜ [Device] ► [Detailed setup] ► [Device information] ► [Order information] ► [Liquid gas select]

Sets the fluid type.

	Value	Description
	Liquid	Fluid to be measured is liquid.
–	[Liquid] [Liquid]	Selectable units for corrected volume flow are all standard units.
	Gas	Fluid to be measured is gas.
–	[Gas] [Gas]	Selectable units for corrected volume flow are all standard units and normal units. Switching from gas to liquid is not possible if normal unit is used (e.g., m ³ /h(Normal), m ³ (Normal), Nml Cum/P).

Concentration measurement select

Ⓛ [Detailed setup] ► [Dev info] ► [Order info] ► [Conc sel]

Ⓜ [Device] ► [Detailed setup] ► [Device information] ► [Order information] ► [Concentration measurement select]

Shows the type of concentration measurement that is possible.

	Value	Description
	Inhibit	
–	[Inhibit] [Inhibit]	Concentration measurement is not available.
	Standard	
–	[std] [Standard]	Standard concentration measurement is available.
	Advanced	
–	[Adv] [Advanced]	Advanced concentration measurement is available.
	Net oil computing API	
–	[NOC] [Net oil computing API]	Net Oil Computing is available.
	Net oil computing API and GVF	
–	[NOC GVF] [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] ► [Detailed setup] ► [Device information] ► [Order information] ► [Function option code]

Shows available options on the transmitter.

	Value	Description
–	Tube Health Check [Tube health chk] [Tube Health Check]	Tube Health Check is available.
–	Tube leakage detection [Tube lkg] [Tube leakage detection]	Tube leakage detection is available.
–	Calorific Value [Cal via AI] [External input calorific value]	Calorific value from an external device is available.
–	Viscosity [Visc] [Viscosity]	Viscosity is available.

Function option status

① [Detailed setup] ► [Dev info] ► [Order info] ► [Func opt sts]

② [Device] ► [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] [Tube Health Check]	Tube Health Check is available.
–	Tube leakage detection [Tube lkg] [Tube leakage detection]	Tube leakage detection is available.
–	Calorific Value [Cal via AI] [External input calorific value]	Calorific Value from external device is available.
–	Viscosity [Visc] [Viscosity]	Viscosity is available.

	Value	Description
	Concentration Standard	
–	[Conc std] [Concentration standard]	Standard concentration measurement is available.
	Concentration Advanced	
–	[Conc adv] [Concentration advanced]	Advanced concentration measurement is available.
	Net oil computing API	
–	[NOC API] [Net oil computing API]	Net Oil Computing is available.
	Net oil computing API and GVF	
–	[NOC API GVF] [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]

② [Device] ► [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	
–	[32 alphanumeric digit] [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]

② [Device] ► [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]

② [Device] ► [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

① [Detailed setup] ► [Dev info] ► [Order info] ► [SI opt]

② [Device] ► [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 [on] [SI Units only]	Units comply with Japanese measurement law.
–	Off [off] [No restrictions]	General configuration.

Capability information

Menu for showing the physical capabilities of the sensor.

The following menus/settings are available:

	Full name	Display name	Web name	Page
–	Max permissible temperature	[Max permit temp]	[Max permissible temperature]	[▶ 358]
–	Max permissible pressure	[Max permit pres]	[Max permissible pressure]	[▶ 358]
–	Temperature lower limit	[Temp lo lim]	[Temperature lower limit]	[▶ 358]
–	Temperature upper limit	[Temp hi lim]	[Temperature upper limit]	[▶ 358]

Max permissible temperature

Ⓐ [Detailed setup] ▶ [Dev info] ▶ [Cpblty info] ▶ [Max permit temp]

Ⓜ [Device] ▶ [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

Ⓐ [Detailed setup] ▶ [Dev info] ▶ [Cpblty info] ▶ [Max permit pres]

Ⓜ [Device] ▶ [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

Ⓐ [Detailed setup] ▶ [Dev info] ▶ [Cpblty info] ▶ [Temp lo lim]

Ⓜ [Device] ▶ [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> [▶ 208].

Temperature upper limit

Ⓐ [Detailed setup] ▶ [Dev info] ▶ [Cpblty info] ▶ [Temp hi lim]

Ⓜ [Device] ▶ [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> [▶ 208].

Version/Number information

Menu for showing firmware and hardware revision information.

The following menus/settings are available:

	Full name	Display name	Web name	Page
–	Sensor serial number	[Snsr serial]	[Sensor serial number]	[▶ 359]
–	Complete device serial number	[Cmplt ser num]	[Complete device serial number]	[▶ 359]
–	Transmitter spare serial number	[Trsmtr spare ser num]	[Transmitter spare serial number]	[▶ 360]
–	Sensor spare serial number	[Snsr spare ser num]	[Sensor spare serial number]	[▶ 360]
–	Indicator software revision	[Ind soft rev]	[Indicator software revision]	[▶ 360]
–	Main software revision	[Main soft rev]	[Main software revision]	[▶ 360]
–	Sensor software revision	[Snsr soft rev]	[Sensor software revision]	[▶ 360]
–	Indicator software revision	[Ind soft rev]	[Indicator software revision]	[▶ 360]
–	Option board software revision	Opt bd soft rev	[Option board software revision]	[▶ 361]
–	Hardware revision	[Hard rev]	[Hardware revision]	[▶ 361]
Ⓜ	Software description	–	[Software description]	[▶ 361]

Sensor serial number

① [Detailed setup] ▶ [Dev info] ▶ [Ver/Num info] ▶ [Snsr serial]

Ⓜ [Device] ▶ [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

① [Detailed setup] ▶ [Dev info] ▶ [Ver/Num info] ▶ [Cmplt ser num]

Ⓜ [Device] ▶ [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

Ⓛ [Detailed setup] ► [Dev info] ► [Ver/Num info] ► [Trsmtr spare ser num]

Ⓜ [Device] ► [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

Ⓛ [Detailed setup] ► [Dev info] ► [Ver/Num info] ► [Snsr spare ser num]

Ⓜ [Device] ► [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

Ⓛ [Detailed setup] ► [Dev info] ► [Ver/Num info] ► [Main soft rev]

Ⓜ [Device] ► [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

Ⓛ [Detailed setup] ► [Dev info] ► [Ver/Num info] ► [Snsr soft rev]

Ⓜ [Device] ► [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

Ⓛ [Detailed setup] ► [Dev info] ► [Ver/Num info] ► [Ind soft rev]

Ⓜ [Device] ► [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

Option board software revision

Ⓛ [Detailed setup] ► [Dev info] ► [Ver/Num info] ► Option board software revision

Ⓜ [Device] ► [Detailed setup] ► [Device information] ► [Version/Number information] ► [Option board software revision]

Shows the software revision of the Option board firmware.

	Value	Description
–	ASCII characters.	Indicator software revision

Hardware revision

Ⓛ [Detailed setup] ► [Dev info] ► [Ver/Num info] ► [Hard rev]

Ⓜ [Device] ► [Detailed setup] ► [Device information] ► [Version/Number information] ► [Hardware revision]

Shows the revision of the hardware.

	Value	Description
–	ASCII characters.	Hardware revision

Software description

Ⓜ [Device] ► [Detailed setup] ► [Device information] ► [Version/Number information] ► [Software description]

Shows the ID number of the transmitter.

	Value	Description
–	Numeric digits	Software description

PROFINET information

Menu for PROFINET relevant information and configuration.

The following menus/settings are available:

	Full name	Display name	Page
Ⓛ	Target mode	[Target mode]	[▶ 362]
Ⓛ	IP address	[IP addr]	[▶ 362]
Ⓛ	Subnet mask	[Subnet mask]	[▶ 362]
Ⓛ	Default gateway	[dflt gateway]	[▶ 362]
Ⓛ	Device reset	[Device reset]	[▶ 362]
Ⓛ	MAC address	[MAC addr]	[▶ 362]
Ⓛ	AI 1 – 6 input selector	[Input Sel]	[▶ 363]
Ⓛ	Analog Output Target mode	[Target mode]	[▶ 364]
Ⓛ	Analog output flow units	[Unit]	[▶ 364]
Ⓛ	Analog output low limit	[Lo lim]	[▶ 364]
Ⓛ	Analog output high limit	[Hi lim]	[▶ 365]

Target mode

⌚ [Detailed setup] ► [Dev info] ► [PROFINET info] ► [FTB] ► [Target mode]

Target mode sets the Target mode for Physical Block, All Transducer Block and All Function Blocks. Many parameters cannot be written when Target mode is set to Auto.

	Display parameter	Description
–	Auto	Operation is Auto mode.
–	O/S	Operation is out of service mode.

IP address

⌚ [Detailed setup] ► [Dev info] ► [PROFINET info] ► [FTB] ► [IP addr]

IP address can be configured for this device. IP address is reflected after restarting the device.

	Display parameter	Description
–	Numeric digits	Set IP address. Default value is 192.168.1.210 if no delivery setting is specified.

Subnet mask

⌚ [Detailed setup] ► [Dev info] ► [PROFINET info] ► [FTB] ► [Subnet mask]

Subnet mask can be configured for this device. Subnet mask is reflected after restarting the device.

	Display parameter	Description
–	Numeric digits	Set Subnet mask. Default value is 255.255.255.0 if no delivery setting is specified.

Default gateway

⌚ [Detailed setup] ► [Dev info] ► [PROFINET info] ► [FTB] ► [dflt gateway]

Default gateway can be configured for this device. Default gateway is reflected after restarting the device.

	Display parameter	Description
–	Numeric digits	Set Default gateway. Default value is empty if no delivery setting is specified.

Device reset

⌚ [Detailed setup] ► [Dev info] ► [PROFINET info] ► [FTB] ► [Device reset]

Restarts the device.

	Display parameter	Description
–	Cancel	No restarting, the device is done.
–	Execute	Restarts the device.

MAC address

⌚ [Detailed setup] ► [Dev info] ► [PROFINET info] ► [FTB] ► [MAC addr]

Shows MAC address of this device.

	Display parameter	Description
–	Numeric digits	Shows MAC address.

**Analog input 1-6
input selector**

① [Detailed setup] ► [Dev info] ► [PROFINET info] ► [AI1 - 6] ► [Input Sel]

This parameter is configured to assign the Analog Input 1-6 to send process value to host system such as DCS/PLC.

	Value	Description
—	Mass flow [Mass]	Sets the process value to assign Analog Input 1-6. Default value of Analog Input 1: Mass flow Default value of Analog Input 2: Density Default value of Analog Input 3: Temperature Default value of Analog Input 4: Volume flow Default value of Analog Input 5: Reference density Default value of Analog Input 6: Corrected volume flow
—	Density [Dens]	
—	Temperature [Temp]	
—	Pressure [Pres]	
—	Volume flow [Vol]	
—	Reference density [Ref dens]	
—	Relative density [Rel dens]	
—	Corrected volume flow [Corr vol]	
—	Concentration [Conc]	
Ⓕ	Net mass flow 1 [Net mass1]	
Ⓕ	Net mass flow 2 [Net mass2]	
Ⓕ	Net volume flow 1 [Net vol1]	
Ⓕ	Net volume flow 2 [Net vol2]	
Ⓕ	Net corrected volume flow [Net corr vol]	
Ⓕ	Viscosity [Visc]	
Ⓖ	Drive current [Drv curr]	
Ⓕ	TuHC Change ratio of inlet stiffness [Inlet stiff chg]	
Ⓖ	TuHC Change ratio of outlet stiffness [Outlet stiff chg]	

**Analog Output
Target mode**

⌚ [Detailed setup] ► [Dev info] ► [PROFINET info] ► [AO] ► [Target mode]

Analog Output Target mode sets the Target mode for Analog Output Block.

	Display parameter	Description
–	Auto	Operation is Auto mode.
–	O/S	Operation is out of service mode.
–	Man	Operation is manual mode.

**Analog output flow
units**

⌚ [Detailed setup] ► [Dev info] ► [PROFINET info] ► [AO] ► [Unit]

Unit of this parameter is configured to receive the value from external device via Analog Output Block.

	Value	Description
–	inH2O(68°F)	Sets the unit for external device. Default value is bar. Pressure, temperature and calorific value unit can be set.
–	inHg	
–	ftH2O(68°F)	
–	mmH2O(68°F)	
–	mmHg	
–	psi	
–	bar	
–	mbar	
–	g/cm ²	
–	kg/cm ²	
–	Pa	
–	kPa	
–	torr	
–	atm	
–	MPa	
–	inH2O	
–	mmH2O	
–	ftH2O	
–	hPa	
–	degC	
–	degF	
–	degR	
–	K	
–	MJ/kg	
–	Btu/lb	
–	MJ/m ³	
–	Btu/gal	
–	MJ/Nml m ³	
–	Btu/Std ft ³	

**Analog output
low limit**

⌚ [Detailed setup] ► [Dev info] ► [PROFINET info] ► [AO] ► [Lo lim]

This parameter is configured the low limit value to receive the value from external device via Analog Output Block.

	Value	Description
–	Numeric digits	The unit for this value is defined in the parameter Analog output flow units. Default value is 0.0.

Analog output high limit

⌚ [Detailed setup] ► [Dev info] ► [PROFINET info] ► [AO] ► [Hi lim]

This parameter is configured the high limit value to receive the value from external device via Analog Output Block.

	Value	Description
–	Numeric digits	The unit for this value is defined in the parameter Analog output flow units. Default value is 200.0.

Network

Menu for Network relevant information and the configuration.

The following menus/settings are available:

	Full name	Display name	Web name	Page
Ⓜ	Communication settings	–	[Communication settings]	[▶ 365]
Ⓜ	Communication status	–	[Communication status]	[▶ 367]

Communication settings

Menu for communication relevant information and the configuration.

The following menus/settings are available:

	Full name	Display name	Web name	Page
Ⓜ	IP address	–	[IP address]	[▶ 365]
Ⓜ	Subnet mask	–	[Subnet mask]	[▶ 366]
Ⓜ	Default gateway	–	[Default gateway]	[▶ 366]
Ⓜ	Station name	–	[Station name]	[▶ 366]
Ⓜ	MAC address	–	[MAC address]	[▶ 366]
Ⓜ	Web enable	–	[Web enable]	[▶ 366]
Ⓜ	SNMP enable	–	[SNMP enable]	[▶ 367]
Ⓜ	SNMP community name for read	–	[SNMP community name for read]	[▶ 367]
Ⓜ	SNMP community name for write	–	[SNMP community name for write]	[▶ 367]

IP address

Ⓜ [Device] ► [Detailed setup] ► [Network] ► [Communication settings] ► [IP address]

IP address can be configured for this device. IP address is reflected after restarting the device.

	Display parameter	Description
–	Numeric digits	Set IP address. Default value is 192.168.1.210 if no delivery setting is specified.

Subnet mask

Ⓜ [Device] ► [Detailed setup] ► [Network] ► [Communication settings] ► [Subnet mask]

Subnet mask can be configured for this device. Subnet mask is reflected after restarting the device.

	Display parameter	Description
–	Numeric digits	Set Subnet mask. Default value is 255.255.255.0 if no delivery setting is specified.

Default gateway

Ⓜ [Device] ► [Detailed setup] ► [Network] ► [Communication settings] ► [Default gateway]

Default gateway can be configured for this device. Default gateway is reflected after restarting the device.

	Display parameter	Description
–	Numeric digits	Set Default gateway. Default value is empty if no delivery setting is specified.

Station name

Ⓜ [Device] ► [Detailed setup] ► [Network] ► [Communication settings] ► [Station name]

Station name for PROFINET communication can be configured for this device. Station name is reflected after restarting the device

	Display parameter	Description
–	Numeric digits	Sets Station name for [PROFINET]. Default value is PN370300 + Complete device serial number.

MAC address

Ⓜ [Device] ► [Detailed setup] ► [Network] ► [Communication settings] ► [MAC address]

Shows MAC address of this device.

	Display parameter	Description
–	Numeric digits	Shows MAC address.

Web enable

Ⓜ [Device] ► [Detailed setup] ► [Network] ► [Communication settings] ► [Web enable]

Web page can be selected to Enable or Disable. Web enable is reflected after restarting the device.

	Display parameter	Description
–	Disable	Web page function is not available.
–	Enable	Web page function is available.

SNMP enable

Ⓜ [Device] ► [Detailed setup] ► [Network] ► [Communication settings] ► [SNMP enable]

SNMP agent function can be selected to Enable or Disable. SNMP agent function is disabled when shipped from the factory. SNMP enable is reflected after restarting the device.

	Display parameter	Description
–	Disable	SNMP agent function is not available.
–	Enable	SNMP agent function is available.

SNMP community name for read

Ⓜ [Device] ► [Detailed setup] ► [Network] ► [Communication settings] ► [SNMP community name for read]

Set the community name for MIB read. When reading, it will always be an empty string. Set the following string as the community name. The setting will be reflected immediately.

- String length is between 1 and 16.
- Characters consist of alphanumerical characters, periods (.) and hyphens (-). The first and the last characters must be alphanumerical characters.

	Value	Description
–	ASCII characters	Community name for MIB read (default setting is "public")

SNMP community name for write

Ⓜ [Device] ► [Detailed setup] ► [Network] ► [Communication settings] ► [SNMP community name for write]

Set the community name for MIB write. When reading, it will always be an empty string. Set the following string as the community name. The setting will be reflected immediately.

- String length is between 1 and 16.
- Characters consist of alphanumerical characters, periods (.) and hyphens (-). The first and the last characters must be alphanumerical characters.

	Value	Description
–	ASCII characters	Community name for MIB write (default setting is "private")

Communication status

Menu for communication relevant status.

The following menus/settings are available:

	Full name	Display name	Web name	Page
Ⓜ	Web software seal	–	[Web software seal]	[▶ 367]
Ⓜ	Auto negotiation restart	–	[Auto negotiation restart]	[▶ 368]

Web software seal

Ⓜ [Device] ► [Detailed setup] ► [Network] ► [Communication status] ► [Web software seal]

Software seal shows what kind of password is set for web page.

	Display parameter	Description
–	Break	Protect is canceled by the wild-card password.
–	Keep	Setting reverts to Keep if the protection is canceled by a new password.

Auto negotiation restart

Ⓜ [Device] ► [Detailed setup] ► [Network] ► [Communication status] ► [Auto negotiation restart]

Web page can be selected to Enable or Disable. Web enable is reflected after restarting the device.

	Display parameter	Description
–	Not execute	Auto negotiation is not restarted.
–	Execute	Auto negotiation is restarted.

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	Web name	Page
–	Write protect	–	[Write protection]	[▶ 368]
–	Write Protect New password	–	[Write protect New password]	[▶ 369]
–	Enable write 10 min	–	[Enable write 10min]	[▶ 369]
–	Write Protect Software seal	–	[Write protect Software seal]	[▶ 369]
–	Web enable	–	–	[▶ 369]

Write protect

Ⓜ [Device] ► [Detailed setup] ► [Write protect] ► [Write protection]

Sets the write protection status.

	Value	Description
–	Yes [Yes]	Write protection is enabled, the parameters of the device cannot be changed.
–	No [No write protection]	Write protection is disabled, the parameters of the device can be changed.
–	Hardware write protection [Hardware write protection]	Hardware write protection is enable, the parameters of the device cannot be changed.
–	Password write protection [Password write protection]	Software write protection is enable, the parameters of the device cannot be changed.

Write Protect New password

Ⓜ [Device] ► [Detailed setup] ► [Write protect] ► [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. Maximum length is 8 digits.
–	8 blank spaces	Disables write protection.

Enable write 10 min

Ⓜ [Device] ► [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. Maximum length is 8 digits.

Write Protect Software seal

Ⓜ [Device] ► [Detailed setup] ► [Write protect] ► [Write Protect Software seal]

Shows what kind of password is set.

	Value	Description
–	Break [Break] [Break]	Protect is canceled by the wild-card password, that is 8 blank spaces.
–	Keep [Keep] [Keep]	Setting reverts to Keep if the protection is canceled by a new password.

Web enable

Web page can be selected to Enable or Disable. Web enable is reflected after restarting the device.

	Display parameter	Description
–	Disable	Web page function is not available.
–	Enable	Web page function is available.

Others

Menu for other parameters.

The following menus/settings are available:

	Full name	Display name	Web name	Page
–	Signal gain	[Signal gain]	[Signal gain]	[370]
–	Memo 1	[Memo1]	[Memo 1]	[370]
–	Memo 2	[Memo2]	[Memo 2]	[370]
–	Memo 3	[Memo3]	[Memo 3]	[371]

Signal gain

Ⓛ [Detailed setup] ► [Others] ► [Signal gain]

Ⓜ [Device] ► [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 [Gain1] [Gain 1]	Tubes oscillation amplitude 100%.
–	Gain2 [Gain2] [Gain 2]	Tubes oscillation amplitude about 60%.
–	Gain3 [Gain3] [Gain 3]	Tubes oscillation amplitude about 30%.
–	Gain4 [Gain4] [Gain 4]	Tubes oscillation amplitude about 15%.

Memo 1

Ⓛ [Detailed setup] ► [Others] ► [Memo1]

Ⓜ [Device] ► [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] ► [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] ► [Detailed setup] ► [Others] ► [Memo 3]

Sets a general purpose memo.

	Value	Description
–	ASCII characters	Maximum length is 16 ASCII characters.

5.8 microSD

Menu for microSD card parameters.

The following menus/settings are available:

	Full name	Display name	Web name	Page
④	Target mode	[Target mode]	—	[372]
④	microSD contents	[Contents]	—	[372]
④	microSD unmount	[Unmount]	—	[372]
④	microSD format	[Format]	—	[372]
④	microSD property	[Property]	—	[373]
④	microSD file name	[File name]	—	[373]

Target mode

④ [Detailed setup] ► [microSD] ► [Target mode]

Target mode sets the Target mode for Physical Block, All Transducer Block and All Function Blocks. Many parameters cannot be written when Target mode is set to Auto.

	Display parameter	Description
—	Auto	Operation is Auto mode.
—	O/S	Operation is out of service mode.

microSD contents

④ [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

④ [microSD] ► [Unmount]

Sets unmounting of the microSD card.

	Value	Description
—	Cancel [Cancel]	microSD unmounting will be canceled.
—	Execute [Execute]	microSD unmounting will be executed.

microSD format

④ [microSD] ► [Format]

Sets the formatting of the microSD card.

	Value	Description
—	Cancel [Cancel]	microSD formatting will be canceled.
—	Execute [Execute]	microSD formatting will be executed.

**microSD
file name**

① [microSD] ► [File name]

Shows the file name of each extension.

	Value	Description
–	*.EVT [* .EVT]	Event file name
–	*.TRD [* .TRD]	Logging file name
–	*.PAR [* .PAR]	Backup file name
–	*.MON [* .MON]	Monitoring file name

5.8.1 microSD property

Menu for microSD card properties.

The following menus/settings are available:

	Full name	Display name	Web name	Page
①	microSD total space	[Total space]	–	[▶ 373]
①	microSD available space	[Available space]	–	[▶ 373]
①	microSD file system	[File system]	–	[▶ 373]

**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 [Unknown]	File system type is unknown.
–	FAT12 [FAT12]	File system type is FAT12.
–	FAT16 [FAT16]	File system type is FAT16.
–	FAT32 [FAT32]	File system type is FAT32.

	Value	Description
–	exFAT [exFAT]	File system type is exFAT.

5.9 Diagnostic

Diagnostic menu shows device status of device.

Tab. 31: Explanation of symbols used in the menu description

Sym-bols	Description
Ⓜ	Menu item or menu path is available via the Web page.

The following menus/settings are available:

	Full name	Display name	Web name	Page
Ⓜ	Diagnosis	–	[Diagnosis]	[▶ 374]
Ⓜ	Device Status (Details)	–	[Device Status (Details)]	[▶ 375]

5.9.1 Diagnosis

Menu for Diagnosis.

The following menus/settings are available:

	Full name	Display name	Web name	Page
Ⓜ	NE107 Status	–	[NE107 Status]	[▶ 374]
Ⓜ	Diagnosis	–	[Diagnosis]	[▶ 374]
Ⓜ	NE107 details	–	[NE107 details]	[▶ 375]

NE107 Status

Ⓜ [Diagnostic] ▶ [Diagnosis] ▶ [NE107 status]

Shows overall current NE 107 status of this device.

	Value	Description
–	Good	Good status.
–	Maintenance	Maintenance required.
–	Out of specification	This device is Out of specification.
–	Function check	Function check is necessary.
–	Failure	This device is failure status.

Diagnosis

Ⓜ [Diagnostic] ▶ [Diagnosis] ▶ [Diagnosis]

Shows the diagnosis based on PA Profile 4.02.

	Value	Description
–	DIA MAINTENANCE	Maintenance required.
–	DIA MAINTENANCE ALARM	Maintenance alarm status.
–	DIA MAINTENANCE_DEMANDED	Maintenance demanded.

	Value	Description
–	DIA_FUNC-TION_CHECK	Function check is necessary.
–	DIA OUT OF SPEC	This device is failure status.
–	DIA UPDATE EVENT	Shows the status of the update event flag.

NE107 details

Menu for details of NE 107: This device shows the following NE 107 alarms based on PA Profile 4.02.

- NE107 common
- Link NE107 common.Faulty installat
- Link NE107 common.Overloading
- Link NE107 common.Maximum line length exceeded
- Link NE107 common.Auxil medium missing or insuffic
- Link NE107 common.Wear reserve used up (operation)
- Link NE107 common.Wear reserve used up (wear)
- Link NE107 common.Error in peripherals
- Link NE107 common.Auxiliary medium missing
- Link NE107 common.Excessive temperature shock
- Link NE107 common.Deviation from measurement
- Link NE107 common.Humidity in electronics area
- Link NE107 common.Mechanical damage
- Link NE107 common.Communication error
- Link NE107 common.Foreign material in electro area
- NE107 coriolis
- Link NE107 coriolis.Gas bubbles in the liquid
- Link NE107 coriolis.Fouling, clogging
- Link NE107 coriolis.Asymmetry of measuring tubes
- Link NE107 coriolis.External vibrations
- Link NE107 coriolis.Incomplete filling

5.9.2 Device Status (Details)

Menu for Device Status (Details).

The following menus/settings are available:

	Full name	Display name	Web name	Page
Ⓜ	Device Status 1 – 8	–	[Device Status 1]	[▶ 375]

Device status 1 – 8

Ⓜ [Diagnostic] ▶ [Device Status (Details)] ▶ [Device status]

Shows the device status of this device.

	Display parameter	Description
–	Device status 1	Status of the following events: ▪ 401:PB in O/S Mode

	Display parameter	Description
–	Device status 2	Status of the following events: ▪ 101: Resonance frequency failure ▪ 102: Signal failure ▪ 103 – 104: Pick off 1 failure ▪ 105 – 106: Pick off 2 failure ▪ 107: Temperature range failure ▪ 108: Temperature sensor failure ▪ 109: Tube leakage detection ▪ 141: Option board communication error1 ▪ 142: Option board communication error2 ▪ 143: Option board communication error3 ▪ 121: Main board CPU failure ▪ 122: Main board EEPROM failure ▪ 123: Parameter restore incomplete ▪ 124: Sensor board failure ▪ 125: Sensor board mismatch ▪ 126: Sensor communication error ▪ 127: Option board failure ▪ 128: Option board EEPROM failure ▪ 130: Indicator board failure ▪ 131: Indicator board EEPROM failure ▪ 132: LCD driver failure ▪ 133: Indicator board mismatch ▪ 134: Indicator communication error ▪ 135: microSD failure
–	Device status 3	Status of the following events: ▪ 201: Slug detection ▪ 202: Empty pipe detection ▪ 203: Corrosion detection ▪ 204: Autozero judgment multiphase ▪ 205: Autozero judgment flow ▪ 206: Autozero judgment temperature ▪ 210: Oil density calculation failure ▪ 211: Water density calculation failure ▪ 212: NOC calculation failure ▪ 335: Totalizer 1 configuration error ▪ 336: Totalizer 2 configuration error ▪ 337: Totalizer 3 configuration error ▪ 342: Data logging not started

	Display parameter	Description
–	Device status 4	Status of the following events: ▪ 301: Mass flow configuration error ▪ 302: Density configuration error ▪ 303: Temperature configuration error ▪ 305: Pressure configuration error ▪ 307: Volume flow configuration error ▪ 308: Reference density configuration error ▪ 309: Relative density configuration error ▪ 310: Corrected volume flow configuration error ▪ 311: Calorific configuration error ▪ 313: Concentration configuration error ▪ 314: Net mass flow 1 configuration error ▪ 315: Net mass flow 2 configuration error ▪ 316: Net volume flow 1 configuration error ▪ 317: Net volume flow 2 configuration error ▪ 318: Net corrected volume flow configuration error ▪ 319: Velocity configuration error ▪ 320: Viscosity configuration error ▪ 323: Pulse output configuration error ▪ 324: Frequency output configuration error
–	Device status 5	Status of the following events: ▪ 703: Density fixed ▪ 704: Temperature fixed ▪ 705: Pressure fixed ▪ 706: Reference density fixed ▪ 707: Calorific value fixed ▪ 710: Pulse output simulation ▪ 715: Process variable trimming ▪ 718: Pulse output saturated ▪ 721: Autozero running ▪ 722: Tube health check execution error ▪ 723: Date/Time not set ▪ 724: Display over warning ▪ 725: microSD card size warning ▪ 726: microSD card mismatch ▪ 728: microSD card removal procedure error ▪ 729: Parameter backup incomplete ▪ 730: Parameter restore running

	Display parameter	Description
–	Device status 6	Status of the following events: ▪ 733: Viscosity Not Calculated ▪ 734: Viscosity Not Reliable ▪ 735: Autozero warning ▪ 743: Default MAC address ▪ 901: Device configuration locked ▪ 902: Device configuration not locked ▪ 903: Parameter backup running ▪ 904: Data logging running ▪ 905: Tube health check running ▪ 909: Maintenance mode running
–	Device status 7	Status of the following events: ▪ 414: AI1 Simulation Active ▪ 424: AI2 Simulation Active ▪ 434: AI3 Simulation Active ▪ 444: AI4 Simulation Active ▪ 454: AI5 Simulation Active ▪ 464: AI6 Simulation Active
–	Device status 8	Status of the following events: ▪ 504: TOT1 Simulation Active ▪ 514: TOT2 Simulation Active ▪ 524: TOT3 Simulation Active ▪ 601: AO in O/S Mode ▪ 602: AO in Man Mode

5.10 Maintenance

Diagnostic menu shows the parameters used for service/maintenance.

Tab. 32: Explanation of symbols used in the menu description

Sym-bols	Description
Ⓜ	Menu item or menu path is available via the Web page.

The following menus/settings are available:

	Full name	Display name	Web name	Page
Ⓜ	Mode	—	[Mode]	[▶ 379]
Ⓜ	Test/Adjustment	—	[Test/Adjustment]	[▶ 379]
Ⓜ	Event settings	—	[Event settings]	[▶ 384]
Ⓜ	Standard Diagnostics	—	[Standard Diagnostics]	[▶ 392]
Ⓜ	Total Health Check	—	[Total Health Check]	[▶ 398]
Ⓜ	Data Logging	—	[Data Logging]	[▶ 414]
Ⓜ	Parameter Backup/Restore	—	[Parameter Backup/ Restore]	[▶ 419]
Ⓜ	Calibration information	—	[Calibration information]	[▶ 422]

5.10.1 Mode

Menu for parameters used to configure the Target mode.

The following menus/settings are available:

	Full name	Display name	Web name	Page
Ⓜ	Current mode	—	[Current mode]	[▶ 379]
Ⓜ	Target mode	—	[Target mode]	[▶ 379]

Current mode

Ⓜ [Maintenance] ▶ [Mode] ▶ [Current mode]

This parameter shows the current Target mode for Physical Block, All Transducer Block and All Function Blocks.

	Value	Description
—	Auto	Operation is Auto mode.
—	O/S	Operation is out of service.

Target mode

Ⓜ [Maintenance] ▶ [Mode] ▶ [Target mode]

Target mode sets the Target mode for Physical Block, All Transducer Block and All Function Blocks. Many parameters cannot be written when Target mode is set to Auto.

	Display parameter	Description
—	Auto	Operation is Auto mode.
—	O/S	Operation is out of service mode.

5.10.2 Test/Adjustment

Menu for ...

The following menus/settings are available:

	Full name	Display name	Web name	Page
Ⓜ	Autozero	—	[Autozero]	[▶ 380]
Ⓜ	Time stamp	—	[Time stamp]	[▶ 382]
Ⓜ	Output test	—	[Output test]	[▶ 382]
Ⓜ	Display indication	—	[Display indication]	[▶ 383]

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	Web name	Page
Ⓜ	Autozero execute	—	[Autozero execute]	[▶ 380]
Ⓜ	Autozero Time	—	[Autozero time]	[▶ 380]
Ⓜ	Autozero Value	—	[Autozero value]	[▶ 380]
Ⓜ	Autozero Standard Deviation	—	[Autozero standard deviation]	[▶ 380]
Ⓜ	Clear autozero failure	—	[Clear autozero failure]	[▶ 381]
Ⓜ	Clear autozero	—	[Clear autozero]	[▶ 381]
Ⓜ	Autozero failure detection	—	[Autozero failure detection]	[▶ 381]

Autozero execute

Ⓜ [Maintenance] ▶ [Test/Adjustment] ▶ [Autozero] ▶ [Autozero execute]

	Value	Description
—	Not execute [Not execute]	Autozero will not be executed. This value will be displayed, if the zero point alignment does not run.
—	Execute [Execute]	Autozero will be executed. This value will be displayed, if the zero point alignment runs.

Autozero Time

Ⓜ [Maintenance] ▶ [Test/Adjustment] ▶ [Autozero] ▶ [Autozero time]

Sets the execution time for autozero.

	Value	Description
—	Numeric digits	Default value is 180 s (Recommended). Setting range: 10 – 400 s. The input value is rounded to 10.

Autozero Value

Ⓜ [Maintenance] ▶ [Test/Adjustment] ▶ [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

Ⓜ [Maintenance] ▶ [Test/Adjustment] ▶ [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

Ⓜ [Maintenance] ► [Test/Adjustment] ► [Autozero] ► [Clear autozero]

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

	Value	Description
–	[Not exe] [Not execute]	Default value.
–	[Exe] [Execute]	Clears autozero value and resets autozero value to factory default.

Clear Autozero Failure

Ⓜ [Maintenance] ► [Test/Adjustment] ► [Autozero] ► [Clear autozero failure]

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

	Value	Description
–	[Not exe] [Not execute]	Default value.
–	[Exe] [Execute]	Clears autozero failure alarm.

Autozero failure detection

Ⓜ [Maintenance] ► [Test/Adjustment] ► [Autozero] ► [Autozero failure detection]

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] [Off]	Process condition is not checked when Autozero is performed.
–	[on] [On]	Process condition is checked when Autozero is performed Default value.

Time stamp**Time stamp**

Ⓜ [Maintenance] ► [Test/Adjustment] ► [Time stamp]

Shows parameters for time information.

	Display parameter	Description
–	Current Date [Current Date]	Shows actual current date, if the date was set correctly when the device started running. This parameter is also available in additional menus. The values can be shown in each of these menus:
–	Operation time [Operation time]	Shows accumulated operating time of the device since it started running.

Output test

The output test sets output levels to fixed values for outputs IO1 to IO4. 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* [▶ 100], 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	Web name	Page
Ⓜ	Test mode	–	[Test mode]	[▶ 382]
Ⓜ	Frequency output test	–	[Frequency output test]	[▶ 382]
Ⓜ	Test auto release time	–	[Test auto release time]	[▶ 383]

Test mode

Ⓜ [Maintenance] ► [Test/Adjustment] ► [Test mode]

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

	Value	Description
–	On [On] [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 Frequency output test. The measured value is not output during test mode.
–	Off [Off] [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.

Frequency output test

Ⓜ [Maintenance] ► [Test/Adjustment] ► [Frequency output test]

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

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

Test auto release time

Ⓜ [Maintenance] ► [Test/Adjustment] ► [Test auto release time]

Sets a time period for ending the test mode automatically.

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

Display indication

The following menus/settings are available:

	Full name	Display name	Web name	Page
Ⓜ	LCD Test	–	[LCD Test]	[▶ 383]
Ⓜ	Squawk	–	[Squawk]	[▶ 384]

LCD test

Ⓜ [Maintenance] ► [Test/Adjustment] ► [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	The test is not executed or cancelled. If selected and set during testing, the test is immediately terminated. Default value.
–	[Not exe] [Not execute]	
	Execute all	Shows all test patterns from 1 to 4.
–	[Exe] [Execute]	
	Show pattern 1	All pixels turned on.
–	[Pattern1] [Show pattern 1]	

	Value	Description
	Show pattern 2	
–	[Pattern2] [Show pattern 2]	All dots turned off.
	Show pattern 3	
–	[Pattern3] [Show pattern 3]	Small hound's tooth check.
	Show pattern 4	
–	[Pattern4] [Show pattern 4]	Big hound's tooth check.

Squawk

Ⓜ [Maintenance] ► [Test/Adjustment] ► [Display indication] ► [Squawk]

Sets a flashing back light on the display.

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

5.10.3 Event Settings

The following menus/settings are available:

	Full name	Display name	Web name	Page
Ⓜ	Alarm delay	–	[Alarm delay]	[385]
Ⓜ	Update event acknowledge	–	[Update event acknowledge]	[385]
Ⓜ	Update event mode	–	[Update event mode]	[385]
Ⓜ	Event setting slug detection	–	[Event setting slug detection]	[386]
Ⓜ	Event setting empty pipe detection	–	[Event setting empty pipe detection]	[386]
Ⓜ	Event setting corrosion detection	–	[Event setting corrosion detection]	[387]
Ⓜ	Event setting density fixed	–	[Event setting density fixed]	[387]
Ⓜ	Event setting temperature fixed	–	[Event setting temperature fixed]	[387]
Ⓜ	Event setting pressure fixed	–	[Event setting pressure fixed]	[388]
Ⓜ	Event setting reference density fixed	–	[Event setting reference density fixed]	[388]

Ⓜ	Event setting calorific value fixed	—	[Event setting calorific value fixed]	[▶ 389]
Ⓜ	Event setting process variables trim	—	[Event setting process variables trim]	[▶ 389]
Ⓜ	Event setting date/time not set	—	[Event setting date/time not set]	[▶ 390]
Ⓜ	Event setting device configuration locked	—	[Event setting device configuration locked]	[▶ 390]
Ⓜ	Event setting device configuration not locked	—	[Event setting device configuration not locked]	[▶ 391]
Ⓜ	Event file name	—	[Event file name]	[▶ 391]
Ⓜ	Monitor file name	—	[Monitor file name]	[▶ 391]

Alarm delay

Ⓜ [Maintenance] ▶ [Event setting] ▶ [Alarm delay]

Sets the alarm delay for PROFINET.

	Value	Description
—	Numerics	Default value is 0 sec.

Update event acknowledge

Ⓜ [Maintenance] ▶ [Event setting] ▶ [Update event acknowledge]

Set update event acknowledge.

	Value	Description
—	no acknowledgement	No acknowledgement.
—	reset update event flag Device has to reset any update flag in value status bytes and to set this parameter (UP-DATE_EVENT_ACK) to zero.	Update event flag is cleared.

Update event mode

Ⓜ [Maintenance] ▶ [Event setting] ▶ [Update event mode]

Set update event mode for auto or manual.

	Value	Description
—	auto-acknowledge 20 seconds after notification	Auto-acknowledge 20 seconds after notification.
—	manual acknowledge by means of parameter UP-DATE_EVENT_ACK	Manual acknowledge by means of parameter Update event acknowledge.

Event setting slug detection

Ⓜ [Maintenance] ► [Event setting] ► [Event setting slug detection]

Defines the device behavior when the following warning occurs:

201: Slug detection

[201:Slug detect]

	Value	Description
	Ignore	
–	[Ignore] [Ignore]	Event does not have any effect. Default value.
	History only	
–	[Hist only] [History only]	Pre-defined Event is recorded in the device history.
	Generate	
–	[Generate] [Generate]	An alarm is generated by the event.
	Monitor	
–	[Monitor] [Monitor]	Diagnostics data is logged when the event occurs.

Event setting empty pipe detection

Ⓜ [Maintenance] ► [Event setting] ► [Event setting empty pipe detection]

Defines the device behavior when the following warning occurs:

202: Empty pipe detection

[202:Empty detect]

	Value	Description
	Ignore	
–	[Ignore] [Ignore]	Event does not have any effect. Default value.
	History only	
–	[Hist only] [History only]	Pre-defined Event is recorded in the device history.
	Generate	
–	[Generate] [Generate]	An alarm is generated by the event.
	Monitor	
–	[Monitor] [Monitor]	Diagnostics data is logged when the event occurs.

**Event setting
corrosion
detection**

Ⓜ [Maintenance] ► [Event setting] ► [Event setting corrosion detection]

Defines the device behavior when the following warning occurs:

203: Corrosion detection

[203:Crrsn detect]

	Value	Description
–	Ignore [Ignore] [Ignore]	Event does not have any effect. Default value.
–	History only [Hist only] [History only]	Pre-defined Event is recorded in the device history.
–	Generate [Generate] [Generate]	An alarm is generated by the event.
–	Monitor [Monitor] [Monitor]	Diagnostics data is logged when the event occurs.

**Event setting
density fixed**

Ⓜ [Maintenance] ► [Event setting] ► [Event setting density fixed]

Defines the device behavior when the following warning occurs:

703: Density fixed

[703:Dens fix]

	Value	Description
–	Ignore [Ignore] [Ignore]	Event does not have any effect. Default value.
–	History only [Hist only] [History only]	Pre-defined Event is recorded in the device history.
–	Generate [Generate] [Generate]	An alarm is generated by the event.
–	Monitor [Monitor] [Monitor]	Diagnostics data is logged when the event occurs.

**Event setting
temperature fixed**

Ⓜ [Maintenance] ► [Event setting] ► [Event setting temperature fixed]

Defines the device behavior when the following warning occurs:

704: Temperature fixed

[704:Temp fix]

	Value	Description
	Ignore	
–	[Ignore] [Ignore]	Event does not have any effect. Default value.
	History only	
–	[Hist only] [History only]	Pre-defined Event is recorded in the device history.
	Generate	
–	[Generate] [Generate]	An alarm is generated by the event.
	Monitor	
–	[Monitor] [Monitor]	Diagnostics data is logged when the event occurs.

Event setting pressure fixed

Ⓜ [Maintenance] ► [Event setting] ► [Event setting pressure fixed]

Defines the device behavior when the following warning occurs:

705: Pressure fixed

[705:Pres fix]

	Value	Description
	Ignore	
–	[Ignore] [Ignore]	Event does not have any effect. Default value.
	History only	
–	[Hist only] [History only]	Pre-defined Event is recorded in the device history.
	Generate	
–	[Generate] [Generate]	An alarm is generated by the event.
	Monitor	
–	[Monitor] [Monitor]	Diagnostics data is logged when the event occurs.

Event setting reference density fixed

Ⓜ [Maintenance] ► [Event setting] ► [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	
–	[Ignore] [Ignore]	Event does not have any effect. Default value.
	History only	
–	[Hist only] [History only]	Pre-defined Event is recorded in the device history.

	Value	Description
	Generate	
–	[Generate] [Generate]	An alarm is generated by the event.
	Monitor	
–	[Monitor] [Monitor]	Diagnostics data is logged when the event occurs.

Event setting calorific value fixed

④ [Maintenance] ► [Event setting] ► [Event setting calorific value fixed]

Defines the device behavior when the following warning occurs:

707: Calorific value fixed
[707:Cal fix]

	Value	Description
	Ignore	
–	[Ignore] [Ignore]	Event does not have any effect. Default value.
	History only	
–	[Hist only] [History only]	Pre-defined Event is recorded in the device history.
	Generate	
–	[Generate] [Generate]	An alarm is generated by the event.
	Monitor	
–	[Monitor] [Monitor]	Diagnostics data is logged when the event occurs.

Event setting process variables trim

④ [Maintenance] ► [Event setting] ► [Event setting process variables trim]

Defines the device behavior when the following warning occurs:

715: Process variables trimming
[715:Pro var trim]

	Value	Description
	Ignore	
–	[Ignore] [Ignore]	Event does not have any effect. Default value.
	History only	
–	[Hist only] [History only]	Pre-defined Event is recorded in the device history.
	Generate	
–	[Generate] [Generate]	An alarm is generated by the event.
	Monitor	
–	[Monitor] [Monitor]	Diagnostics data is logged when the event occurs.

**Event setting date/
time not set**

Ⓜ [Maintenance] ► [Event setting] ► [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
	Ignore	
–	[Ignore] [Ignore]	Event does not have any effect. Default value.
	History only	
–	[Hist only] [History only]	Pre-defined Event is recorded in the device history.
	Generate	
–	[Generate] [Generate]	An alarm is generated by the event.
	Monitor	
–	[Monitor] [Monitor]	Diagnostics data is logged when the event occurs.

**Event setting
device
configuration
locked**

Ⓜ [Maintenance] ► [Event setting] ► [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.

901: Device configuration locked

[901:Dev cfg lock]

	Value	Description
	Ignore	
–	[Ignore] [Ignore]	Event does not have any effect. Default value.
	History only	
–	[Hist only] [History only]	Pre-defined Event is recorded in the device history.
	Generate	
–	[Generate] [Generate]	An alarm is generated by the event.
	Monitor	
–	[Monitor] [Monitor]	Diagnostics data is logged when the event occurs.

Event setting device configuration not locked

Ⓜ [Maintenance] ► [Event setting] ► [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.

902: Device configuration not locked

[902:No dev cfg lock]

	Value	Description
–	Ignore [Ignore] [Ignore]	Event does not have any effect. Default value.
–	History only [Hist only] [History only]	Pre-defined Event is recorded in the device history.
–	Generate [Generate] [Generate]	An alarm is generated by the event.
–	Monitor [Monitor] [Monitor]	Diagnostics data is logged when the event occurs.

Event file name

Ⓜ [Maintenance] ► [Event setting] ► [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. Maximum length is 8 characters. The following are invalid characters: space, ", *, +, ,, ., /, :, ;, <, =, >, ?, [, \,]

Monitor file name

Ⓜ [Maintenance] ► [Event setting] ► [Monitor file name]

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

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

5.10.4 Standard diagnostics

Sets the parameters for configuring standard diagnostic functions.

The following menus/settings are available:

	Full name	Display name	Web name	Page
Ⓜ	Slug detection	–	[Slug detection]	[392]
Ⓜ	Empty pipe detection	–	[Empty pipe detection]	[395]
Ⓜ	Corrosion detection	–	[Corrosion detection]	[396]
Ⓜ	Tube leakage detection	–	[Tube leakage detection]	[397]

Slug detection

Sets the parameters for configuring the slug detection function.

The following menus/settings are available:

	Full name	Display name	Web name	Page
Ⓜ	Slug detection level	–	[Slug detection level]	[392]
Ⓜ	Slug hysteresis	–	[Slug hysteresis]	[393]
Ⓜ	After slug mass flow	–	[After slug mass flow]	[393]
Ⓜ	After slug density	–	[After slug density]	[393]
Ⓜ	Average start time	–	[Average start time]	[394]
Ⓜ	Average end time	–	[Average end time]	[394]
Ⓜ	After slug mass flow fixed value	–	[After slug mass flow fixed value]	[394]
Ⓜ	After slug density fixed value	–	[After slug density fixed value]	[394]
Ⓜ	Slug alarm delay	–	[Slug alarm delay]	[395]
Ⓜ	Drive current damping	–	[Drive current damping]	[395]

Slug detection level

Ⓜ [Maintenance] ► [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. Default value is 350 mApp.

Slug hysteresis

Ⓜ [Maintenance] ► [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 %. Default value is 10.0 %.

After slug mass flow

Ⓜ [Maintenance] ► [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.

	Value	Description
–	Measured value [Meas val] [Measured value]	Actual measured mass flow values during the slug alarm. If a fixed value has been selected and set for these process variables, the specified fixed value is output. Default value.
–	Hold [Hold] [Hold]	Measured mass flow values before the slug alarm are held and output. If a fixed value has been selected and set for these process variables, the specified fixed value is output.
–	Fixed value [Fix val] [Fixed value]	After slug mass flow fixed value is used during slug alarm output.

After slug density

Ⓜ [Maintenance] ► [Standard diagnostics] ► [Slug detection] ► [After slug density]

Sets the Density value during slug alarm or when the driving current exceeds Slug detection level.

	Value	Description
–	Measured value [Meas val] [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. Default value.
–	Hold [Hold] [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 [Fix val] [Fixed value]	After slug density fixed value is used during slug alarm output.

Average start time

Ⓜ [Maintenance] ► [Standard diagnostics] ► [Slug detection] ► [Average 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]. Default value is 5 [sec].

Average end time

Ⓜ [Maintenance] ► [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]. Default value is 5 [sec].

After slug mass flow fixed value

Ⓜ [Maintenance] ► [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

Ⓜ [Maintenance] ► [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

Ⓜ [Maintenance] ► [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. Default value is 0.0 s.

Drive current damping

Ⓜ [Maintenance] ► [Standard diagnostics] ► [Slug detection] ► [Drive current damping]

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

- *Detailed setup* [► 276]

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. 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	Web name	Page
Ⓜ	Empty pipe criteria	–	[Empty pipe criteria]	[► 395]
Ⓜ	After empty pipe	–	[After empty pipe]	[► 396]
Ⓜ	Empty pipe alarm delay	–	[Empty pipe alarm delay]	[► 396]

Empty pipe criteria

Ⓜ [Maintenance] ► [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. Default value is 0.0. Unit correspondent to the customer configuration for density measurement.

After empty pipe

Ⓜ [Maintenance] ► [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 [0%] [0%]	Mass flow value is set to 0. Default value.
–	Measured value [Meas val] [Measured value]	Actual measured mass flow and density values during the slug alarm are output. If a fixed value has been selected and set for these process variables, the specified fixed value is output.
–	Hold [Hold] [Hold]	Measured mass flow and density values before the slug alarm are held and output. If a fixed value has been selected and set for these process variables, the specified fixed value is output.

Empty pipe alarm delay

Ⓜ [Maintenance] ► [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. 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	Web name	Page
Ⓜ	Corrosion criteria	–	[Corrosion criteria]	[396]
Ⓜ	Corrosion damping	–	[Corrosion damping]	[397]

Corrosion criteria

Ⓜ [Maintenance] ► [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. Default value is 1.5. Unit corresponds to the customer definition for density measurement.

Corrosion damping

Ⓜ [Maintenance] ► [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. Default value is 10 h.

Tube leakage detection

Sets parameters for configuring the tube leakage detection function.

The tube leakage alarm can only be used in conjunction with a pressure sensor attached to the secondary containment of the Rotamass Total Insight. When the inner tube is damaged the process medium enters the secondary containment, causing an increase in pressure. The pressure limit of the secondary containment can be set by the user. It is preset to the highest possible value in order to prevent false alarms.

The following menus/settings are available:

	Full name	Display name	Page
Ⓜ	Tube leakage criteria	[Tube lkg crit]	[▶ 397]
Ⓜ	Clear tube leakage detection	[Clr tube lkg]	[▶ 397]

Tube leakage criteria

Ⓜ [Diag/Service] ► [Std diag] ► [Tube lkg] ► [Tube lkg crit]

Sets the threshold pressure value for activating the tube leakage alarm. If the measured pressure is larger than this value, the tube leakage alarm is activated.

	Value	Description
Ⓜ	Numeric digits	Setting range: 0.0 – 500.0 bar. Default value is 500.0 bar. The value is converted according to the unit that the customer configures.

Clear tube leakage detection

Ⓜ [Diag/Service] ► [Std diag] ► [Tube lkg] ► [Clr tube lkg]

Clears the tube leakage detection alarm. If Execute is set for this parameter, the tube leakage alarm is cleared and the value returns to Not execute.

	Value	Description
Ⓜ	Not execute [Not exe] [Not execute]	Default value.
Ⓜ	Execute [Exe] [Execute]	Clear tube leakage alarm.

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	Web name	Page
Ⓢ	Total health result	—	[Total health result]	[▶ 398]
Ⓢ	Tube health check	—	[Tube health check]	[▶ 399]
Ⓢ	TuHC result	—	[TuHC result]	[▶ 402]
Ⓢ	TuHC configuration	—	[TuHC configuration]	[▶ 404]
Ⓢ	TuHC execution/status	—	[TuHC execution/status]	[▶ 408]
Ⓢ	TuHC reference data	—	[TuHC reference data]	[▶ 413]

Total health check**Total health result**

Ⓢ [Maintenance] ▶ [Total health check] ▶ [Total health result]

This parameter shows the current device integrity.

	Display parameter	Description
	Good (with TuHC and No critical failure) - [Good(with TuHC)] [Good (with TuHC and No critical failure)]	The following conditions are applied: - Result of TuHC(TuHC health result) is OK - System alarm status 0,1,2,3 and Process alarm status 0 are not set 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) - [Good] [Good (No critical failure)]	The following conditions are applied: - Result of TuHC(TuHC health result) is OK over 24hours or TuHC is not done (Not execute) - System alarm status 0,1,2,3 and Process alarm status 0 are not set 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 - [Warning] [Warning]	The following conditions are applied: - Result of TuHC(TuHC health result) is Warning - System alarm status 0,1,2,3 and Process alarm status 0 are not set
	Error - [Error] [Bad]	The following 1 or more conditions are applied: - Result of TuHC(TuHC health result) is Bad 1 or more alarms of System alarm status 0,1,2,3 or Process alarm status 0 are set

	Display parameter	Description
	Start	
-	[Start] [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* [▶ 127]), 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 ± 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	Web name	Page
Ⓕ	TuHC enable	—	[TuHC enable]	[▶ 400]
Ⓖ				

TuHC enable

④ [Maintenance] ► [Total health check] ► [Tube health check] ► [TuHC enable]

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

- *TuHC execution/status* [► 130]

	Value	Description
④	Not running [Not run] [Not running]	Indicates that the tube health check has not been executed. If it is set, the test is interrupted before completion.
④	Start tube health check [Start TuHC] [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.
④	Take reference [Take ref] [Take Reference]	Acquires reference data.
④	AGC test [AGC test] [AGC Test]	Function that self-checks the stability test. Executes the stability test in automatic gain control mode. Stiffness is not measured.
④	Copy current result to reference [Copy result to ref] [Copy current result to reference]	Copies the test results to the reference data. This function is not effective, if the next diagnostic has started.
④	Copy reference from shipment to test [Copy ref to test] [Copy reference from shipment to test]	Copies the shipment reference to the reference data.
④	Initialize result and flags [Init result flag] [Initialize result and flags]	Resets the internal TuHC alarm and TuHC warning.
④	Initialize counter [Init cnt] [Initialize counter]	Resets the test counter.
④	Initialize coeff for FDG [Init coeff FDG] [Initialize coeff for FDG]	Resets the drive gain control coefficient. The next test starts following adjustment of the coefficient. This is a maintenance function.
④	Clear reference [Clr ref] [Clear reference]	Clears the reference data for the test.

	Value	Description
Ⓕ	Clear all history [Clr all hist] [Clear all history]	Sets all histories and current history number to 0. This is a maintenance function.
Ⓕ	Start one TuHC as interrupt [Start one TuHC] [Start one TuHC as interrupt]	Starts one tube health check immediately.

TuHC result

Displays the result of the tube health check.

The following menus/settings are available:

	Full name	Display name	Web name	Page
Ⓢ Ⓜ	TuHC health result	—	[TuHC health result]	[▶ 402]
Ⓢ Ⓜ	TuHC result flag	—	[TuHC result flag]	[▶ 402]
Ⓢ Ⓜ	TuHC change ratio of inlet stiffness	—	[TuHC change ratio of inlet stiffness]	[▶ 403]
Ⓢ Ⓜ	TuHC change ratio of outlet stiffness	—	[TuHC change ratio of outlet stiffness]	[▶ 403]
Ⓢ Ⓜ	TuHC date at start	—	[TuHC date at start]	[▶ 403]
Ⓢ Ⓜ	TuHC operation time at start	—	[TuHC operation time at start]	[▶ 404]

TuHC health result

Ⓜ [Maintenance] ▶ [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
Ⓢ Ⓜ	Not execute [Not exe] [Not execute]	Test is not executed.
Ⓢ Ⓜ	Warning [Warn] [Warning]	Test is stopped or skipped with Alarm or Warning.
Ⓢ Ⓜ	Error [Error] [Error]	Change in stiffness is above the threshold.
Ⓢ Ⓜ	OK [OK] [OK]	Change in stiffness is within the threshold.

TuHC result flag

Ⓜ [Maintenance] ▶ [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
Ⓔ	Change of inlet stiffness is over threshold [Chg inlet stiff] [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.
Ⓔ	Change of outlet stiffness is over threshold [Chg outlet stiff] [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.
Ⓔ	Suspicious test (continue test) [Suspicious test] [Suspicious test (continue test)]	Suspicious test is set when Suspicious test on TuHC warning [▶ 133] has been set and an unstable condition occurs.
Ⓔ	Skip test (continue test) [Skip test] [Skip test (continue test)]	Skip test is set when Stop test on TuHC warning [▶ 133] has been set, but the slope cannot be controlled. Tube health check skips this test, but continues the testing.
Ⓔ	Stop test [Stop test] [Stop test]	Stop test is set when any TuHC alarm [▶ 132] has been set with an error. Tube health check stops the test and sets TuHC enable [▶ 122] to Not running.

TuHC change ratio of inlet stiffness

Ⓔ [Maintenance] ▶ [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

Ⓔ [Maintenance] ▶ [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

Ⓔ [Maintenance] ▶ [Total health check] ▶ [Tube health check] ▶ [TuHC result] ▶ [TuHC date at start]

	Value	Description
Ⓔ	Numeric digits	Specifies test start date. The date format for Web page depends on the OS regional setting. Hour, minutes and seconds are always zero on the Web page.

TuHC operation time at start

Ⓜ [Maintenance] ► [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	Web name	Page
Ⓜ Ⓜ	TuHC continue interval	—	[TuHC continue interval]	[▶ 404]
Ⓜ Ⓜ	TuHC continue number	—	[TuHC continue number]	[▶ 405]
Ⓜ Ⓜ	TuHC stiffness change limit	—	[TuHC stiffness change limit]	[▶ 405]
Ⓜ Ⓜ	TuHC retry number	—	[TuHC retry number]	[▶ 405]
Ⓜ Ⓜ	TuHC retry interval	—	[TuHC retry interval]	[▶ 405]
Ⓜ Ⓜ	TuHC setting retry	—	[TuHC setting retry]	[▶ 405]
Ⓜ Ⓜ	TuHC reference number copy from	—	[TuHC reference number copy from]	[▶ 406]
Ⓜ Ⓜ	TuHC magnet temperature selection	—	[TuHC magnet temperature selection]	[▶ 406]
Ⓜ Ⓜ	TuHC fixed temperature	—	[TuHC fixed temperature]	[▶ 407]
Ⓜ Ⓜ	TuHC temperature ratio for magnet 1	—	[TuHC temperature ratio for magnet 1]	[▶ 407]
Ⓜ Ⓜ	TuHC temperature ratio for magnet 2	—	[TuHC temperature ratio for magnet 2]	[▶ 407]

TuHC continue interval

Ⓜ [Maintenance] ► [Total health check] ► [Tube health check] ► [TuHC configuration] ► [TuHC continue interval]

	Value	Description
Ⓜ	Numeric digits	Specifies time between consecutive diagnostics in minutes. Setting range: 0 – 65535 min. Default value is 60 min.

TuHC continue number

④ [Maintenance] ► [Total health check] ► [Tube health check] ► [TuHC configuration] ► [TuHC continue number]

	Value	Description
⑤	Numeric digits	Specifies the number of consecutive tests to be executed. If set to 0, consecutive diagnostics are executed until stopped by TuHC enable [122]. Setting range: 0 – 65535. 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

④ [Maintenance] ► [Total health check] ► [Tube health check] ► [TuHC configuration] ► [TuHC stiffness change limit]

	Value	Description
⑤	Numeric digits	Indicates the threshold value for the change in stiffness. An alarm 203 is output, if the change exceeds the numeric value. Setting range: 0.5 – 100 %. Default value is 4.0 %.

TuHC retry number

④ [Maintenance] ► [Total health check] ► [Tube health check] ► [TuHC configuration] ► [TuHC retry number]

	Value	Description
⑤	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. Setting range: 0 – 255 mins. Default value is 2 min.

TuHC retry interval

④ [Maintenance] ► [Total health check] ► [Tube health check] ► [TuHC configuration] ► [TuHC retry interval]

	Value	Description
⑤	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. Setting range: 0 – 255 mins. Default value is 2 min.

TuHC setting retry

④ [Maintenance] ► [Total health check] ► [Tube health check] ► [TuHC configuration] ► [TuHC setting retry]

Sets the condition for executing the retry.

	Value	Description
⑤	No retry [No retry] [No retry]	Do not attempt a retry of the Tube health check when it has failed due to unstable process conditions.

	Value	Description
Ⓔ	Retry when skip test [Retry when skip test] [Retry when skip test]	Retry the Tube health check when it has failed due to unstable process conditions.
Ⓔ	Retry when suspicious test [Retry when sus. test] [Retry when suspicious test]	Retry the Tube health check when it has failed due to unstable process conditions. Default value.
Ⓔ	Retry by force [Retry by force] [Retry by force]	Force retry of Tube health check.

TuHC reference number copy from

Ⓔ [Maintenance] ► [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* [122] to Copy reference from shipment to test.

	Value	Description
Ⓔ	Test [Test] [Test]	Reference for test.
Ⓔ	Air [Air] [Air]	Reference for air. Default value.
Ⓔ	Water [Water] [Water]	Reference for water.

TuHC magnet temperature selection

Ⓔ [Maintenance] ► [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
Ⓔ	Use temperature on sensor [Snsr temp] [Use temperature on sensor]	Use temperature on sensor as the temperature of the driver system and pick-offs. Default value.

	Value	Description
Ⓔ	Compensate with fixed temperature [Comp fix temp] [Compensate with fixed temperature]	Use analog input temperature that is set with the parameter TuHC fixed temperature [▶ 129] as the temperature of the driver system and pick-offs.
Ⓔ	Compensate with indicator temperature [Comp ind temp] [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.
Ⓔ	Compensate with transmitter temperature [Comp trsmtr temp] [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

Ⓗ [Maintenance] ▶ [Total health check] ▶ [Tube health check] ▶ [TuHC configuration] ▶ [TuHC fixed temperature]

	Value	Description
Ⓔ	Numeric digits	Specifies field temperature for calculating the temperature of the driver system and pick-offs. Default value is 20 degrees Celsius.

TuHC temperature ratio for magnet 1

Ⓗ [Maintenance] ▶ [Total health check] ▶ [Tube health check] ▶ [TuHC configuration] ▶ [TuHC temperature ratio for magnet 1]

	Value	Description
Ⓔ	Numeric digits	Specifies the temperature change ratio from the temperature of the tube to the temperature of the S1 pick-off and driver system. Default value is 0.1.

TuHC temperature ratio for magnet 2

Ⓗ [Maintenance] ▶ [Total health check] ▶ [Tube health check] ▶ [TuHC configuration] ▶ [TuHC temperature ratio for magnet 2]

	Value	Description
Ⓔ	Numeric digits	Specifies the temperature change ratio from the temperature of the tube to the temperature on the S2 pick-off and driver system. 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	Web name	Page
Ⓕ Ⓗ	TuHC enable	—	[TuHC enable]	[▶ 408]
Ⓕ Ⓗ	TuHC progress percentage	—	[TuHC progress percentage]	[▶ 409]
Ⓕ Ⓗ	TuHC test counter	—	[TuHC test counter]	[▶ 409]
Ⓕ Ⓗ	TuHC alarm	—	[TuHC alarm]	[▶ 410]
Ⓕ Ⓗ	TuHC warning	—	[TuHC warning]	[▶ 411]

TuHC enable

Ⓗ [Maintenance] ▶ [Total health check] ▶ [Tube health check] ▶ [TuHC execution/status] ▶ [TuHC enable]

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

- *Total health check* [▶ 398]

	Value	Description
Ⓕ Ⓗ	Not running [Not run] [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 [Start TuHC] [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 [Take ref] [Take Reference]	Acquires reference data.
Ⓕ Ⓗ	AGC test [AGC test] [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 [Copy result to ref] [Copy current result to reference]	Copies the test results to the reference data. This function is not effective, if the next diagnostic has started.

	Value	Description
⑤	Copy reference from shipment to test [Copy ref to test] [Copy reference from shipment to test]	Copies the shipment reference to the reference data.
⑤	Initialize result and flags [Init result flag] [Initialize result and flags]	Resets the internal TuHC alarm and TuHC warning.
⑤	Initialize counter [Init cnt] [Initialize counter]	Resets the test counter.
⑤	Initialize coeff for FDG [Init coeff FDG] [Initialize coeff for FDG]	Resets the drive gain control coefficient. The next test starts following adjustment of the coefficient. This is a maintenance function.
⑤	Clear reference [Clr ref] [Clear reference]	Clears the reference data for the test.
⑤	Clear all history [Clr all hist] [Clear all history]	Sets all histories and current history number to 0. This is a maintenance function.
⑤	Start one TuHC as interrupt [Start one TuHC] [Start one TuHC as interrupt]	Starts one tube health check immediately.

TuHC progress percentage

④ [Maintenance] ► [Total health check] ► [Tube health check] ► [TuHC execution/status] ► [TuHC progress percentage]

	Value	Description
⑤	Numeric digits	Specifies test progress by percentage. Progress is 100 % when a single test has been completed.

TuHC test counter

④ [Maintenance] ► [Total health check] ► [Tube health check] ► [TuHC execution/status] ► [TuHC test counter]

	Value	Description
⑤	Numeric digits	Specifies total test count. Reset to 0 when TuHC enable [► 122] = Initialize result and flags.

TuHC alarm

④ [Maintenance] ► [Total health check] ► [Tube health check] ► [TuHC execution/status] ► [TuHC alarm]

	Value	Description
⑤	No error [No err] [No error]	No error.
⑤	S1 amplitude is zero at AGC [S1 amp zero AGC] [S1 amplitude is zero at AGC]	S1 (Pick-off #1) amplitude is zero at AGC. Check the connection to the sensor.
⑤	S2 amplitude is zero at AGC [S2 amp zero AGC] [S2 amplitude is zero at AGC]	S2 (Pick-off #2) amplitude is zero at AGC. Check the connection to the sensor.
⑤	Drive current is zero at AGC [Drv curr zero AGC] [Drive current is zero at AGC]	Drive current is zero at AGC. Check the connection to the sensor.
⑤	Drive gain is zero at AGC [Drv gain zero AGC] [Drive gain is zero at AGC]	Drive gain is zero at AGC. Check the connection to the sensor.
⑤	Amplitude is zero at fixed drive gain [Amp zero fix drv] [Amplitude is zero at fixed drive gain]	Amplitude of pick-off is zero at AGC. Check the connection to the sensor.
⑤	No reference data [No ref data] [No reference data]	No reference data. A new reference must be taken.
⑤	Different sensor parameters to reference [Snsr param to ref] [Different sensor parameters to reference]	Different sensor from reference. When sensor or parameters are changed, a new reference must be taken.

	Value	Description
Ⓔ	Unable to copy bad result to reference [Unable copy result] [Unable to copy bad result to reference]	Unable to copy result to reference because test result is bad (warning has occurred). Check TuHC warning [▶ 133] and try again.
Ⓔ	Next test was started to copy reference [Next test start] [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.
Ⓔ	Parameter error [Param err] [Parameter error]	TuHC parameter is out of range. Check TuHC parameters.

TuHC warning

Ⓔ [Maintenance] ▶ [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 [Suspicious test] [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 [▶ 125] 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 [▶ 128] is Retry when suspicious test or Retry by force, Tube Health Check retries the test.
Ⓔ	Unstable condition at AGC1 & AGC2 [Unstable AGC1,2] [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 [Unstable test/ref] [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.

	Value	Description
⑥	Fluctuation of condition at AGC1 [Fluct at AGC1] [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.
⑥	Change threshold level [Chng thresh lev] [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.
⑥	Temperature or Pressure is out of range [T or P out] [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).
⑥	Fluctuation of condition at scan [Fluct at scan] [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.
⑥	No cross thresholds [No cross thr] [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.
⑥	Deviation of slope [Dev of slope] [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.
⑥	Unstable condition at AGC1 & scan [Unstable AGC1 sc] [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.
⑥	Skip test [Skip test] [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 [▶ 125] 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 [▶ 128] is not No retry, Tube Health Check retries the test.
⑥	Slope control error [Slope cnt err] [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.

	Value	Description
Ⓜ ⓔ	Amplitude is out of limit [Amp out limit] [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.
Ⓜ ⓔ	Data trans error [Data trans err] [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.
Ⓜ ⓔ	Calculation error [Calc err] [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	Web name	Page
Ⓜ ⓔ	TuHC date at reference 1	—	[TuHC date at reference 1]	[▶ 413]
Ⓜ ⓔ	TuHC operation time at reference 1	—	[TuHC operation time at reference 1]	[▶ 413]
Ⓜ ⓔ	TuHC temperature at reference 1	—	[TuHC temperature at reference 1]	[▶ 414]
Ⓜ ⓔ	TuHC mass flow at reference 1	—	[TuHC mass flow at reference 1]	[▶ 414]
Ⓜ ⓔ	TuHC density at reference 1	—	[TuHC density at reference 1]	[▶ 414]

TuHC date at reference 1

Ⓜ [Maintenance] ▶ [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 operation time at reference 1

Ⓜ [Maintenance] ▶ [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

Ⓜ [Maintenance] ► [Total health check] ► [Tube health check] ► [TuHC reference data] ► [TuHC temperature at reference 1]

	Value	Description
Ⓜ ⓔ	Numeric digits	Tube temperature when reference was taken.

TuHC mass flow at reference 1

Ⓜ [Maintenance] ► [Total health check] ► [Tube health check] ► [TuHC reference data] ► [TuHC mass flow at reference 1]

	Value	Description
Ⓜ ⓔ	Numeric digits	Mass flow when reference was taken.

TuHC density at reference 1

Ⓜ [Maintenance] ► [Total health check] ► [Tube health check] ► [TuHC reference data] ► [TuHC density at reference 1]

	Value	Description
Ⓜ ⓔ	Numeric digits	Density when reference was taken.

5.10.5 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	Web name	Page
Ⓜ	Logging file name	—	[Logging file name]	▶ 414
Ⓜ	Logging 1 – 4 select	—	[Logging 1 – 4 select]	▶ 415
Ⓜ	Logging interval time	—	[Logging interval time]	▶ 416
Ⓜ	Logging end time	—	[Logging end time]	▶ 417
Ⓜ	Logging execute	—	[Logging execute]	▶ 417
Ⓜ	Logging start date	—	[Logging start date]	▶ 418
Ⓜ	Data logging display	—	[Data logging display]	▶ 418

Logging file name

Ⓜ [Maintenance] ► [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. The following are invalid characters: space, ", *, +, ,, ., /, :, ;, <, =, >, ?, [, \,]

**Logging 1 – 4
select**

④ [Maintenance] ► [Data logging] ► [Logging 1 – 4 select]

Sets the process variables that are to be logged to the microSD card.

Value	Description
None – [None] [None]	Set Logging 1 – 4 select. Default value for setting of Logging 1 is Mass flow. Default value for setting of Logging 2 is Density. Default value for setting of Logging 3 is Temperature. Default value for setting of Logging 4 is Volume flow.
Mass flow – [Mass] [Mass flow]	
Density – [Dens] [Density]	
Temperature – [Temp] [Temperature]	
Volume flow – [Vol] [Volume flow]	
Pressure – [Pres] [Pressure]	
Concentration ⑤ [Conc] [Concentration]	
Net mass flow 1 ⑤ [Net mass1] [Net Mass Flow 1]	
Net volume flow 1 ⑤ [Net vol1] [Net volume flow 1]	
Viscosity ⑤ [Visc] [Viscosity]	

	Value	Description
	Resonance frequency – [Freq] [Resonance frequency]	Set Logging 1 – 4 select. Default value for setting of Logging 1 is Mass flow. Default value for setting of Logging 2 is Density. Default value for setting of Logging 3 is Temperature. Default value for setting of Logging 4 is Volume flow.
	Phase difference – [Phase diff] [Phase difference]	
	Drive gain – [Drv gain] [Drive gain]	
	Drive current – [Drv curr] [Drive current]	
	Transmitter temperature – [Trsmtr temp] [Transmitter temperature]	

Logging interval time

Ⓜ [Maintenance] ► [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 – [1s] [1s]	Data logging takes place once a second. Default value.
	10 s – [10s] [10s]	Data logging takes place every 10 seconds.
	30 s – [30s] [30s]	Data logging takes place every 30 seconds.
	1 min – [1min] [1min]	Data logging takes place every minute .
	5 min – [5min] [5min]	Data logging takes place every 5 minutes.
	30 min – [30min] [30min]	Data logging takes place every 30 minutes.

	Value	Description
	60 min	
–	[60min] [60min]	Data logging takes place every hour.

Logging end time

Ⓜ [Maintenance] ► [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] [10min]	Data logging is executed for 10 minutes. Default value.
	30 min	
–	[30min] [30min]	Data logging is executed for 30 minutes.
	60 min	
–	[60min] [60min]	Data logging is executed for 1 hour.
	3 hour	
–	[3h] [3hour]	Data logging is executed for 3 hours.
	12 hour	
–	[12h] [12hour]	Data logging is executed for 12 hours.
	24 hour	
–	[24h] [24hour]	Data logging is executed for 24 hours.
	72 hour	
–	[72h] [72hour]	Data logging is executed for 72 hours.
	240 hour	
–	[240h] [240hour]	Data logging is executed for 240 hours.
	720 hour	
–	[720h] [720hour]	Data logging is executed for 720 hours.

Logging execute

Ⓜ [Maintenance] ► [Data logging] ► [Logging execute]

Starts data logging and indicates the status.

	Value	Description
	Not Execute	
–	[Not exe] [Not Execute]	Data logging is stopped. While this value is set, data logging is not executed.

	Value	Description
–	Execute [Exe] [Execute]	Data logging is started. While this value is set, data logging is executing. When data logging via manual control is completed, this value becomes Not execute. Through auto control of a monitoring event, this value becomes Execute with monitor event.
–	Execute with monitor event [Exe with monitor] [Execute with monitor event]	While this value is set, data logging is not executed. When a monitored Event, as set in the Event settings, occurs, this parameter value becomes Execute, so data logging is started.

Logging start date

Ⓜ [Maintenance] ► [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. The date format for Web page depends on the OS regional setting.

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	Web name	Page
Ⓜ	Display measurement mode	–	[Display measurement mode]	[▶ 418]
Ⓜ	Trend offline LRV	–	[Trend offline LRV]	[▶ 419]
Ⓜ	Trend offline URV	–	[Trend offline URV]	[▶ 419]

Display measurement mode

Ⓜ [Maintenance] ► [Data logging] ► [Data logging display] ► [Display measurement mode]

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

- Detailed setup
 - Display [▶ 313]

Sets the display mode for logging data on the LCD display of the Indicator.

	Value	Description
Ⓜ	Normal [Normal] [Normal]	Normal display mode. Default value.
Ⓜ	Trend online [Trend] [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.

Trend offline LRV

Ⓜ [Maintenance] ► [Data logging] ► [Data logging display] ► [Trend offline LRV]

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

- *Detailed Setup* [► 338]
- *Maintenance* [► 419]

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] ► [Data logging] ► [Data logging display] ► [Trend offline URV]

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

- *Detailed Setup* [► 339]
- *Maintenance* [► 419]

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.

5.10.6 Parameter backup/restore

Menu for configuring the backup/restore function.

The following menus/settings are available:

	Full name	Display name	Web name	Page
Ⓜ	Backup file name	—	[Backup file name]	[► 419]
Ⓜ	User configuration backup	—	[User configuration backup]	[► 420]
Ⓜ	User configuration backup name 1 – 3	—	[User configuration backup name 1 – 3]	[► 422]
Ⓜ	User configuration backup date 1 – 3	—	[User configuration backup date 1 – 3]	[► 420]
Ⓜ	Factory backup name	—	[Factory backup name]	[► 420]
Ⓜ	Factory backup date	—	[Factory backup date]	[► 421]
Ⓜ	Restoration	—	[Restoration]	[► 421]

Backup file name

Ⓜ [Maintenance] ► [Parameter backup/restore] ► [Backup]

Sets the file name of the parameter backup data on the microSD card.

	Value	Description
—	ASCII characters	Maximum length is 8 characters. Default value is SD_FILE. The following are invalid characters: space, ", *, +, ,, /, :, ;, <, =, >, ?, [, \,]

User configuration backup

Ⓜ [Maintenance] ► [Parameter backup/restore] ► [Backup] ► [User configuration backup]

Executes parameter backup.

	Value	Description
–	Not execute [Not exe]	Parameter backup is not executed.
–	Store to 1 [Store to 1]	Parameter backup is executed to indicator memory 1.
–	Store to 2 [Store to 2]	Parameter backup is executed to indicator memory 2.
–	Store to 3 [Store to 3]	Parameter backup is executed to indicator memory 3.
–	Store to microSD [Store to SD]	Parameter backup is executed to the microSD card. The file name defined in the parameter Backup file name is used.
–	Store from 1 to microSD [Store 1 to SD]	Parameter backup is copied from indicator memory 1 to the microSD card. The file name defined in the parameter Backup file name is used.
–	Store from 2 to microSD [Store 2 to SD]	Parameter backup is copied from indicator memory 2 to the microSD card. The file name defined in the parameter Backup file name is used.
–	Store from 3 to microSD [Store 3 to SD]	Parameter backup is copied from indicator memory 3 to the microSD card. The file name defined in the parameter Backup file name is used.

User configuration backup date 1 – 3

Ⓜ [Maintenance] ► [Parameter backup/restore] ► [Backup] ► [User configuration backup date 1 – 3]

Shows the date of the parameter Backup data in indicator memory 1 – 3.

	Value	Description
–	Numeric digits	The date format for Web page depends on the OS regional setting. Hour, minutes and seconds are always zero on the Web page.

Factory backup name

Ⓜ [Maintenance] ► [Parameter backup/restore] ► [Backup] ► [Factory backup name]

	Value	Description
–	Factory Delivery	Name of factory backup. Cannot be changed.

Factory backup date

Ⓜ [Maintenance] ► [Parameter backup/restore] ► [Backup] ► [Factory backup date]

Shows the date of factory backup.

	Value	Description
–	Numeric digits	The date format for Web page depends on the OS regional setting. Cannot be changed. Hour, minutes and seconds are always zero on the Web page.

Restoration

Ⓜ [Maintenance] ► [Parameter backup/restore] ► [Backup] ► [Restoration]

Restores or duplicates the user configuration backup to a device.

	Value	Description
–	Not Execute [Not exe]	Parameter restore is not executed or cancelled.
–	Duplicate user configuration 1 [Duplicate cfg1]	Parameters are duplicated from backup settings in indicator memory 1.
–	Duplicate user configuration 2 [Duplicate cfg2]	Parameters are duplicated from backup settings in indicator memory 2.
–	Duplicate user configuration 3 [Duplicate cfg3]	Parameters are duplicated from backup settings in indicator memory 3.
–	Duplicate from microSD [Duplicate SD]	Parameters are duplicated from backup settings on the microSD card. The file on the microSD card that has the name defined in the parameter Backup file name is used.
–	Restore user configuration 1 [Restore cfg1]	Parameters are restored from backup settings in indicator memory 1.
–	Restore user configuration 2 [Restore cfg2]	Parameters are restored from backup settings in indicator memory 2.
–	Restore user configuration 3 [Restore cfg3]	Parameters are restored from backup settings in indicator memory 3.
–	Restore from microSD [Restore SD]	Parameters are restored from backup settings on the microSD card. The file on the microSD card that has the name defined in the parameter Backup file name is used.
–	Restore factory default [Restore F val]	Parameters are restored from default settings.
–	Download sensor constant from user configuration 1 [DL snsr cnst cfg1]	Sensor constants are downloaded from indicator memory 1.

	Value	Description
–	Download sensor constant from microSD [DL snsr cnst SD]	Sensor constants are downloaded from the microSD card. The file on the microSD card that has the name defined in the parameter Backup file name is used.

User configuration backup name 1 – 3

Ⓜ [Maintenance root menu] ► [Parameter backup/restore] ► [Backup] ►
[User configuration backup name 1 – 3]

Shows the file name of the parameter Backup data in indicator memory 1 – 3.

	Value	Description
–	ASCII characters	Maximum length is 8 characters. Default value is "Backup 1" – "Backup 3"

5.10.7 Calibration information

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	Web name	Page
Ⓜ	Last calibration date 1 – 5	–	[Last calibration date 1 – 5]	[▶ 422]
Ⓜ	Next calibration date	–	[Next calibration date]	[▶ 422]
Ⓜ	Last calibration information 1 – 5	–	[Last calibration information 1 – 5]	[▶ 423]

Last calibration date 1 – 5

Ⓜ [Maintenance] ► [Calibration date] ► [Last calibration date 1 – 5]

	Value	Description
–	Numeric digits	The date format depends on the OS regional setting. If date format is MM/DD/YYYY, the default value is 01/01/2015 00:00:00.

Next calibration date

Ⓜ [Maintenance] ► [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* [▶ 336] parameter.

	Value	Description
–	Numeric digits	The date format depends on the OS regional setting. If date format is MM/DD/YYYY, the default value is 01/01/2015 00:00:00.

**Last calibration
information 1 – 5**

Ⓜ [Maintenance] ► [Last calibration information] ► [Last calibration
information 1 – 5]

Defines parameters for setting calibration or service information.

Sets text about calibration or service.

	Value	Description
–	ASCII characters	Maximum length is 32 characters. Default value is space.

5.11 System

Change target mode and Change password of Web login.

Tab. 33: Explanation of symbols used in the menu description

Sym-bols	Description
Ⓜ	Menu item or menu path is available via the Web page.

The following menus/settings are available:

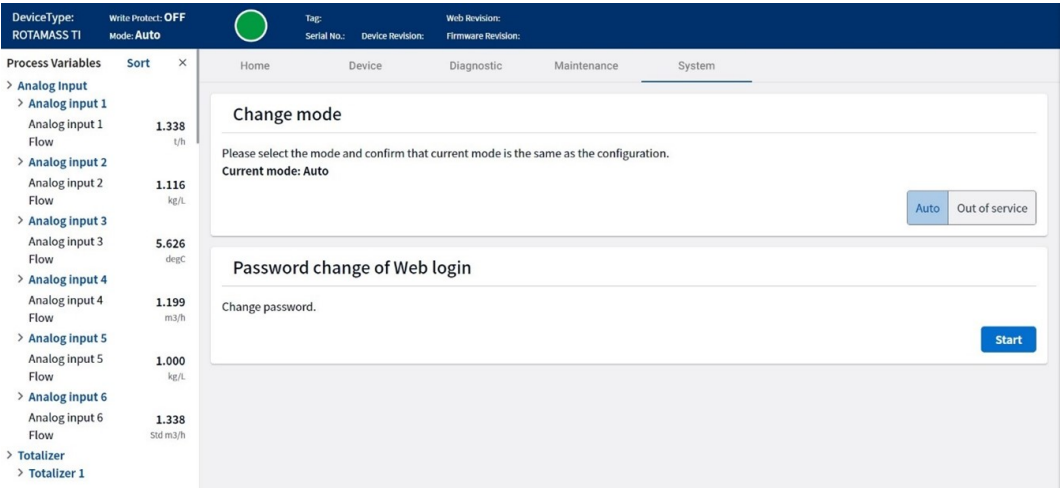
	Full name	Display name	Web name	Page
Ⓜ	Change mode	—	[Change mode]	[▶ 424]
Ⓜ	Password change of Web lo-gin	—	[Password change of Web login]	[▶ 425]

5.11.1 Change mode

Change mode

Ⓜ [System] ▶ [Change mode]

Sets the target mode for Physical block. This functionality also can be executed from: Target mode.



5.11.2 Password change of Web login

Password change of Web login

[System] ► [Password change of Web login]

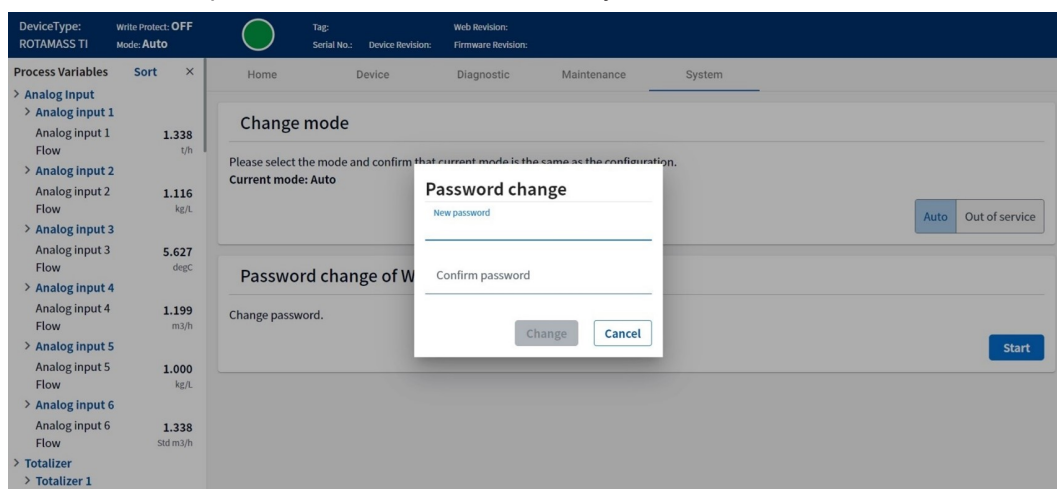
Change web login password by clicking start button.

When start button is clicked, then the following screen is shown and password can be changed.

The characters that can be used in a password are upper case alphabetic letters, lower case alphabetic letters, numbers, and symbols "!\"#\$%&'()*+,-./:;<=>?@[\\]^_`{|}~".

The password should follow the conditions below.

- Between 8 and 32 characters
- At least three of the following should be included: upper case alphabetical letters, lower case alphabetical letters, numbers and symbols.



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* [▶ 54]

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. 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. b) Check connection to sensor.
108	Temperature sensor failure.	a) Adjust temperature. 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.
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.
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.

Alarm no.	Cause	Remedy
134	Indicator communication error. Poor communication between display and main board.	a) Check connection of display.
135	microSD card failure.	a) Change microSD card [▶ 27].
141	Option board communication error1	a) Contact Yokogawa service. See contact details on the back page of this manual.
142	Option board communication error2	a) Contact Yokogawa service. See contact details on the back page of this manual.
143	Option board communication error3	a) Contact Yokogawa service. See contact details on the back page of this manual.

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. b) Fill pipe. c) Reduce gas bubbles in process. d) Perform zero adjustment again [▶ 102]
205	Autozero assessment flow.	a) Check valve. b) Check flow. c) Check vibration. d) Check density. e) Check electrical connections. f) Perform zero adjustment again [▶ 102]
206	Autozero assessment temperature. Zero adjustment and unstable flow.	a) Stabilize process temperature. b) Perform zero adjustment again [▶ 102].
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.

Setting alarms

Alarm no.	Cause	Remedy
301	Mass flow configuration error.	a) Change mass flow parameter setting [▶ 197]. 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 units, SI option.
302	Density configuration error.	a) Change density parameter setting [▶ 203]. b) Check parameter setting of the following parameters: Density LRV, Density URV, Density low cut, Alarm hysteresis, Liquid gas select, Density value select, Density units, SI option.

Alarm no.	Cause	Remedy
303	Temperature configuration error.	a) Change temperature parameter setting [208] . b) Check parameter setting of the following parameters: Temperature LRV, Temperature URV, Temperature upper limit, Temperature unit, SI option.
305	Pressure configuration error.	a) Change pressure parameter setting [217] . b) Check parameter setting of the following parameters: Pressure LRV, Pressure URV, Alarm hysteresis, Pressure units, SI option.
307	Volume flow configuration error.	a) Change volume flow parameter setting [212] . b) Check parameter setting of the following parameters: Volume flow LRV, Volume flow URV, Volume flow bi-directional mode, Alarm hysteresis, Volume flow units, SI option.
308	Reference density configuration error.	a) Change reference density parameter setting [221] . 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.
309	Relative density configuration error.	a) Change relative density parameter setting [225] . b) Check parameter setting of the following parameters: Relative density LRV, Relative density URV, Alarm hysteresis, 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 [229] . 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 units, SI option.
311	Calorific value configuration error.	a) Change calorific value parameter setting [233] . b) Check parameter setting of the following parameters: Calorific unit, SI option.

Alarm no.	Cause	Remedy
313	Concentration configuration error.	a) Change concentration parameter setting [235] . 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 unit set 1 – 4.
314	Net mass flow 1 configuration error.	a) Change net mass flow 1 parameter setting [260] . 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.
315	Net mass flow 2 configuration error.	a) Change net mass flow 2 parameter setting [260] . 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 units, SI option.
316	Net volume flow 1 configuration error.	a) Change net volume flow 1 parameter setting [264] . 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 units, SI option.
317	Net volume flow 2 configuration error.	a) Change net volume flow 2 parameter setting [264] . 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 units, SI option.
318	Net corrected volume flow configuration error.	a) Change net corrected volume flow parameter setting [268] . 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 units, SI option.
319	Velocity configuration error.	a) Change velocity parameter setting [234] . b) Check parameter setting of the following parameters: Velocity unit, SI option.

Alarm no.	Cause	Remedy
320	Viscosity configuration error	a) Change viscosity parameter setting [272] . b) Check parameter setting of the following parameters: Viscosity LRV, Viscosity URV, Alarm hysteresis, Viscosity units, SI option
323	Pulse output configuration error.	a) Change pulse output parameter setting [293] . b) Check parameter setting of the following parameters: Pulse out select, Pulse out unit select, SI option, Pulse out flow direction, URV/LRV parameters which are assigned for Pulse out select, Pulse out width.
335	Totalizer 1 configuration error.	a) Change totalizer 1 parameter setting [302] . b) Check parameter setting of the following parameters: Total 1 input selector, Total 1 unit, SI option.
336	Totalizer 2 configuration error.	a) Change totalizer 2 parameter setting [302] . b) Check parameter setting of the following parameters: Total 2 input selector, Total 2 unit, SI option.
337	Totalizer 3 configuration error.	a) Change totalizer 3 parameter setting [302] . b) Check parameter setting of the following parameters: Total 3 input selector, Total 3 unit, SI option.
342	Data logging not started	a) Insert microSD card.

Warnings

Alarm no.	Cause	Remedy
703	Density fixed.	a) Set density parameter to measured value [206] .
704	Temperature fixed.	a) Set temperature parameter to measured value [210] .
705	Pressure fixed.	a) Set pressure parameter to measured value.
706	Reference density fixed.	a) Set reference density parameter to measured value [223] .
707	Calorific value fixed	a) Set calorific value parameter to measured value.
710	Pulse output simulation in progress.	a) Check simulation [289] .
715	Process variable trimming.	a) Check gain/offset of the corresponding process variable [196] .
718	Pulse output 1 saturated.	a) Check setting and process value output to pulse output 1 [293] .
721	Autozero running. Zero adjustment in progress.	a) Wait until zero adjustment has completed.

Alarm no.	Cause	Remedy
722	Tube health check diagnostics execution error.	a) Check diagnostic setting and operating procedure [▶ 121]. b) Retry diagnosis.
723	Date and time not set.	a) Set date and time [▶ 340].
724	Display over warning. The number of digits that can be displayed has been exceeded.	a) Check display format parameter [▶ 311].
725	microSD card size warning. Remaining space on memory card has exceeded the threshold value.	a) Free up microSD card memory [▶ 27].
726	microSD card mismatch. Unexpected microSD card type is in use.	a) Change microSD card [▶ 27].
728	microSD card removal procedure error.	a) Remove microSD card properly [▶ 27].
729	Parameter backup incomplete.	a) Retry parameter backup [▶ 140]. b) Change microSD card [▶ 27].
730	Parameter restore in progress.	a) Wait until parameter restore has completed.
733	Viscosity not calculated	a) Check the delta pressure value which is received from external device via Analog input. b) Check process.
734	Viscosity not reliable	a) Check the delta pressure value which is received from external device via Analog input. b) Check process.
735	Autozero warning.	a) Check the environment and retry Autozero.
743	Default MAC address	a) Contact Yokogawa service. See contact details on the back page of this manual.
901	Device configuration locked.	
902	Device configuration not locked.	
903	Parameter backup running.	
904	Data logging running.	
905	Tube Health Check running.	
909	Maintenance in progress.	

PROFINET Relevant alarms

Alarm no.	Cause	Remedy
414	AI1 Simulation Active	a) Release simulation mode in Target mode of Analog Input 1 Function Block.
424	AI2 Simulation Active	a) Release simulation mode in Target mode of Analog Input 2 Function Block.
434	AI3 Simulation Active	a) Release simulation mode in Target mode of Analog Input 3 Function Block.
444	AI4 Simulation Active	a) Release simulation mode in Target mode of Analog Input 4 Function Block.
454	AI5 Simulation Active	a) Release simulation mode in Target mode of Analog Input 5 Function Block.
464	AI6 Simulation Active	a) Release simulation mode in Target mode of Analog Input 6 Function Block.

Alarm no.	Cause	Remedy
601	AO in O/S Mode	a) Set to Auto mode in Target mode of Analog Output Function Block.
602	AO in Man Mode	a) Set to Auto mode in Target mode of Analog Output Function Block.

7 Appendix

7.1 Firmware change log

Hardware Revision	Main Software Revision	Sensor Software Revision	Indicator Software Revision	Option board Software Revision	Changes
S1.01	R1.01.01	R1.01.04	R1.01.01 R1.02.01	R1.01.01	Initial release
S1.01 S2.01	R1.01.01	R1.01.04	R1.02.01	R1.01.01	Change of an electronic part
	R2.01.01	R1.01.04	R2.01.01	R2.01.01	Comply PROFINET / PA profile certification

7.2 Parameter list

R: Read only

R/W(C0): Operator

R/W(C0)a: Operator(Autozero)

R/W(C0)d: Operator(Display)

R/W(C1): Maintenance

R/W(C2): Specialist

* Access write is handled as Specialist when parameter is written from PROFINET communication.



Initial value of some parameters might be changed when delivery depend on MS-CODE.

7.2.1 Physical Block

Ⓐ	Submodule Index	Ⓘ	Initial Value
Ⓑ	Parameter	ⓖ	ID
Ⓒ	Sub-Parameter	ⓓ	Parameter Label
Ⓓ	Access	Ⓢ	Enum/Array description
Ⓔ	Write Mode		

Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	Ⓘ	ⓖ	ⓓ	Ⓢ
0xB000	BLOCK_OBJECT	-	R	-	-	-	-	-
-	-	Reserved	R	-	250	-	Reserved	250(0xFA):Not used
-	-	Block Object	R	-	1	-	Block Object	0x01:Physical Block
-	-	Parent Class	R	-	1	-	Parent Class	0x01:Transmitter
-	-	Class	R	-	250	-	Class	250(0xFA):Not used
-	-	Dev_Rev	R	-	1	9070	Device Revision	-

-	-	Dev_Rev_Comp	R	-	1	9071	Device Revision Compatibility	-
-	-	DD Revision	R	-	65534	-	DD Revision	-
-	-	Profile	R	-	0x40,0xFA	-	Profile	-
-	-	Profile Revision	R	-	0x04,0x02	-	Profile Revision	-
-	-	Execution Time	R	-	254	-	Execution Time	-
-	-	Number of Parameters	R	-	81	-	Number of Parameters	-
0xB001	CURRENT_MODE	-	R	-	0x08	-	Current mode	0x08: AUTO 0x80: Out of Service (O/S)
0xB002	IM_Tag_Function	-	R/W (C2)	-	"FT2001"	30441	Tag (PROFINET)	-
0xB006	TARGET_MODE	-	R/W (C1)	-	0x08	9000	Target Mode	0x08: AUTO 0x80: Out of Service (O/S)
0xB007	OrderID	-	R	-	RCU*-*- *-*-T3*/*	9001	Order ID	-
0xB008	SOFTWARE_REVISION	-	R	-	"R1.01.01"	12160	Software revision	-
0xB009	HARDWARE_REVISION	-	R	-	"S1.01"	32164	Hardware revision	-
0xB00A	DEVICE_Man_ID	-	R	-	55	-	Manufacturer ID	55: Yokogawa
0xB00B	DeviceType	-	R	-	"ROTA-MASS TI"	-	Device type	-
0xB00D	IM_Serial_Number	-	R	-	"PN370300R000000"	32160	Serial number	-
0xB00E	DIAGNOSIS	-	R	-	0x00,0x00,0x00,0x00	-	Diagnosis	0x00200000:DIA_MAINTENANCE 0x00000100:DIA_MAINTENANCE_ALARM 0x00000200:DIA_MAINTENANCE_DEMANDED 0x00000400:DIA_FUNCTION_CHECK 0x00000800:DIA_OUT_OF_SPEC 0x00001000:DIA_UPDATE_EVENT
0xB010	IM_Tag_Location	-	R/W (C2)	-	" "	-	Tag location	-
0xB011	IM_Revision_Counter	-	R	-	0	-	Revision counter	-
0xB012	IM_Profile_ID	-	R	-	0x9700	-	Profile ID	-

0xB013	IM_Profile_Specific_Type	-	R	-	0x01,0x01	-	Profile specific type	-
0xB014	RESET	-	R/W (C1)	-	0	9003	Reset	0:No action 1:Application reset 2506:Restart 2712:Communication on Reset, 2713:Application and Communication Reset
0xB015	IM_Descriptor	-	R/W (C2)	-	" "	-	Descriptor	-
0xB016	LANGUAGE	-	R/W (C0)d	-	en	9004	Language	-
0xB017	IM_Date	-	R/W (C2)	-	" "	-	Date	-
0xB018	STARTUP_PARAMETER_VALIDITY	-	R/W (C2)	-	0	-	Startup parameter validity	0: Startup parameters shall not be accepted ("Ignored"). 1: Parameter set 1 ("Units only") of startup parameters are to be accepted. Parameters not belonging to this set shall be ignored. 2: Parameter set 2 of Profile startup parameters and manufacturer specific startup parameters are to be accepted. Applies only for PROFINET.
0xB019	IPv4_ADDRESS	-	R	-	0xC0A801D2 (192.168.1.210)	9005	IP address	-
0xB01A	IPv4_SUBNET_MASK	-	R	-	0xFFFFFFFF (255.255.255.0)	9006	Subnet mask	-
0xB01B	IPv4_DEFAULT_GATEWAY	-	R	-	0x00000000 (0.0.0.0)	9007	Default gateway	-
0xB01C	NAME_OF_STATION	-	R	-	PN370300	9089	Name of station	-
0xB01D	MAC_ADDRESS	-	R	-	0x000064B2C000	9008	MAC address	-
0xB01E	WRITE_PROTECTION	-	R	-	0x0000	9009	Write protection	0x0000:No write protection 0x0001:Hardware write protection 0x0004:Password write protection
0xB01F	ALARM_DELAY	-	R/W (C1)	-	0	9010	Alarm delay	-

0xB0 20	UP- DATE_EVENT_ ACK	-	R/W (C2)	-	0	-	Update event ac- knowledge	0:no acknowledgement 1:reset update event flag. Device has to reset any up- date event flag in value sta- tus bytes and to set this pa- rameter (UP- DATE_EVENT_ACK) to zero.
0xB0 21	UP- DATE_EVENT_ MODE	-	R/W (C2)	-	0	-	Update event mode	0:autoacknowledge 20 sec- onds after notification. 1>manual acknowledge by means of parameter

0xB022	NE107_COMMON	-	R	-	0xFF,0xFF,0xFF,0xFC,0x00,0x00	-	NE 107 common	0x010000000000: Sensor element exciter faulty 0x020000000000: Error in evaluation electronics 0x040000000000: Error in internal energy supply 0x080000000000: Error in sensor element 0x100000000000: Error in actuator element 0x200000000000: Faulty installat e.g. dead space 0x400000000000: Parameter setting error 0x800000000000: Line break / Short circuit 0x000100000000: Overloading 0x000200000000: Wrong polarity of aux power 0x000400000000: Maximum line length exceeded 0x000800000000: Corrosion/abrasion by medium 0x001000000000: Fouling on sensor element 0x002000000000: Auxil medium missing or insuffic 0x004000000000: Wear reserve used up (operation) 0x008000000000: Wear reserve used up (wear) 0x000001000000: Error in peripherals 0x000002000000: Electro-mag interference too high 0x000004000000: Temperature of medium too high 0x000008000000: Ambient temperature too high 0x000010000000: Vibration/Impact load too high 0x000020000000: Auxiliary power range off-spec 0x000040000000: Auxiliary medium missingn 0x000080000000: Excessive temperature shock 0x000000010000: Deviation from measurement 0x000000020000: Humidity in electronics area

0xB0 22	NE107_COM- MON	-	R	-	0xFF,0xFF ,0xFF,0xF C,0x 00,0x00	-	NE 107 common	0x000000040000: Medium in electronics area 0x000000080000: Mechani- cal damage 0x000000100000: Communi- cation error 0x000000200000: Foreign material in electro area
0xB0 23	LINK_NE107_C OMMON	-	R/W (C2)	-	-	-	Link NE 107 com- mon	-
-	-	Reserved	R/W (C2)	-	4	-	Reserved	0: GOOD - ok 1: GOOD - maintenance re- quired. 2: GOOD - maintenance de- manded. 3: UNCERTAIN - mainte- nance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process re- lated, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / lo- cal override 8: GOOD - function check
-	-	Reserved	R/W (C2)	-	4	-	Reserved	0: GOOD - ok 1: GOOD - maintenance re- quired. 2: GOOD - maintenance de- manded. 3: UNCERTAIN - mainte- nance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process re- lated, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / lo- cal override 8: GOOD - function check

-	-	Reserved	R/W (C2)	-	4	-	Reserved	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check
-	-	Reserved	R/W (C2)	-	4	-	Reserved	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check
-	-	Reserved	R/W (C2)	-	4	-	Reserved	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check

-	-	Faulty installat	R/W (C2)	-	1	-	Link NE 107 com-mon.Faulty installat	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check
-	-	Reserved	R/W (C2)	-	4	-	Reserved	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check
-	-	Reserved	R/W (C2)	-	4	-	Reserved	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check

-	-	Overload- ing	R/W (C2)	-	4	-	Link NE 107 com- mon.Over- loading	0: GOOD - ok 1: GOOD - maintenance re- quired. 2: GOOD - maintenance de- manded. 3: UNCERTAIN - mainte- nance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process re- lated, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / lo- cal override 8: GOOD - function check
-	-	Reserved	R/W (C2)	-	4	-	Reserved	0: GOOD - ok 1: GOOD - maintenance re- quired. 2: GOOD - maintenance de- manded. 3: UNCERTAIN - mainte- nance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process re- lated, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / lo- cal override 8: GOOD - function check
-	-	Maximum line length exceeded	R/W (C2)	-	4	-	Link NE 107 com- mon.Maxi- mum line length ex- ceeded	0: GOOD - ok 1: GOOD - maintenance re- quired. 2: GOOD - maintenance de- manded. 3: UNCERTAIN - mainte- nance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process re- lated, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / lo- cal override 8: GOOD - function check

-	-	Reserved	R/W (C2)	-	1	-	Reserved	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check
-	-	Reserved	R/W (C2)	-	1	-	Reserved	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check
-	-	Auxil medium missing or insuffic	R/W (C2)	-	1	-	Link NE 107 common.Auxil medium missing or insuffic	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check

-	-	Wear reserve used up (operation)	R/W (C2)	-	1	-	Link NE 107 common.Wear reserve used up (operation)	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check
-	-	Wear reserve used up (wear)	R/W (C2)	-	1	-	Link NE 107 common.Wear reserve used up (wear)	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check
-	-	Error in peripherals	R/W (C2)	-	1	-	Link NE 107 common.Error in peripherals	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check

-	-	Reserved	R/W (C2)	-	5	-	Reserved	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check
-	-	Reserved	R/W (C2)	-	5	-	Reserved	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check
-	-	Reserved	R/W (C2)	-	5	-	Reserved	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check

-	-	Reserved	R/W (C2)	-	5	-	Reserved	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check
-	-	Reserved	R/W (C2)	-	5	-	Reserved	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check
-	-	Auxiliary medium missing	R/W (C2)	-	1	-	Link NE 107 common.Auxiliary medium missing	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check

-	-	Excessive temperature shock	R/W (C2)	-	1	-	Link NE 107 common.Excessive temperature shock	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check
-	-	Deviation from measurement	R/W (C2)	-	1	-	Link NE 107 common.Deviation from measurement	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check
-	-	Humidity in electronics area	R/W (C2)	-	1	-	Link NE 107 common.Humidity in electronics area	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check

-	-	Reserved	R/W (C2)	-	1	-	Reserved	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check
-	-	Mechanical damage	R/W (C2)	-	1	-	Link NE 107 common.Mechanical damage	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check
-	-	Communication error	R/W (C2)	-	1	-	Link NE 107 common.Communication error	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check

-	-	Foreign material in electro area	R/W (C2)	-	1	-	Link NE 107 common. Foreign material in electro area	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check
-	-	Reserved	R/W (C2)	-	0	-	Reserved	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check
-	-	Reserved	R/W (C2)	-	0	-	Reserved	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check

-	-	Reserved	R/W (C2)	-	0	-	Reserved	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check
-	-	Reserved	R/W (C2)	-	0	-	Reserved	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check
-	-	Reserved	R/W (C2)	-	0	-	Reserved	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check

-	-	Reserved	R/W (C2)	-	0	-	Reserved	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check
-	-	Reserved	R/W (C2)	-	0	-	Reserved	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check
-	-	Reserved	R/W (C2)	-	0	-	Reserved	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check

-	-	Reserved	R/W (C2)	-	0	-	Reserved	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check
-	-	Reserved	R/W (C2)	-	0	-	Reserved	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check
-	-	Reserved	R/W (C2)	-	0	-	Reserved	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check

-	-	Reserved	R/W (C2)	-	0	-	Reserved	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check
-	-	Reserved	R/W (C2)	-	0	-	Reserved	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check
-	-	Reserved	R/W (C2)	-	0	-	Reserved	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check

-	-	Reserved	R/W (C2)	-	0	-	Reserved	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check
-	-	Reserved	R/W (C2)	-	0	-	Reserved	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check
-	-	Reserved	R/W (C2)	-	0	-	Reserved	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check

-	-	Reserved	R/W (C2)	-	0	-	Reserved	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check
0xB0 24	LATEST_CHANGE	-	R/W (C2)	-	" "	-	Latest change	-
0xB0 25	NE107_STATUS	-	R	-	-	-	NE 107 status	0:Good 1:Maintenance 2:Out of specification 3:Function check 4:Failure
0xB0 26	View_1	-	R	-	-	-	View 1	-
0xB0 27	View_2	-	R/W (C2)	-	-	-	View 2	-
0xB0 28	STARTUP_RECORD	-	R/W (C2)	-	-	-	Startup record	-
0xB0 29	IPv6_ADDRESS	-	R	-	0x00000000 00000000 00000000 00000000	9011	IP6 address	-
0xB0 2A	IPv6_Prefix	-	R	-	0x00000000 00000000	9012	IP6 prefix	-
0xB0 2B	IPv6_DEFAULT_GATEWAY	-	R	-	0x00000000 00000000 00000000 00000000	9013	IP6 default gateway	-
0xB0 2C	IPv4_ADDRESS_VIS	-	R	-	"192.168.1.210"	-	IP address vis	-
0xB0 2D	IPv4_SUBNET_MASK_VIS	-	R	-	"255.255.255.0"	-	Subnet mask vis	-
0xB0 2E	IPv4_DEFAULT_GATEWAY_VIS	-	R	-	"0.0.0.0"	-	Default gateway vis	-
0xB0 2F	IPv6_ADDRESS_VIS	-	R	-	"0000:0000:0000:0000:0000:0000:0000:0000"	-	IP6 address vis	-
0xB0 30	IPv6_Prefix_VIS	-	R	-	"0000:0000:0000:0000:0000:0000:0000:0000"	-	IP6 prefix vis	-

0xB031	IPv6_DEFAULT_GATEWAY_VIS	-	R	-	"0000:0000:0000:0000:0000:0000:0000:0000"	-	IP6 default gateway vis	-
0x0000	SOFT_DESC	-	R	-	5.6.0.0 - 0300 - 1.01.01	-	Software description	-
0x0003	DEVICE_STATUS_1	-	R	-	0x00000000	9014	Device status 1	0x80000000: (reserved) 0x40000000: (reserved) 0x20000000: (reserved) 0x10000000: (reserved) 0x08000000: (reserved) 0x04000000: (reserved) 0x02000000: (reserved) 0x01000000: (reserved) 0x00800000: (reserved) 0x00400000: 401:PB in O/S Mode 0x00200000: (reserved) 0x00100000: (reserved) 0x00080000: (reserved) 0x00040000: (reserved) 0x00020000: (reserved) 0x00010000: (reserved) 0x00008000: (reserved) 0x00004000: (reserved) 0x00002000: (reserved) 0x00001000: (reserved) 0x00000800: (reserved) 0x00000400: (reserved) 0x00000200: (reserved) 0x00000100: (reserved) 0x00000080: (reserved) 0x00000040: (reserved) 0x00000020: (reserved) 0x00000010: (reserved) 0x00000008: (reserved) 0x00000004: (reserved) 0x00000002: (reserved) 0x00000001: (reserved)

0x0004	DEVICE_STATUS_2	-	R	-	0x00000000	9015	Device status 2	0x80000000: 101:Resonance frequency failure 0x40000000: 102:Signal failure 0x20000000: 103:Pick off 1 failure 0x10000000: 104:Pick off 1 failure 0x08000000: 106:Pick off 2 failure 0x04000000: 105:Pick off 2 failure 0x02000000: 107:Temperature range failure 0x01000000: 108:Temperature sensor failure 0x00800000: 109:Tube leakage detection 0x00400000: 141:Option board communication error1 0x00200000: 142:Option board communication error2 0x00100000: 143:Option board communication error3 0x00080000: (reserved) 0x00040000: (reserved) 0x00020000: (reserved) 0x00010000: (reserved) 0x00008000: 121:Main board CPU failure 0x00004000: 122:Main board EEPROM failure 0x00002000: 123:Parameter restore incomplete 0x00001000: 124:Sensor board failure 0x00000800: 125:Sensor board mismatch 0x00000400: 126:Sensor communication error 0x00000200: 127:Option board failure 0x00000100: 128:Option board EEPROM failure 0x00000080: (reserved) 0x00000040: 130:Indicator board failure

0x0004	DEVICE_STATUS_2	-	R	-	0x00000000	9015	Device status 2	0x00000020: 131:Indicator board EEPROM failure 0x00000010: 132:LCD driver failure 0x00000008: 133:Indicator board mismatch 0x00000004: 134:Indicator communication error 0x00000002: 135:microSD failure 0x00000001: (reserved)

							0x80000000: 201:Slug detection
							0x40000000: 202:Empty pipe detection
							0x20000000: 203:Corrosion detection
							0x10000000: 204:Autozero judgment multiphase
							0x08000000: 205:Autozero judgment flow
							0x04000000: 206:Autozero judgment temperature
							0x02000000: (reserved)
							0x01000000: (reserved)
							0x00800000: (reserved)
							0x00400000: (reserved)
							0x00200000: (reserved)
							0x00100000: 210:Oil density calculation failure
							0x00080000: 211:Water density calculation failure
							0x00040000: 212:NOC calculation failure
0x0005	DEVICE_STATUS_3	-	R	-	0x00000000	9016	Device status 3
							0x00020000: (reserved)
							0x00010000: (reserved)
							0x00008000: (reserved)
							0x00004000: (reserved)
							0x00002000: (reserved)
							0x00001000: (reserved)
							0x00000800: (reserved)
							0x00000400: (reserved)
							0x00000200: (reserved)
							0x00000100: (reserved)
							0x00000080: 335:Totalizer 1 configuration error
							0x00000040: 336:Totalizer 2 configuration error
							0x00000020: 337:Totalizer 3 configuration error
							0x00000010: (reserved)
							0x00000008: (reserved)
							0x00000004: (reserved)
							0x00000002: (reserved)
							0x00000001: 342:Data logging not started

0x0006	DEVICE_STATUS_4	-	R	-	0x00000000	9017	Device status 4	0x80000000: 301:Mass flow configuration error 0x40000000: 302:Density configuration error 0x20000000: 303:Temperature configuration error 0x10000000: (reserved) 0x08000000: 305:ressure configuration error 0x04000000: (reserved) 0x02000000: 307:Volume flow configuration error 0x01000000: 308:Reference density configuration error 0x00800000: 309:Relative density configuration error 0x00400000: 310:Corrected volume flow configuration error 0x00200000: 311:Calorific value configuration error 0x00100000: (reserved) 0x00080000: 313:Concentration configuration error 0x00040000: 314:Net mass flow 1 configuration error 0x00020000: 315:Net mass flow 2 configuration error 0x00010000: 316:Net volume flow 1 configuration error 0x00008000: 317:Net volume flow 2 configuration error 0x00004000: 318:Net corrected volume flow configuration error 0x00002000: 319:Velocity configuration error 0x00001000: 320:Viscosity configuration error 0x00000800: (reserved) 0x00000400: (reserved) 0x00000200: (reserved) 0x00000100: (reserved) 0x00000080: (reserved) 0x00000040: (reserved) 0x00000020: 323:Pulse output configuration error 0x00000010: 324:Frequency output configuration error

0x0006	DEVICE_STATUS_4	-	R	-	0x00000000	9017	Device status 4	0x00000008: (reserved) 0x00000004: (reserved) 0x00000002: (reserved) 0x00000001: (reserved)
0x0007	DEVICE_STATUS_5	-	R	-	0x00000000	9018	Device status 5	0x80000000: (reserved) 0x40000000: (reserved) 0x20000000: 703:Density fixed 0x10000000: 704:Temperature fixed 0x08000000: 705:Pressure fixed 0x04000000: 706:Reference density fixed 0x02000000: 707:Calorific value fixed 0x01000000: (reserved) 0x00800000: (reserved) 0x00400000: 710:Pulse output simulation 0x00200000: (reserved) 0x00100000: (reserved) 0x00080000: (reserved) 0x00040000: (reserved) 0x00020000: 715:Process variable trimming 0x00010000: (reserved) 0x00008000: (reserved) 0x00004000: 718:Pulse output saturated 0x00002000: (reserved) 0x00001000: (reserved) 0x00000800: 721:Autozero running 0x00000400: 722:Tube Health Check execution error 0x00000200: 723:Date/Time not set 0x00000100: 724:Display over warning 0x00000080: 725:microSD card size warning 0x00000040: 726:microSD card mismatch 0x00000020: (reserved)

0x0007	DEVICE_STATUS_5	-	R	-	0x00000000	9018	Device status 5	0x00000010: 728:microSD card removal procedure error 0x00000008: 729:Parameter backup incomplete 0x00000004: 730:Parameter restore running 0x00000002: (reserved) 0x00000001: (reserved)
0x0008	DEVICE_STATUS_6	-	R	-	0x00000000	9019	Device status 6	0x80000000: 733:Viscosity Not Calculated 0x40000000: 734:Viscosity Not Reliable 0x20000000: 735:Autozero warning 0x10000000: (reserved) 0x08000000: (reserved) 0x04000000: (reserved) 0x02000000: 743: Default MAC address 0x01000000: (reserved) 0x00800000: 901:Device configuration locked 0x00400000: 902:Device configuration not locked 0x00200000: 903:Parameter backup running 0x00100000: 904:Data logging running 0x00080000: 905:Tube Health Check running 0x00040000: (reserved) 0x00020000: (reserved) 0x00010000: (reserved) 0x00008000: 909:Maintenance mode running 0x00004000: (reserved) 0x00002000: (reserved) 0x00001000: (reserved) 0x00000800: (reserved) 0x00000400: (reserved) 0x00000200: (reserved) 0x00000100: (reserved) 0x00000080: (reserved) 0x00000040: (reserved) 0x00000020: (reserved) 0x00000010: (reserved) 0x00000008: (reserved) 0x00000004: (reserved) 0x00000002: (reserved) 0x00000001: (reserved)

							0x80000000: (reserved)
							0x40000000: (reserved)
							0x20000000: (reserved)
							0x10000000: (reserved)
							0x08000000: (reserved)
							0x04000000: (reserved)
							0x02000000: (reserved)
							0x01000000: (reserved)
							0x00800000: (reserved)
							0x00400000: (reserved)
							0x00200000: (reserved)
							0x00100000: 414:AI1 Simulation Active
							0x00080000: (reserved)
							0x00040000: (reserved)
							0x00020000: (reserved)
							0x00010000: 424:AI2 Simulation Active
0x0009	DEVICE_STATUS_7	-	R	-	0x00000000	9020	Device status 7
							0x00008000: (reserved)
							0x00004000: (reserved)
							0x00002000: (reserved)
							0x00001000: 434:AI3 SimulationActive
							0x00000800: (reserved)
							0x00000400: (reserved)
							0x00000200: (reserved)
							0x00000100: 444:AI4 Simulation Active
							0x00000080: (reserved)
							0x00000040: (reserved)
							0x00000020: (reserved)
							0x00000010: 454:AI5 Simulation Active
							0x00000008: (reserved)
							0x00000004: (reserved)
							0x00000002: (reserved)
							0x00000001: 464:AI6 Simulation Active

								0x80000000: (reserved) 0x40000000: (reserved) 0x20000000: (reserved) 0x10000000: 504:TOT1 Sim- ulation Active 0x08000000: (reserved) 0x04000000: (reserved) 0x02000000: (reserved) 0x01000000: 514:TOT2 Sim- ulation Active 0x00800000: (reserved) 0x00400000: (reserved) 0x00200000: (reserved) 0x00100000: 524:TOT3 Sim- ulation Active 0x00080000: (reserved) 0x00040000: (reserved) 0x00020000: (reserved) 0x00010000: (reserved) 0x00008000: 601:AO in O/S Mode 0x00004000: 602:AO in Man Mode 0x00002000: (reserved) 0x00001000: (reserved) 0x00000800: (reserved) 0x00000400: (reserved) 0x00000200: (reserved) 0x00000100: (reserved) 0x00000080: (reserved) 0x00000040: (reserved) 0x00000020: (reserved) 0x00000010: (reserved) 0x00000008: (reserved) 0x00000004: (reserved) 0x00000002: (reserved) 0x00000001: (reserved)
0x00 0A	DEVICE_STA- TUS_8	-	R	-	0x0000000 0	9021	Device sta- tus 8	
0x00 0E	SI_CON- TROL_CODES	-	R	-	0	1130	SI option	0: No restrictions 1: SI Units only

7.2.2 Flow Transducer Block

Ⓐ	Submodule Index	Ⓕ	Initial Value
Ⓑ	Parameter	Ⓖ	ID
Ⓒ	Sub-Parameter	Ⓗ	Parameter Label
Ⓓ	Access	Ⓘ	Enum/Array description
Ⓔ	Write Mode		

Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	Ⓕ	Ⓖ	Ⓗ	Ⓘ
0xB000	BLOCK_OBJECT	-	R	-	-	-	-	-
-	-	Reserved	R	-	250	-	Reserved	250(0xFA):Not used
-	-	Block Object	R	-	0x03	-	Block Object	0x03:Transducer Block
-	-	Parent Class	R	-	0x03	-	Parent Class	0x03:Flow
-	-	Class	R	-	0x03	-	Class	0x03:Coriolis
-	-	Dev_Rev	R	-	1	9070	Device Revision	-
-	-	Dev_Rev_Comp	R	-	1	9071	Device Revision Compatibility	-
-	-	DD Revision	R	-	65534	-	DD Revision	-
-	-	Profile	R	-	0x40FA	-	Profile	-
-	-	Profile Revision	R	-	0x0402	-	Profile Revision	-
-	-	Execution Time	R	-	254	-	Execution Time	-
-	-	Number of Parameters	R	-	240	-	Number of Parameters	-
0xB001	CURRENT_MODE	-	R	-	0x08	-	Current mode	0x08: AUTO 0x80: Out of Service (O/S)
0xB006	VOLUME_FLOW	-	R	-	-	-	-	-
-	-	Value	R	-	0	11984	Volume flow	-
-	-	Status	R	-	0	-	Volume flow.status	-

0xB007	VOL- UME_FLOW_UN- ITS	-	R/W (C1)	-	1349	30692	Volume flow unit	1512: cm ³ /min 1513: cm ³ /h 1351: L/s 1352: L/min 1353: L/h 1354: L/d 1347: m ³ /s 1348: m ³ /min 1349: m ³ /h 1350: m ³ /d 1362: gal/s 1363: gal/min 1364: gal/h 1365: gal/d 1356: ft ³ /s 1357: ft ³ /min 1358: ft ³ /h 1359: ft ³ /d 1371: bbl/s 1372: bbl/min 1373: bbl/h 1374: bbl/d 1367: Impgal/s 1368: Impgal/min 1369: Impgal/h 1370: Impgal/d 32768: User unit
0xB008	VOL- UME_FLOW_LO- LIMIT	-	R	-	0	30686	Volume flow LRV	-
0xB009	VOL- UME_FLOW_HI- LIMIT	-	R	-	10	30687	Volume flow URV	-
0xB00A	MASS_FLOW	-	R	-	-	-	-	-
-	-	Value	R	-	0	11980	Mass flow	-
-	-	Status	R	-	0	-	Mass flow.status	-

0xB0 0B	MASS_FLOW_UNITS	-	R/W (C1)	-	1328	30532	Mass flow unit	1318: g/s 1319: g/min 1320: g/h 1322: kg/s 1323: kg/min 1324: kg/h 1325: kg/d 1327: t/min 1328: t/h 1329: t/d 1330: lb/s 1331: lb/min 1332: lb/h 1333: lb/d 32787: User unit 1335: STon/min 1336: STon/h 1337: STon/d 1339: LTon/min 1340: LTon/h 1341: LTon/d
0xB0 0C	MASS_FLOW_LO_LIMIT	-	R	-	0	30526	Mass flow LRV	-
0xB0 0D	MASS_FLOW_HI_LIMIT	-	R	-	10	30527	Mass flow URV	-
0xB0 0E	DENSITY	-	R	-	-	-	-	-
-	-	Value	R	-	0	11981	Density	-
-	-	Status	R	-	0	-	Den- sity.status	-
0xB0 0F	DENSITY_UNITS	-	R/W (C1)	-	1103	30561	Density unit	1104: g/mL 1103: kg/L 1097: kg/m ³ 1108: lb/gal 1107: lb/ft ³ 1100: g/cm ³ 1105: g/L 32788: User unit 32769: kg/cm ³ 1099: kg/dm ³ 32770: g/cc
0xB0 10	DENSITY_LO_LIMIT	-	R	-	0	30555	Density LRV	-
0xB0 11	DENSITY_HI_LIMIT	-	R	-	1.5	30556	Density URV	-
0xB0 12	TEMPERATURE	-	R	-	-	-	-	-
-	-	Value	R	-	0	11982	Tempera- ture	-

-	-	Status	R	-	0	-	Temperature.status	-
0xB013	TEMPERATURE_UNITS	-	R/W (C1)	-	1001	30590	Temperature unit	1001: degC 1002: degF 1003: degR 1000: K
0xB014	TEMPERATURE_LO_LIMIT	-	R	-	0	30584	Temperature LRV	-
0xB015	TEMPERATURE_HI_LIMIT	-	R	-	150	30585	Temperature URV	-
0xB01E	LOW_FLOW_CUTOFF	-	R/W (C2)	-	1	30525	Mass flow lowcut	-
0xB01F	FLOW_DIRECTION	-	R/W (C1)	-	0	31310	Flow direction	0: positive 1: negative
0xB020	NE107_CORIOLIS	-	R	-	0xFF,0x00,0x00	-	NE 107 Coriolis	0x010000: Gas bubbles in the liquid 0x020000: Fouling, clogging 0x040000: Erosion, corrosion 0x080000: Faulty mounting 0x100000: Asymmetry of measuring tubes 0x200000: External vibrations 0x400000: Pulsating flow 0x800000: Incomplete filling
0xB021	LINK_NE107_CORIOLIS	-	R/W (C2)	-	-	-	Link NE 107 Coriolis	-
-	-	Gas bubbles in the liquid	R/W (C2)	-	5	-	Link NE 107 Coriolis. Gas bubbles in the liquid	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check

-	-	Fouling, clogging	R/W (C2)	-	5	-	Link NE 107 Coriolis.Fouling, clogging	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check
-	-	Reserved	R/W (C2)	-	5	-	Reserved	-
-	-	Reserved	R/W (C2)	-	1	-	Reserved	-
-	-	Asymmetry of measuring tubes	R/W (C2)	-	5	-	Link NE 107 Coriolis.Asymmetry of measuring tubes	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check
-	-	External vibrations	R/W (C2)	-	1	-	Link NE 107 Coriolis.External vibrations	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check
-	-	Reserved	R/W (C2)	-	5	-	Reserved	-

-	-	Incomplete filling	R/W (C2)	-	5	-	Link NE 107 Coriolis.Incomplete filling	0: GOOD - ok 1: GOOD - maintenance required. 2: GOOD - maintenance demanded. 3: UNCERTAIN - maintenance demanded. 4: BAD - maintenance alarm 5: UNCERTAIN - process related, no maintenance 6: BAD - process related, no maintenance 7: BAD - function check / local override 8: GOOD - function check
-	-	Reserved	R/W (C2)	-	0	-	Reserved	-
-	-	Reserved	R/W (C2)	-	0	-	Reserved	-
-	-	Reserved	R/W (C2)	-	0	-	Reserved	-
-	-	Reserved	R/W (C2)	-	0	-	Reserved	-
-	-	Reserved	R/W (C2)	-	0	-	Reserved	-
-	-	Reserved	R/W (C2)	-	0	-	Reserved	-
-	-	Reserved	R/W (C2)	-	0	-	Reserved	-
-	-	Reserved	R/W (C2)	-	0	-	Reserved	-
-	-	Reserved	R/W (C2)	-	0	-	Reserved	-
-	-	Reserved	R/W (C2)	-	0	-	Reserved	-
-	-	Reserved	R/W (C2)	-	0	-	Reserved	-
-	-	Reserved	R/W (C2)	-	0	-	Reserved	-
-	-	Reserved	R/W (C2)	-	0	-	Reserved	-
-	-	Reserved	R/W (C2)	-	0	-	Reserved	-
-	-	Reserved	R/W (C2)	-	0	-	Reserved	-
-	-	Reserved	R/W (C2)	-	0	-	Reserved	-
0xB02C	SET_PV_TO_ZERO	-	R/W (C0)a	-	0	9022	Set PV zero	0: no action 1: Select factory adjustment values 3: Perform and activate field adjustment with current process conditions

0xB0 2D	View_1	-	R	-	-	-	View 1	-
0xB0 2E	View_2	-	R/W (C2)	-	-	-	View 2	-
0xB0 2F	SET_PV_TO_ZERO_STATUS	-	R	-	1	9023	Set PV zero status	1: Factory adjustment is used 2: Field adjustment is used 3: Field adjustment with current process conditions is ongoing
0xB0 30	STARTUP_RECORD	-	R/W (C2)	-	-	-	Startup record	-
0x00 00	MASS_FLOW_DAMPING	-	R/W (C1)	-	3	30523	Mass flow damping	-
0x00 01	MASS_FLOW_LOW_CUT_OFF	-	R/W (C2)	-	0.005	30525	Mass flow lowcut	-
0x00 02	MASS_FLOW_USER_UNIT	-	R/W (C2)	-	" "	30533	Mass flow user unit	-
0x00 03	MASS_FLOW_USER_UNIT_CONVERSION_FACTOR	-	R/W (C2)	-	1	30535	Mass flow user unit conversion factor	-
0x00 04	MASS_FLOW_TRIM_SELECT	-	R/W (C2)	-	0	30520	Mass flow trim select	0: Inhibit 1: Enable
0x00 05	MASS_FLOW_TRIM_OFFSET	-	R/W (C2)	-		30521	Mass flow trim offset	-
0x00 06	MASS_FLOW_TRIM_GAIN	-	R/W (C2)	-	1	30522	Mass flow trim gain	-
0x00 07	DENSITY_DAMPING	-	R/W (C1)	-	3	30553	Density damping	-
0x00 08	DENSITY_LOW_CUT_OFF	-	R/W (C2)	-	0.3	30554	Density lowcut	-
0x00 09	DENSITY_SELECT	-	R/W (C2)	-	0	30565	Density value select	0: Measured value 1: Fixed value 2: Calculated value
0x00 0A	DENSITY_FIXED	-	R/W (C2)	-	1	30564	Density fixed value	-
0x00 0B	DENSITY_USER_UNIT	-	R/W (C2)	-	" "	30562	Density user unit	-
0x00 0C	DENSITY_USER_UNIT_CONVERSION_FACTOR	-	R/W (C2)	-	1	30563	Density user unit conversion factor	-
0x00 0D	DENSITY_TRIM_SELECT	-	R/W (C2)	-	0	30550	Density trim select	0: Inhibit 1: Enable
0x00 0E	DENSITY_TRIM_OFFSET	-	R/W (C2)	-	0	30551	Density trim offset	-
0x00 0F	DENSITY_TRIM_GAIN	-	R/W (C2)	-	1	30552	Density trim gain	-
0x00 10	TEMPERATURE_DAMPING	-	R/W (C1)	-	10	30583	Temperature damping	-

0x0011	TEMPERATURE_SEL	-	R/W (C2)	-	0	30592	Temperature function select	0: Internal value 1: Fixed value
0x0012	TEMPERATURE_FIXED	-	R/W (C2)	-	30	30591	Temperature fixed value	
0x0013	TEMPERATURE_TRIM_SELECT	-	R/W (C2)	-	0	30580	Temperature trim select	0: Inhibit 1: Enable
0x0014	TEMPERATURE_TRIM_OFFSET	-	R/W (C2)	-	0	30581	Temperature trim offset	-
0x0015	TEMPERATURE_TRIM_GAIN	-	R/W (C2)	-	1	30582	Temperature trim gain	-
0x0016	VOLUME_FLOW_DAMPING	-	R/W (C1)	-	3	30683	Volume flow damping	-
0x0017	VOLUME_FLOW_LOWCUT_OFF	-	R/W (C2)	-	0	30685	Volume flow lowcut	-
0x0018	VOLUME_FLOW_USER_UNIT	-	R/W (C2)	-	" "	30693	Volume flow user unit	-
0x0019	VOLUME_FLOW_USER_UNIT_CONVERSION_FACTOR	-	R/W (C2)	-	1	30695	Volume flow user unit conversion factor	-
0x001A	VOLUME_FLOW_TRIM_SELECT	-	R/W (C2)	-	0	30680	Volume flow trim select	-
0x001B	VOLUME_FLOW_TRIM_OFFSET	-	R/W (C2)	-	0	30681	Volume flow trim offset	-
0x001C	VOLUME_FLOW_TRIM_GAIN	-	R/W (C2)	-	1	30682	Volume flow trim gain	-
0x001D	VELOCITY	-	R	-	0	11995	Velocity	-
0x001E	VELOCITY_UNITS	-	R/W (C2)	-	1061	32140	Velocity unit	1061: m/s 1067: ft/s
0x001F	PRESSURE	-	R	-		-	-	-
-	-	Value	R	-	0	11983	Pressure	-
-	-	Status	R	-	0	-	Pressure.status	-
0x0020	PRESSURE_FIXED	-	R/W (C1)	-	0	30641	Pressure fixed value	-

0x00 21	PRES- SURE_UNITS	-	R/W (C2)	-	1137	30640	Pressure unit	1148: inH2O@68degF 1155: inHg 1154: ftH2O@68degF 1151: mmH2O@68degF 1157: mmHg 1141: psi 1137: bar 1138: mbar 1144: g/cm ² 1145: kg/cm ² 1130: Pa 1133: kPa 1139: torr 1140: atm 1132: MPa 1146: inH2O 1149: mmH2O 1152: ftH2O 1136: hPa
0x00 22	PRES- SURE_LO_LIMI T	-	R/W (C2)	-	0	30634	Pressure LRV	-
0x00 23	PRES- SURE_HI_LIMIT	-	R/W (C2)	-	200	30635	Pressure URV	-
0x00 24	PRES- SURE_DAMP- ING	-	R/W (C2)	-	3	30633	Pressure damping	-
0x00 25	ABS_GAUGE_S EL	-	R/W (C2)	-	1	30642	Absolute/ Gauge se- lect	0: Absolute 1: Gauge
0x00 26	GAS_DEN- SITY_PRES- SURE	-	R/W (C2)	-	1.01325	1089	Gas den- sity pres- sure	-
0x00 27	PRES- SURE_TRIM_SE L	-	R/W (C2)	-	0	30630	Pressure trim select	0: Inhibit 1: Enable
0x00 28	PRES- SURE_TRIM_O FFSET	-	R/W (C2)	-	0	30631	Pressure trim offset	-
0x00 29	PRES- SURE_TRIM_G AIN	-	R/W (C2)	-	1	30632	Pressure trim gain	-
0x00 2A	REFER- ENCE_DENSITY	-	R	-	-	-	-	-
-	-	Value	R	-	0	11985	Reference density	-
-	-	Status	R	-	0	-	Reference den- sity.status	-
0x00 2B	REFER- ENCE_DEN- SITY_LO_LIMIT	-	R/W (C2)	-	0	30735	Reference density LRV	-

0x00 2C	REFER- ENCE_DEN- SITY_HI_LIMIT	-	R/W (C2)	-	1.5	30736	Reference density URV	-
0x00 2D	REFER- ENCE_DEN- SITY_DAMPING	-	R/W (C2)	-	3	30733	Reference density damping	-
0x00 2E	REFER- ENCE_TEM- PERATURE	-	R/W (C2)	-	25	30710	Reference tempera- ture	-
0x00 2F	REFER- ENCE_PRES- SURE	-	R/W (C2)	-	1.01325	1090	Reference pressure	-
0x00 30	TEMPERA- TURE_CO- EFF_A	-	R/W (C2)	-	0	30711	Tempera- ture coeff A	-
0x00 31	TEMPERA- TURE_CO- EFF_B	-	R/W (C2)	-	0	30712	Tempera- ture coeff B	-
0x00 32	REFER- ENCE_DEN- SITY_LOW_CUT _OFF	-	R/W (C2)	-	0.3	30734	Reference density lowcut	-
0x00 33	REFER- ENCE_DEN- SITY_VALUE_S EL	-	R/W (C2)	-	1	30742	Reference density value se- lect	0: Measured value 1: Fixed value
0x00 34	REFER- ENCE_DEN- SITY_FIXED	-	R/W (C2)	-	1	30741	Reference density fixed value	-
0x00 35	REFER- ENCE_DEN- SITY_TRIM_SEL	-	R/W (C2)	-	0	30730	Reference density trim select	0: Inhibit 1: Enable
0x00 36	REFER- ENCE_DEN- SITY_TRIM_OF FSET	-	R/W (C2)	-	0	30731	Reference density trim offset	-
0x00 37	REFER- ENCE_DEN- SITY_TRIM_GAI N	-	R/W (C2)	-	1	30732	Reference density trim gain	-
0x00 38	RELA- TIVE_DENSITY	-	R	-	-	-	-	-
-	-	Value	R	-	0	11986	Relative density	-
-	-	Status	R	-	0	-	Relative den- sity.status	-

0x0039	RELATIVE_DENSITY_IND_EQU_SEL	-	R/W (C2)	-	1	30761	Relative density indication/equation select	0: No function 1: SG 4degC 2: SG 15degC 3: SG 20degC 4: SG 60degF 5: degAPI 6: degBaum hv 7: degBaum lt 8: Bh 9: BI 10: degSake
0x003A	RELATIVE_DENSITY_LO_LIMIT	-	R/W (C2)	-	0	30783	Relative density LRV	-
0x003B	RELATIVE_DENSITY_HI_LIMIT	-	R/W (C2)	-	100	30784	Relative density URV	-
0x003C	RELATIVE_DENSITY_DAMPING	-	R/W (C2)	-	3	32590	Relative density damping	-
0x003D	RELATIVE_DENSITY_REFERENCE_SEL	-	R/W (C2)	-	0	30760	Relative density reference select	0: Actual density 1: Reference density
0x003E	RELATIVE_DENSITY_TRIM_SEL	-	R/W (C2)	-	0	30780	Relative density trim select	0: Inhibit 1: Enable
0x003F	RELATIVE_DENSITY_TRIM_OFFSET	-	R/W (C2)	-	0	30781	Relative density trim offset	-
0x0040	RELATIVE_DENSITY_TRIM_GAIN	-	R/W (C2)	-	1	30782	Relative density trim gain	-
0x0047	CORR_VOLUME_FLOW	-	R	-	-	-	-	-
-	-	Value	R	-	0	11987	Corrected volume flow	-
-	-	Status	R	-	0	-	Corrected volume flow.status	-

0x00 48	CORR_VOL- UME_FLOW_UN- ITS	-	R/W (C2)	-	1598	30812	Corrected volume flow unit	1592: Nml L/s 1593: Nml L/min 1594: Nml L/h 1595: Nml L/d 1588: Nml m ³ /s 1589: Nml m ³ /min 1590: Nml m ³ /h 1591: Nml m ³ /d 1600: Std L/s 1601: Std L/min 1602: Std L/h 1603: Std L/d 1604: Std ft ³ /s 1360: Std ft ³ /min 1361: Std ft ³ /h 1605: Std ft ³ /d 1596: Std m ³ /s 1597: Std m ³ /min 1598: Std m ³ /h 1599: Std m ³ /d 32789: User unit 32773: mmscfh 32774: mmscfd
0x00 49	CORR_VOL- UME_FLOW_LO _LIMIT	-	R/W (C2)	-	0	30806	Corrected volume flow LRV	-
0x00 4A	CORR_VOL- UME_FLOW_HI _LIMIT	-	R/W (C2)	-	10	30807	Corrected volume flow URV	-
0x00 4B	CORR_VOL- UME_FLOW_DA MPING	-	R/W (C2)	-	3	30803	Corrected volume flow damp- ing	-
0x00 4C	CORR_VOL- UME_FLOW_LO W_CUT_OFF	-	R/W (C2)	-	0	30805	Corrected volume flow lowcut	-
0x00 4D	CORR_VOL- UME_FLOW_US ER_UNIT	-	R/W (C2)	-	" "	30813	Corrected volume flow user unit	-
0x00 4E	CORR_VOL- UME_FLOW_US ER_UNIT_CON V_FACTOR	-	R/W (C2)	-	1	30815	Corrected volume flow user unit con- version factor	-
0x00 4F	CORR_VOL- UME_FLOW_TR IM_SEL	-	R/W (C2)	-	0	30800	Corrected volume flow trim select	0: Inhibit 1: Enable

0x0050	CORR_VOLUME_FLOW_TRIM_OFFSET	-	R/W (C2)	-	0	30801	Corrected volume flow trim offset	-
0x0051	CORR_VOLUME_FLOW_TRIM_GAIN	-	R/W (C2)	-	1	30802	Corrected volume flow trim gain	-
0x0052	CALORIFIC_VALUE	-	R	-	-	-	-	-
-	-	Value	R	-	0	11988	Calorific value	-
-	-	Status	R	-	0	-	Calorific value.status	-
0x0053	CALORIFIC_UNITS	-	R/W (C2)	-	1207	1091	Calorific unit	1207: MJ/kg 1516: Btu/lb 32775: MJ/m ³ 32776: Btu/gal 32777: MJ/Nml m ³ 32778: Btu/Std ft ³
0x0054	CALORIFIC_DAMPING	-	R/W (C2)	-	0	30830	Calorific damping	-
0x0055	CALORIFIC_VALUE_FIXED	-	R/W (C2)	-	0	30832	Calorific fixed value	-
0x0056	VISCOSITY	-	R	-	-	-	-	-
-	-	Value	R	-	0	14050	Viscosity	-
-	-	Status	R	-	0	-	Viscosity.status	-
0x0057	VISCOSITY_UNITS	-	R/W (C2)	-	32779	1182	Viscosity unit	32779: mPas 1159: Pas 1162: cP 32780: Ns/m ² 32781: kg/ms 32782: User unit(dyna mic) 1163: St 32783: cm ² /s 1164: cSt 32784: mm ² /s 32785: dm ² /s 1160: m ² /s 32786: User unit
0x0058	VISCOSITY_LO_LIMIT	-	R/W (C2)	-	0	14030	Viscosity LRV	-
0x0059	VISCOSITY_HI_LIMIT	-	R/W (C2)	-	100	1183	Viscosity URV	-
0x005A	VISCOSITY_DAMPING	-	R/W (C2)	-	3	1181	Viscosity damping	-
0x005B	VISCOSITY_USER_UNIT_DYNAMIC	-	R/W (C2)	-	" "	8017	Viscosity user unit dynamic	-

0x005C	VISCOSITY_USER_UNIT_KINEMATIC	-	R/W (C2)	-	" "	8018	Viscosity user unit kinematic	-
0x005D	VISCOSITY_USER_UNIT_DYNAMIC_CONV_FACTOR	-	R/W (C2)	-	1	8019	Viscosity user unit dynamic conversion factor	-
0x005E	VISCOSITY_USER_UNIT_KINEMATIC_CONV_FACTOR	-	R/W (C2)	-	1	8020	Viscosity user unit kinematic conversion factor	-
0x005F	VISCOSITY_TRIM_SEL	-	R/W (C2)	-	0	1178	Viscosity trim select	0: Inhibit 1: Enable
0x0060	VISCOSITY_TRIM_OFFSET	-	R/W (C2)	-	0	1179	Viscosity trim offset	-
0x0061	VISCOSITY_TRIM_GAIN	-	R/W (C2)	-	1	1180	Viscosity trim gain	-
0x0062	EVENT_SETTING_DENSITY_FIXED	-	R/W (C2)	-	2	32754	Event setting density fixed	0: Ignore 1: History only 2: Generate 4: Monitor
0x0063	EVENT_SETTING_TEMPERATURE_FIXED	-	R/W (C2)	-	2	32755	Event setting temperature fixed	0: Ignore 1: History only 2: Generate 4: Monitor
0x0064	EVENT_SETTING_PRESSURE_FIXED	-	R/W (C2)	-	0	32756	Event setting pressure fixed	0: Ignore 1: History only 2: Generate 4: Monitor
0x0065	EVENT_SETTING_REFERENCE_DENSITY_FIXED	-	R/W (C2)	-	0	32757	Event setting reference density fixed	0: Ignore 1: History only 2: Generate 4: Monitor
0x0066	EVENT_SETTING_CALORIFIC_VALUE_FIXED	-	R/W (C2)	-	0	32758	Event setting calorific value fixed	0: Ignore 1: History only 2: Generate 4: Monitor
0x0067	EXTERNAL_FUNCTION	-	R/W (C2)	-	0	31510	External function	0: None 1: Pressure compensation 2: Temperature compensation 3: Sensor pressure alarm 4: Calorific value 5: Viscosity delta pressure 6: Pressure compensation and NOC 7: Pressure NOC

0x0068	F_TEST_1	-	R	-	-	-	-	-
-	-	Value	R	-	0	9024	F Test 1	-
-	-	Status	R	-	0	-	F Test 1.status	-
0x0069	F_TEST_2	-	R	-	-	-	-	-
-	-	Value	R	-	0	9025	F Test 2	-
-	-	Status	R	-	0	-	F Test 2.status	-
0x006A	F_TEST_3	-	R	-	-	-	-	-
-	-	Value	R	-	0	9026	F Test 3	-
-	-	Status	R	-	0	-	F Test 3.status	-
0x006B	MASS_FLOW_DAMP- ING_PULSE_TO- TAL	-	R/W (C2)	-	0	30524	Mass flow damping pulse/total	-
0x006C	VOL- UME_FLOW_DA MP- ING_PULSE_TO- TAL	-	R/W (C2)	-	0	30684	Volume flow damp- ing pulse/ total	-
0x006D	CORR_VOL- UME_FLOW_DA MP- ING_PULSE_TO- TAL	-	R/W (C2)	-	0	30804	Corrected volume flow damp- ing pulse/ total	-
0x006F	DENSITY_OFF- SET_ORIENTA- TION	-	R/W (C1)	-	0.00035	1078	Density offset ori- entation	-
0x0070	INSTALL_ORI- ENTATION	-	R/W (C1)	-	0	30408	Installation orientation	0: Vertical 1: Horizontal bend down 2: Horizontal bend up
0x0071	AU- TOZERO_EXE- CUTE	-	R/W (C0) a	-	0	30190	Autozero execute	0: Not execute 1: Execute
0x0072	AU- TOZERO_TIME	-	R/W (C0) a	-	180	30191	Autozero time	-
0x0073	AU- TOZERO_VALU E	-	R	-	0	10190	Autozero value	-
0x0074	AU- TOZERO_STAN- DARD_DÉVIA- TION	-	R	-	0	10192	Autozero standard deviation	-
0x0078	CLEAR_AU- TOZERO_VALU E	-	R/W (C0) a	-	0	32083	Clear au- tozero	0: Not execute 1: Execute
0x0079	CLEAR_AU- TOZERO_FAIL- URE	-	R/W (C0) a	-	0	32490	Clear au- tozero fail- ure	0: Not Execute 1: Execute

0x007A	AUTOZERO_FAILURE_DETECTION	-	R/W (C2)	-	1	8013	Autozero failure detection	0: Off 1: On
0x007B	VISCOSITY_FIXED_VALUE	-	R/W (C2)	-	0	26056	Viscosity fixed value	-
0x007C	VISCOSITY_VALUE_SELECT	-	R/W (C2)	-	1	26058	Viscosity value select	0: Fixed value 1: Calculated value (ASLM) 2: Measured value
0x007D	RE_COMPENSATION_VISCOSITY_VALUE	-	R	-	0	26060	Re compensation viscosity value	-
0x007E	RE_COMPENSATION_VISCOSITY_UNIT	-	R/W (C2)	-	0	26062	Re compensation viscosity unit	0: mPas 1: Pas 2: cP 3: Ns/m ² 4: kg/ms 8: cSt 6: St 9: mm ² /s 7: cm ² /s 10: dm ² /s 11: m ² /s
0x0080	LAST_CALIBRATION_DATE_1	-	R/W (C1)	-	0,0,0,1,1,1 15	32192	Last calibration date 1	-
0x0081	LAST_CALIBRATION_DATE_2	-	R/W (C1)	-	0,0,0,1,1,1 15	32193	Last calibration date 2	-
0x0082	LAST_CALIBRATION_DATE_3	-	R/W (C1)	-	0,0,0,1,1,1 15	32194	Last calibration date 3	-
0x0083	LAST_CALIBRATION_DATE_4	-	R/W (C1)	-	0,0,0,1,1,1 15	32195	Last calibration date 4	-
0x0084	LAST_CALIBRATION_DATE_5	-	R/W (C1)	-	0,0,0,1,1,1 15	32196	Last calibration date 5	-
0x0085	NEXT_CALIBRATION_DATE	-	R/W (C1)	-	0,0,0,1,1,2 55	32197	Next calibration date	-
0x0086	LAST_CALIBRATION_INFORMATION_1	-	R/W (C1)	-	" "	32198	Last calibration information 1	-
0x0087	LAST_CALIBRATION_INFORMATION_2	-	R/W (C1)	-	" "	32199	Last calibration information 2	-
0x0088	LAST_CALIBRATION_INFORMATION_3	-	R/W (C1)	-	" "	32200	Last calibration information 3	-

0x0089	LAST_CALIBRATION_INFORMATION_4	-	R/W (C1)	-	" "	32201	Last calibration information 4	-
0x008A	LAST_CALIBRATION_INFORMATION_5	-	R/W (C1)	-	" "	32202	Last calibration information 5	-
0x008B	SK20	-	R/W (C2)	-	Depends on model and sensor size.	30402	SK20	-
0x008C	SK20_REVERSE	-	R/W (C2)	-	0	30403	SK20 reverse	-
0x008D	SKT	-	R/W (C2)	-	-0.000734	1067	SKT	-
0x008E	SKTK	-	R/W (C2)	-	0.00000196	1068	SKTK	-
0x008F	FTC1	-	R/W (C2)	-	-0.0002179	30404	FTC1	-
0x0090	FTCK	-	R/W (C2)	-	-5.39E-08	30405	FTCK	-
0x0091	KD	-	R/W (C2)	-	4.3	30406	KD	-
0x0092	FL20	-	R/W (C2)	-	179	30407	FL20	-
0x0093	SKT1	-	R/W (C2)	-	0	26000	SKT1	-
0x0094	SKT2	-	R/W (C2)	-	0	26002	SKT2	-
0x0095	SKT3	-	R/W (C2)	-	0	26004	SKT3	-
0x0096	FT1	-	R/W (C2)	-	0	26006	FT1	-
0x0097	FT2	-	R/W (C2)	-	0	26008	FT2	-
0x0098	FT3	-	R/W (C2)	-	0	26010	FT3	-
0x0099	SOUND_VELOCITY_AT_REFERENCE_TEMPERATURE	-	R/W (C2)	-	450	26024	Sound velocity at reference temperature	-
0x009A	REFERENCE_TEMPERATURE_FOR_SOUND_VELOCITY	-	R/W (C2)	-	20	26026	Reference temperature for sound velocity	-
0x009B	SOUND_VELOCITY_TEMPERATURE_COEFFICIENT	-	R/W (C2)	-	0	26028	Sound velocity temperature coefficient	-
0x009C	VK0	-	R	-	0	26041	VK0	-
0x009D	VK1	-	R	-	19.1	26043	VK1	-

0x009E	VK2	-	R	-	8	26045	VK2	-
0x009F	EVENT_SETTING_PROCESS_VARIABLES_TRIM	-	R/W (C2)	-	2	32759	Event setting process variables trim	0: Ignore 1: History only 2: Generate 4: Monitor
0x00A0	EVENT_SETTING_SLUG_DETECTION	-	R/W (C2)	-	0	32750	Event setting slug detection	0: Ignore 1: History only 2: Generate 4: Monitor
0x00A1	EVENT_SETTING_EMPTY_PIPE_DETECTION	-	R/W (C2)	-	0	32751	Event setting empty pipe detection	0: Ignore 1: History only 2: Generate 4: Monitor
0x00A2	EVENT_SETTING_CORROSION_DETECTION	-	R/W (C2)	-	0	32752	Event setting corrosion detection	0: Ignore 1: History only 2: Generate 4: Monitor
0x00A3	DRIVE_CURRENT_LO_LIMIT	-	R/W (C2)	-	0	3522	Drive current LRV	-
0x00A4	DRIVE_CURRENT_HI_LIMIT	-	R/W (C2)	-	300	3521	Drive current URV	-
0x00A5	AVERAGE_START_TIME	-	R/W (C2)	-	5	3789	Average start time	-
0x00A6	AVERAGE_END_TIME	-	R/W (C2)	-	5	3790	Average end time	-
0x00A7	SLUG_DETECTION_LEVEL	-	R/W (C2)	-	350	1101	Slug detection level	-
0x00A8	SLUG_HYSTeresis	-	R/W (C2)	-	10	1102	Slug hysteresis	-
0x00A9	AFTER_SLUG_MASS_FLOW	-	R/W (C2)	-	0	31731	After slug mass flow	0: Measured value 1: Hold 2: Fixed value
0x00AA	AFTER_SLUG_DENSITY	-	R/W (C2)	-	0	3682	After slug density	0: Measured value 1: Hold 2: Fixed value
0x00AB	AFTER_SLUG_MASS_FLOW_FIXED	-	R/W (C2)	-	0	3683	After slug mass flow fixed value	-
0x00AC	AFTER_SLUG_DENSITY_FIXED	-	R/W (C2)	-	1	3684	After slug density fixed value	-
0x00AD	SLUG_ALARM_DELAY	-	R/W (C2)	-	0	1103	Slug alarm delay	-
0x00AE	DRIVE_CURRENT_DAMPING	-	R/W (C2)	-	3	31736	Drive current damping	-

0x00 AF	EMPTY_PIPE_C RITERIA	-	R/W (C2)	-	0	31737	Empty pipe criteria	-
0x00 B0	AF- TER_EMPTY_PI PE	-	R/W (C2)	-	0	31733	After empty pipe	0: 0% 1: Measured value 2: Hold
0x00 B1	EMPTY_PIPE_A LARM_DELAY	-	R/W (C2)	-	5	1104	Empty pipe alarm de- lay	-
0x00 B2	CORRO- SION_CRITERIA	-	R/W (C2)	-	1.5	32611	Corrosion criteria	-
0x00 B3	CORRO- SION_DAMPING	-	R/W (C2)	-	10	32612	Corrosion damping	-
0x00 B4	TUBE_LEAK- AGE_CRITERIA	-	R/W (C2)	-	500	32613	Tube leak- age criteria	-
0x00 B5	CLEAR_TUBE_L EAKAGE_DE- TECTION	-	R/W (C2)	-	0	1105	Clear tube leakage detection	0: Not execute 1: Execute
0x00 B6	PHASE_DIF- ERENCE	-	R	-	0	-	-	-
-	-	Value	R	-	0	14460	Phase dif- ference	-
-	-	Status	R	-	0	-	Phase dif- ference.sta- tus	-
0x00 B7	RESO- NANCE_FRE- QUENCY	-	R	-	0	-	-	-
-	-	Value	R	-	0	10350	Reso- nance fre- quency	-
-	-	Status	R	-	0	-	Reso- nance fre- quency.sta- tus	-
0x00 B8	DRIVE_CUR- RENT	-	R	-	0	-	-	-
-	-	Value	R	-	0	10352	Drive cur- rent	-
-	-	Status	R	-	0	-	Drive cur- rent.status	-
0x00 BB	DRIVE_GAIN	-	R	-	0	10351	Drive gain	-
0x00 BC	TRANSMIT- TER_TEMPER- ATURE	-	R	-	0	12120	Transmit- ter temper- ature	-
0x00 BD	TRANSMIT- TER_MAX_TEM- PERATURE	-	R	-	-230	12121	Max trans- mitter tem- perature	-
0x00 BE	SEN- SOR_MAX_TEM- PERATURE	-	R	-	-230	10090	Sensor max tem- perature	-
0x00 BF	LIQ- UID_GAS_SEL	-	R/W (C2)	-	0	30466	Liquid gas select	0:Liquid 1:Gas

0x00 C0	SIGNAL_GAIN	-	R/W (C2)	-	0	30350	Signal gain	0: Gain 1 1: Gain 2 2: Gain 3 3: Gain 4

7.2.3 LCD Indicator Transducer Block

Ⓐ	Submodule Index	Ⓕ	Initial Value
Ⓑ	Parameter	Ⓖ	ID
Ⓒ	Sub-Parameter	Ⓗ	Parameter Label
Ⓓ	Access	Ⓘ	Enum/Array description
Ⓔ	Write Mode		

Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	Ⓕ	Ⓖ	Ⓗ	Ⓘ
0xB000	BLOCK_OBJECT	-	R	-	-	-	-	-
-	-	Reserved	R	-	250	-	Reserved	250(0xFA):Not used
-	-	Block Object	R	-	0x03	-	Block Object	0x03:Transducer Block
-	-	Parent Class	R	-	0x03	-	Parent Class	0x03:Flow
-	-	Class	R	-	0x81	-	Class	0x81:Manufacturer specific
-	-	Dev_Rev	R	-	1	9070	Device Revision	-
-	-	Dev_Rev_Comp	R	-	1	9071	Device Revision Compatibility	-
-	-	DD Revision	R	-	65534	-	DD Revision	-
-	-	Profile	R	-	0x40FA	-	Profile	-
-	-	Profile Revision	R	-	0x0402	-	Profile Revision	-
-	-	Execution Time	R	-	254	-	Execution Time	-
-	-	Number of Parameters	R	-	81	-	Number of Parameters	-
-	-	Reserved by PI	R	-	-	-	Reserved by PI	-
-	-	Reserved by PI	R	-	-	-	Reserved by PI	-
0xB001	CURRENT_MODE	-	R	-	0x08	-	Current mode	0x08: AUTO 0x80: Out of Service (O/S)
0x0000	DISPLAY_INSTALLATION	-	R/W (C2)	-	1	30465	Display installation	0: No display 1: With display

0x0001	DISPLAY_SELECT_1	-	R/W (C0)d	-	1	31770	Display select 1	1: Mass flow 2: Density 3: Temperature 4: Volume flow 5: Reference density 6: Relative density 7: Corrected volume flow 8: Pressure 9: Totalizer 1 10: Totalizer 2 11: Totalizer 3 15: Mass flow % graph 16: Volume flow % graph 17: Corrected volume flow % graph 18: Tag 19: Long tag 20: Velocity 21: Concentration 22: Net mass flow 1 23: Net mass flow 2 24: Net volume flow 1 25: Net volume flow 2 26: Net corrected volume flow 34: Viscosity 27: Drive current 28: 24hours totalizer 1 29: 24hours totalizer 2 30: 24hours totalizer 3 31: Gas void fraction 32: Display unit mass flow dual 33: Display unit density dual

0x0002	DISPLAY_SELECT_2	-	R/W (C0)d	-	2	31771	Display select 2	0: None 1: Mass flow 2: Density 3: Temperature 4: Volume flow 5: Reference density 6: Relative density 7: Corrected volume flow 8: Pressure 9: Totalizer 1 10: Totalizer 2 11: Totalizer 3 15: Mass flow % graph 16: Volume flow % graph 17: Corrected volume flow % graph 18: Tag 19: Long tag 20: Velocity 21: Concentration 22: Net mass flow 1 23: Net mass flow 2 24: Net volume flow 1 25: Net volume flow 2 26: Net corrected volume flow 34: Viscosity 27: Drive current 28: 24hours totalizer 1 29: 24hours totalizer 2 30: 24hours totalizer 3 31: Gas void fraction 32: Display unit mass flow dual 33: Display unit density dual

0x0003	DISPLAY_SELECT_3	-	R/W (C0)d	-	3	31772	Display select 3	0: None 1: Mass flow 2: Density 3: Temperature 4: Volume flow 5: Reference density 6: Relative density 7: Corrected volume flow 8: Pressure 9: Totalizer 1 10: Totalizer 2 11: Totalizer 3 15: Mass flow % graph 16: Volume flow % graph 17: Corrected volume flow % graph 18: Tag 19: Long tag 20: Velocity 21: Concentration 22: Net mass flow 1 23: Net mass flow 2 24: Net volume flow 1 25: Net volume flow 2 26: Net corrected volume flow 34: Viscosity 27: Drive current 28: 24hours totalizer 1 29: 24hours totalizer 2 30: 24hours totalizer 3 31: Gas void fraction 32: Display unit mass flow dual 33: Display unit density dual

0x0004	DISPLAY_SELECT_4	-	R/W (C0)d	-	4	31773	Display select 4	0: None 1: Mass flow 2: Density 3: Temperature 4: Volume flow 5: Reference density 6: Relative density 7: Corrected volume flow 8: Pressure 9: Totalizer 1 10: Totalizer 2 11: Totalizer 3 15: Mass flow % graph 16: Volume flow % graph 17: Corrected volume flow % graph 18: Tag 19: Long tag 20: Velocity 21: Concentration 22: Net mass flow 1 23: Net mass flow 2 24: Net volume flow 1 25: Net volume flow 2 26: Net corrected volume flow 34: Viscosity 27: Drive current 28: 24hours totalizer 1 29: 24hours totalizer 2 30: 24hours totalizer 3 31: Gas void fraction 32: Display unit mass flow dual 33: Display unit density dual

0x0005	DISPLAY_SELECT_5	-	R/W (C0)d	-	5	31774	Display select 5	0: None 1: Mass flow 2: Density 3: Temperature 4: Volume flow 5: Reference density 6: Relative density 7: Corrected volume flow 8: Pressure 9: Totalizer 1 10: Totalizer 2 11: Totalizer 3 15: Mass flow % graph 16: Volume flow % graph 17: Corrected volume flow % graph 18: Tag 19: Long tag 20: Velocity 21: Concentration 22: Net mass flow 1 23: Net mass flow 2 24: Net volume flow 1 25: Net volume flow 2 26: Net corrected volume flow 34: Viscosity 27: Drive current 28: 24hours totalizer 1 29: 24hours totalizer 2 30: 24hours totalizer 3 31: Gas void fraction 32: Display unit mass flow dual 33: Display unit density dual

								0: None 1: Mass flow 2: Density 3: Temperature 4: Volume flow 5: Reference density 6: Relative density 7: Corrected volume flow 8: Pressure 9: Totalizer 1 10: Totalizer 2 11: Totalizer 3 15: Mass flow % graph 16: Volume flow % graph 17: Corrected volume flow % graph 18: Tag 19: Long tag 20: Velocity 21: Concentration 22: Net mass flow 1 23: Net mass flow 2 24: Net volume flow 1 25: Net volume flow 2 26: Net corrected volume flow 34: Viscosity 27: Drive current 28: 24hours totalizer 1 29: 24hours totalizer 2 30: 24hours totalizer 3 31: Gas void fraction 32: Display unit mass flow dual 33: Display unit density dual
0x0006	DISPLAY_SELECT_6	-	R/W (C0)d	-	7	31775	Display select 6	

0x0007	DISPLAY_SELECT_7	-	R/W (C0)d	-	8	31776	Display select 7	0: None 1: Mass flow 2: Density 3: Temperature 4: Volume flow 5: Reference density 6: Relative density 7: Corrected volume flow 8: Pressure 9: Totalizer 1 10: Totalizer 2 11: Totalizer 3 15: Mass flow % graph 16: Volume flow % graph 17: Corrected volume flow % graph 18: Tag 19: Long tag 20: Velocity 21: Concentration 22: Net mass flow 1 23: Net mass flow 2 24: Net volume flow 1 25: Net volume flow 2 26: Net corrected volume flow 34: Viscosity 27: Drive current 28: 24hours totalizer 1 29: 24hours totalizer 2 30: 24hours totalizer 3 31: Gas void fraction 32: Display unit mass flow dual 33: Display unit density dual

								0: None 1: Mass flow 2: Density 3: Temperature 4: Volume flow 5: Reference density 6: Relative density 7: Corrected volume flow 8: Pressure 9: Totalizer 1 10: Totalizer 2 11: Totalizer 3 15: Mass flow % graph 16: Volume flow % graph 17: Corrected volume flow % graph 18: Tag 19: Long tag 20: Velocity 21: Concentration 22: Net mass flow 1 23: Net mass flow 2 24: Net volume flow 1 25: Net volume flow 2 26: Net corrected volume flow 34: Viscosity 27: Drive current 28: 24hours totalizer 1 29: 24hours totalizer 2 30: 24hours totalizer 3 31: Gas void fraction 32: Display unit mass flow dual 33: Display unit density dual
0x0008	DISPLAY_SELECT_8	-	R/W (C0)d	-	9	31777	Display select 8	

0x0009	DISPLAY_SELECT_9	-	R/W (C0)d	-	10	31778	Display select 9	0: None 1: Mass flow 2: Density 3: Temperature 4: Volume flow 5: Reference density 6: Relative density 7: Corrected volume flow 8: Pressure 9: Totalizer 1 10: Totalizer 2 11: Totalizer 3 15: Mass flow % graph 16: Volume flow % graph 17: Corrected volume flow % graph 18: Tag 19: Long tag 20: Velocity 21: Concentration 22: Net mass flow 1 23: Net mass flow 2 24: Net volume flow 1 25: Net volume flow 2 26: Net corrected volume flow 34: Viscosity 27: Drive current 28: 24hours totalizer 1 29: 24hours totalizer 2 30: 24hours totalizer 3 31: Gas void fraction 32: Display unit mass flow dual 33: Display unit density dual

0x000A	DISPLAY_SELECT_10	-	R/W (C0)d	-	11	31779	Display select 10	0: None 1: Mass flow 2: Density 3: Temperature 4: Volume flow 5: Reference density 6: Relative density 7: Corrected volume flow 8: Pressure 9: Totalizer 1 10: Totalizer 2 11: Totalizer 3 15: Mass flow % graph 16: Volume flow % graph 17: Corrected volume flow % graph 18: Tag 19: Long tag 20: Velocity 21: Concentration 22: Net mass flow 1 23: Net mass flow 2 24: Net volume flow 1 25: Net volume flow 2 26: Net corrected volume flow 34: Viscosity 27: Drive current 28: 24hours totalizer 1 29: 24hours totalizer 2 30: 24hours totalizer 3 31: Gas void fraction 32: Display unit mass flow dual 33: Display unit density dual

								0: None 1: Mass flow 2: Density 3: Temperature 4: Volume flow 5: Reference density 6: Relative density 7: Corrected volume flow 8: Pressure 9: Totalizer 1 10: Totalizer 2 11: Totalizer 3 15: Mass flow % graph 16: Volume flow % graph 17: Corrected volume flow % graph 18: Tag 19: Long tag 20: Velocity 21: Concentration 22: Net mass flow 1 23: Net mass flow 2 24: Net volume flow 1 25: Net volume flow 2 26: Net corrected volume flow 34: Viscosity 27: Drive current 28: 24hours totalizer 1 29: 24hours totalizer 2 30: 24hours totalizer 3 31: Gas void fraction 32: Display unit mass flow dual 33: Display unit density dual
0x000B	DISPLAY_SELECT_11	-	R/W (C0)d	-	9	31780	Display select 11	

0x000C	DISPLAY_SELECT_12	-	R/W (C0)d	-	10	31781	Display select 12	0: None 1: Mass flow 2: Density 3: Temperature 4: Volume flow 5: Reference density 6: Relative density 7: Corrected volume flow 8: Pressure 9: Totalizer 1 10: Totalizer 2 11: Totalizer 3 15: Mass flow % graph 16: Volume flow % graph 17: Corrected volume flow % graph 18: Tag 19: Long tag 20: Velocity 21: Concentration 22: Net mass flow 1 23: Net mass flow 2 24: Net volume flow 1 25: Net volume flow 2 26: Net corrected volume flow 34: Viscosity 27: Drive current 28: 24hours totalizer 1 29: 24hours totalizer 2 30: 24hours totalizer 3 31: Gas void fraction 32: Display unit mass flow dual 33: Display unit density dual

0x000D	DISPLAY_SELECT_13	-	R/W (C0)d	-	11	31782	Display select 13	0: None 1: Mass flow 2: Density 3: Temperature 4: Volume flow 5: Reference density 6: Relative density 7: Corrected volume flow 8: Pressure 9: Totalizer 1 10: Totalizer 2 11: Totalizer 3 15: Mass flow % graph 16: Volume flow % graph 17: Corrected volume flow % graph 18: Tag 19: Long tag 20: Velocity 21: Concentration 22: Net mass flow 1 23: Net mass flow 2 24: Net volume flow 1 25: Net volume flow 2 26: Net corrected volume flow 34: Viscosity 27: Drive current 28: 24hours totalizer 1 29: 24hours totalizer 2 30: 24hours totalizer 3 31: Gas void fraction 32: Display unit mass flow dual 33: Display unit density dual

0x000E	DISPLAY_SELECT_14	-	R/W (C0)d	-	15	31783	Display select 14	0: None 1: Mass flow 2: Density 3: Temperature 4: Volume flow 5: Reference density 6: Relative density 7: Corrected volume flow 8: Pressure 9: Totalizer 1 10: Totalizer 2 11: Totalizer 3 15: Mass flow % graph 16: Volume flow % graph 17: Corrected volume flow % graph 18: Tag 19: Long tag 20: Velocity 21: Concentration 22: Net mass flow 1 23: Net mass flow 2 24: Net volume flow 1 25: Net volume flow 2 26: Net corrected volume flow 34: Viscosity 27: Drive current 28: 24hours totalizer 1 29: 24hours totalizer 2 30: 24hours totalizer 3 31: Gas void fraction 32: Display unit mass flow dual 33: Display unit density dual

0x000F	DISPLAY_SELECT_15	-	R/W (C0)d	-	16	31784	Display select 15	0: None 1: Mass flow 2: Density 3: Temperature 4: Volume flow 5: Reference density 6: Relative density 7: Corrected volume flow 8: Pressure 9: Totalizer 1 10: Totalizer 2 11: Totalizer 3 15: Mass flow % graph 16: Volume flow % graph 17: Corrected volume flow % graph 18: Tag 19: Long tag 20: Velocity 21: Concentration 22: Net mass flow 1 23: Net mass flow 2 24: Net volume flow 1 25: Net volume flow 2 26: Net corrected volume flow 34: Viscosity 27: Drive current 28: 24hours totalizer 1 29: 24hours totalizer 2 30: 24hours totalizer 3 31: Gas void fraction 32: Display unit mass flow dual 33: Display unit density dual

0x0010	DISPLAY_SELECT_16	-	R/W (C0)d	-	17	31785	Display select 16	0: None 1: Mass flow 2: Density 3: Temperature 4: Volume flow 5: Reference density 6: Relative density 7: Corrected volume flow 8: Pressure 9: Totalizer 1 10: Totalizer 2 11: Totalizer 3 15: Mass flow % graph 16: Volume flow % graph 17: Corrected volume flow % graph 18: Tag 19: Long tag 20: Velocity 21: Concentration 22: Net mass flow 1 23: Net mass flow 2 24: Net volume flow 1 25: Net volume flow 2 26: Net corrected volume flow 34: Viscosity 27: Drive current 28: 24hours totalizer 1 29: 24hours totalizer 2 30: 24hours totalizer 3 31: Gas void fraction 32: Display unit mass flow dual 33: Display unit density dual

0x0011	DISPLAY_SELECT_17	-	R/W (C0)d	-	18	31786	Display select 17	0: None 1: Mass flow 2: Density 3: Temperature 4: Volume flow 5: Reference density 6: Relative density 7: Corrected volume flow 8: Pressure 9: Totalizer 1 10: Totalizer 2 11: Totalizer 3 15: Mass flow % graph 16: Volume flow % graph 17: Corrected volume flow % graph 18: Tag 19: Long tag 20: Velocity 21: Concentration 22: Net mass flow 1 23: Net mass flow 2 24: Net volume flow 1 25: Net volume flow 2 26: Net corrected volume flow 34: Viscosity 27: Drive current 28: 24hours totalizer 1 29: 24hours totalizer 2 30: 24hours totalizer 3 31: Gas void fraction 32: Display unit mass flow dual 33: Display unit density dual

0x0012	DISPLAY_SELECT_18	-	R/W (C0)d	-	19	31787	Display select 18	0: None 1: Mass flow 2: Density 3: Temperature 4: Volume flow 5: Reference density 6: Relative density 7: Corrected volume flow 8: Pressure 9: Totalizer 1 10: Totalizer 2 11: Totalizer 3 15: Mass flow % graph 16: Volume flow % graph 17: Corrected volume flow % graph 18: Tag 19: Long tag 20: Velocity 21: Concentration 22: Net mass flow 1 23: Net mass flow 2 24: Net volume flow 1 25: Net volume flow 2 26: Net corrected volume flow 34: Viscosity 27: Drive current 28: 24hours totalizer 1 29: 24hours totalizer 2 30: 24hours totalizer 3 31: Gas void fraction 32: Display unit mass flow dual 33: Display unit density dual

								0: None 1: Mass flow 2: Density 3: Temperature 4: Volume flow 5: Reference density 6: Relative density 7: Corrected volume flow 8: Pressure 9: Totalizer 1 10: Totalizer 2 11: Totalizer 3 15: Mass flow % graph 16: Volume flow % graph 17: Corrected volume flow % graph 18: Tag 19: Long tag 20: Velocity 21: Concentration 22: Net mass flow 1 23: Net mass flow 2 24: Net volume flow 1 25: Net volume flow 2 26: Net corrected volume flow 34: Viscosity 27: Drive current 28: 24hours totalizer 1 29: 24hours totalizer 2 30: 24hours totalizer 3 31: Gas void fraction 32: Display unit mass flow dual 33: Display unit density dual
0x0013	DISPLAY_SELECT_19	-	R/W (C0)d	-	20	31788	Display select 19	

0x00 14	DISPLAY_SELECT_20	-	R/W (C0)d	-	27	31789	Display select 20	0: None 1: Mass flow 2: Density 3: Temperature 4: Volume flow 5: Reference density 6: Relative density 7: Corrected volume flow 8: Pressure 9: Totalizer 1 10: Totalizer 2 11: Totalizer 3 15: Mass flow % graph 16: Volume flow % graph 17: Corrected volume flow % graph 18: Tag 19: Long tag 20: Velocity 21: Concentration 22: Net mass flow 1 23: Net mass flow 2 24: Net volume flow 1 25: Net volume flow 2 26: Net corrected volume flow 34: Viscosity 27: Drive current 28: 24hours totalizer 1 29: 24hours totalizer 2 30: 24hours totalizer 3 31: Gas void fraction 32: Display unit mass flow dual 33: Display unit density dual
0x00 1A	DISPLAY_FORMAT_MASS_FLOW	-	R/W (C0)d	-	0	31801	Display format mass flow	0: Auto 1: 0digit 2: 1digit 3: 2digit 4: 3digit 5: 4digit 6: 5digit
0x00 1B	DISPLAY_FORMAT_DENSITY	-	R/W (C0)d	-	0	31802	Display format density	0: Auto 1: 0digit 2: 1digit 3: 2digit 4: 3digit 5: 4digit 6: 5digit
0x00 1C	DISPLAY_FORMAT_TEMPERATURE	-	R/W (C0)d	-	2	31803	Display format temperature	0: Auto 1: 0digit 2: 1digit 3: 2digit 4: 3digit 5: 4digit 6: 5digit

0x00 1D	DISPLAY_FORMAT_VOLUME_FLOW	-	R/W (C0)d	-	0	31805	Display format vol- ume flow	0: Auto 1: 0digit 2: 1digit 3: 2digit 4: 3digit 5: 4digit 6: 5digit
0x00 1E	DISPLAY_FORMAT_PRESSURE	-	R/W (C0)d	-	0	31804	Display format pressure	0: Auto 1: 0digit 2: 1digit 3: 2digit 4: 3digit 5: 4digit 6: 5digit
0x00 1F	DISPLAY_FORMAT_REFERENCE_DENSITY	-	R/W (C0)d	-	0	31806	Display format ref- erence density	0: Auto 1: 0digit 2: 1digit 3: 2digit 4: 3digit 5: 4digit 6: 5digit
0x00 20	DISPLAY_FORMAT_RELATIVE_DENSITY	-	R/W (C0)d	-	0	31807	Display format rel- ative den- sity	0: Auto 1: 0digit 2: 1digit 3: 2digit 4: 3digit 5: 4digit 6: 5digit
0x00 21	DISPLAY_FORMAT_CORRECTED_VOLUME_FLOW	-	R/W (C0)d	-	0	31808	Display format cor- rected vol- ume flow	0: Auto 1: 0digit 2: 1digit 3: 2digit 4: 3digit 5: 4digit 6: 5digit
0x00 22	DISPLAY_FORMAT_CONC	-	R/W (C0)d	-	0	31809	Display format concentra- tion	0: Auto 1: 0digit 2: 1digit 3: 2digit 4: 3digit 5: 4digit 6: 5digit
0x00 23	DISPLAY_FORMAT_NET_MASS_FLOW_1	-	R/W (C0)d	-	0	31810	Display format net mass flow 1	0: Auto 1: 0digit 2: 1digit 3: 2digit 4: 3digit 5: 4digit 6: 5digit
0x00 24	DISPLAY_FORMAT_NET_MASS_FLOW_2	-	R/W (C0)d	-	0	31811	Display format net mass flow 2	0: Auto 1: 0digit 2: 1digit 3: 2digit 4: 3digit 5: 4digit 6: 5digit

0x00 25	DISPLAY_FORMAT_NET_VOLUME_FLOW_1	-	R/W (C0)d	-	0	31812	Display format net volume flow 1	0: Auto 1: 0digit 2: 1digit 3: 2digit 4: 3digit 5: 4digit 6: 5digit
0x00 26	DISPLAY_FORMAT_NET_VOLUME_FLOW_2	-	R/W (C0)d	-	0	31813	Display format net volume flow 2	0: Auto 1: 0digit 2: 1digit 3: 2digit 4: 3digit 5: 4digit 6: 5digit
0x00 27	DISPLAY_FORMAT_NET_CORR_VOLUME_FLOW	-	R/W (C0)d	-	0	31814	Display format net corrected volume flow	0: Auto 1: 0digit 2: 1digit 3: 2digit 4: 3digit 5: 4digit 6: 5digit
0x00 28	DISPLAY_FORMAT_TOTAL_1	-	R/W (C0)d	-	0	31335	Display format total 1	0: Auto 1: 0digit 2: 1digit 3: 2digit 4: 3digit 5: 4digit 6: 5digit 7: 6digit 8: 7digit
0x00 29	DISPLAY_FORMAT_TOTAL_2	-	R/W (C0)d	-	0	31365	Display format total 2	0: Auto 1: 0digit 2: 1digit 3: 2digit 4: 3digit 5: 4digit 6: 5digit 7: 6digit 8: 7digit
0x00 2A	DISPLAY_FORMAT_TOTAL_3	-	R/W (C0)d	-	0	31395	Display format total 3	0: Auto 1: 0digit 2: 1digit 3: 2digit 4: 3digit 5: 4digit 6: 5digit 7: 6digit 8: 7digit
0x00 2E	DISPLAY_FORMAT_VISCOSITY	-	R/W (C0)d	-	0	1110	Display format vis- cosity	0: Auto 1: 0digit 2: 1digit 3: 2digit 4: 3digit 5: 4digit 6: 5digit

0x00 34	DISPLAY_CON- TRAST	-	R/W (C0)d	-	5	31791	Display contrast	0: -5 1: -4 2: -3 3: -2 4: -1 5: 0 6: 1 7: 2 8: 3 9: 4 10: 5
0x00 35	DISPLAY_LINE	-	R/W (C0)d	-	3	31795	Display line	0: 1line (big) 1: 1line 2: 2line 3: 3line 4: 4line
0x00 36	DISPLAY_PE- RIOD	-	R/W (C0)d	-	2	31792	Display pe- riod	0: 0.2s 1: 0.4s 2: 1.0s 3: 2.0s 4: 4.0s 5: 8.0s
0x00 37	DIS- PLAY_NE_107	-	R/W (C0)d	-	0	31799	Display NE 107	0: Normal 1: NE 107
0x00 38	DIS- PLAY_ALARM	-	R/W (C0)d	-	0	31800	Display alarm	0: Normal 1: Detail
0x00 39	IRSW_OPERA- TION	-	R/W (C0)d	-	1	1113	IRSW op- eration	0: Inhibit 1: Enable
0x00 3A	DIS- PLAY_SCROLL	-	R/W (C0)d	-	0	31796	Display scroll	0: Off 1: Manual 2: Auto (2.0s) 3: Auto (4.0s) 4: Auto (8.0s)
0x00 3B	DIS- PLAY_DAMP- ING	-	R/W (C0)d	-	3	31790	Display (damping)	-
0x00 3C	DISPLAY_FOR- MAT_DATE	-	R/W (C0)d	-	0	31794	Display format date	0: MM/DD/YYYY 1: DD/MM/YYYY 2: YYYY/MM/DD
0x00 3D	LANGUAGE	-	R/W (C0)d	-	0	31793	Language	0: English 1: French 2: German 3: Italian 4: Spanish 5: Portuguese 6: Russian 7: Kazakh 8: Chinese 9: Japanese 10: Polish
0x00 3E	LAN- GUAGE_PACK- AGE	-	R	-	0	14640	Language package	0: Package 1 1: Package 2 2: Package 3
0x00 3F	DIS- PLAY_UNIT_SE- LECTION	-	R/W (C0)d	-	0	1112	Display unit selec- tion	0: Metric 1: US 2: UK 3: Russia 4: Japan

0x0040	DISPLAY_TOTAL_HEALTH_RESULT	-	R/W (C0)d	-	0	3871	Display total health result	0: Off 1: On
0x0041	DISPLAY_MEAS_MODE	-	R/W (C2)	-	0	1115	Display measurement mode	0: Normal 1: Trend online
0x0042	TREND_OFFLINE_LRV	-	R/W (C2)	-	0	1116	Trend offline LRV	-
0x0043	TREND_OFFLINE_URV	-	R/W (C2)	-	10	1117	Trend offline URV	-
0x0044	DISPLAY_ROTATION	-	R/W (C0)d	-	0	31817	Display rotation	0: Normal 1: Reverse
0x0045	DISPLAY_INVERSION	-	R/W (C0)d	-	0	31818	Display inversion	0: Normal 1: Invert
0x0046	LCD_TEST	-	R/W (C0)	-	0	31816	LCD test	0: Not execute 1: Execute 2: Show pattern 1 3: Show pattern 2 4: Show pattern 3 5: Show pattern 4
0x0047	SQUAWK	-	R/W (C0)	-	0	31820	Squawk	0: Off 1: On 2: Squawk once
0x0048	DISPLAY_MASS_FLOW_DUAL	-	R/W (C0)d	-	1328	3691	Display unit mass flow dual	1318: g/s 1319: g/min 1320: g/h 1322: kg/s 1323: kg/min 1324: kg/h 1325: kg/d 1327: t/min 1328: t/h 1329: t/d 1330: lb/s 1331: lb/min 1332: lb/h 1333: lb/d 32787: User unit 1335: STon/min 1336: STon/h 1337: STon/d 1339: LTon/min 1340: LTon/h 1341: LTon/d
0x0049	DISPLAY_DENSITY_DUAL	-	R/W (C0)d	-	1103	3692	Display unit density dual	1104: g/mL 1103: kg/L 1097: kg/m3 1108: lb/gal 1107: lb/ft3 1100: g/cm3 1105: g/L 32788: User unit 32769: kg/cm3 1099: kg/dm3 32770: g/cc

7.2.4 Concentration Transducer Block

Ⓐ	Submodule Index	Ⓘ	Initial Value
Ⓑ	Parameter	ⓖ	ID
Ⓒ	Sub-Parameter	ⓓ	Parameter Label
Ⓓ	Access	Ⓢ	Enum/Array description
Ⓔ	Write Mode		

Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	Ⓘ	ⓖ	ⓓ	Ⓢ
0xB000	BLOCK_OBJECT	-	R	-	-	-	-	-
-	-	Reserved	R	-	250	-	Reserved	250(0xFA):Not used
-	-	Block Object	R	-	0x03	-	Block Object	0x03:Transducer Block
-	-	Parent Class	R	-	0x03	-	Parent Class	0x03:Flow
-	-	Class	R	-	0x81	-	Class	0x81:manufacturer specific
-	-	Dev_Rev	R	-	1	9070	Device Revision	-
-	-	Dev_Rev_Comp	R	-	1	9071	Device Revision Compatibility	-
-	-	DD Revision	R	-	65534	-	DD Revision	-
-	-	Profile	R	-	0x40FA	-	Profile	-
-	-	Profile Revision	R	-	0x0402	-	Profile Revision	-
-	-	Execution Time	R	-	254	-	Execution Time	-
-	-	Number of Parameters	R	-	181	-	Number of Parameters	-
-	-	Reserved by PI	R	-	-	-	Reserved by PI	-
-	-	Reserved by PI	R	-	-	-	Reserved by PI	-
0xB001	CURRENT_MODE	-	R	-	0x08	-	Current mode	0x08: AUTO 0x80: Out of Service (O/S)
0x0000	CONC_VALUE	-	R	-	-	-	-	-
-	-	Value	R	-	0	11989	Concentration	-
-	-	Status	R	-	0	-	Concentration.status	-
0x0001	SELECTED_CONC_SET	-	R	-	0	10870	Selected concentration set	0: CONC_UNI TS_SET_1, "Set 1" 1: CONC_UNI TS_SET_2, "Set 2" 2: CONC_UNI TS_SET_3, "Set 3" 3: CONC_UNI TS_SET_4, "Set 4"

0x00 02	SE- LECT_CONC_S ET_MANUAL	-	R/W (C2)	-	0	30871	Select con- centration set manual	0: Set 1 1: Set 2 2: Set 3 3: Set 4
0x00 03	CONC_UNITS_ SET_1	-	R/W (C2)	-	32790	31111	Concentra- tion mea- surement unit set 1	1426: degBrix 1343: Wt% sol 1344: Vol% sol 32790: Wt % 1562: Vol % 32791: Wt % User unit 32792: Vol % User unit
0x00 04	CONC_LO_LIMI T_SET_1	-	R/W (C2)	-	0	31113	Concentra- tion mea- surement LRV set 1	-
0x00 05	CONC_HI_LIMIT _SET_1	-	R/W (C2)	-	100	31114	Concentra- tion mea- surement URV set 1	-
0x00 06	CONC_NAME_S ET_1	-	R/W (C2)	-	"Set1 "	31110	Concentra- tion name set 1	-
0x00 07	CONC_USER_U NIT_SET_1	-	R/W (C2)	-	" "	31112	Concentra- tion mea- surement user unit set 1	-
0x00 08	CONC_UNITS_ SET_2	-	R/W (C2)	-	32790	31120	Concentra- tion mea- surement unit set 2	1426: degBrix 1343: Wt% sol 1344: Vol% sol 32790: Wt % 1562: Vol % 32791: Wt % User unit 32792: Vol % User unit
0x00 09	CONC_LO_LIMI T_SET_2	-	R/W (C2)	-	0	31122	Concentra- tion mea- surement LRV set 2	-
0x00 0A	CONC_HI_LIMIT _SET_2	-	R/W (C2)	-	100	31123	Concentra- tion mea- surement URV set 2	-
0x00 0B	CONC_NAME_S ET_2	-	R/W (C2)	-	"Set2 "	31119	Concentra- tion name set 2	-
0x00 0C	CONC_USER_U NIT_SET_2	-	R/W (C2)	-	" "	31121	Concentra- tion mea- surement user unit set 2	-
0x00 0D	CONC_UNITS_ SET_3	-	R/W (C2)	-	32790	31129	Concentra- tion mea- surement unit set 3	1426: degBrix 1343: Wt% sol 1344: Vol% sol 32790: Wt % 1562: Vol % 32791: Wt % User unit 32792: Vol % User unit

0x00 0E	CONC_LO_LIMI T_SET_3	-	R/W (C2)	-	0	31131	Concentra- tion mea- surement LRV set 3	-
0x00 0F	CONC_HI_LIMIT _SET_3	-	R/W (C2)	-	100	31132	Concentra- tion mea- surement URV set 3	-
0x00 10	CONC_NAME_S ET_3	-	R/W (C2)	-	"Set3 "	31128	Concentra- tion name set 3	-
0x00 11	CONC_USER_U NIT_SET_3	-	R/W (C2)	-	" "	31130	Concentra- tion mea- surement user unit set 3	-
0x00 12	CONC_UNITS_ SET_4	-	R/W (C2)	-	32790	31138	Concentra- tion mea- surement unit set 4	1426: degBrix 1343: Wt% sol 1344: Vol% sol 32790: Wt % 1562: Vol % 32791: Wt % User unit 32792: Vol % User unit
0x00 13	CONC_LO_LIMI T_SET_4	-	R/W (C2)	-	0	31140	Concentra- tion mea- surement LRV set 4	-
0x00 14	CONC_HI_LIMIT _SET_4	-	R/W (C2)	-	100	31141	Concentra- tion mea- surement URV set 4	-
0x00 1A	CONC_NAME_S ET_4	-	R/W (C2)	-	"Set4 "	31137	Concentra- tion name set 4	-
0x00 1B	CONC_USER_U NIT_SET_4	-	R/W (C2)	-	" "	31139	Concentra- tion mea- surement user unit set 4	-
0x00 1C	CONC_DAMP- ING	-	R/W (C2)	-	3	30875	Concentra- tion damp- ing	-
0x00 1D	CONC_TRIM_S EL	-	R/W (C2)	-	0	30872	Concentra- tion trim select	0: Inhibit 1: Enable
0x00 1E	CONC_TRIM_O FFSET	-	R/W (C2)	-	0	30873	Concentra- tion trim offset	-
0x00 1F	CONC_TRIM_G AIN	-	R/W (C2)	-	1	30874	Concentra- tion trim gain	-
0x00 20	STD_CONC_SE T_1	-	-	-	-	-	-	-
-	-	Reference tempera- ture	R/W (C2)	-	25	31070	Concentra- tion refer- ence tem- perature set 1	-

-	-	Reference density carrier	R/W (C2)	-	0.997	31071	Concentration reference density carrier set 1	-
-	-	Temperature coeff A carrier	R/W (C2)	-	-0.000261	31072	Concentration temperature coeff A carrier set 1	-
-	-	Temperature coeff B carrier	R/W (C2)	-	-0.0000036	31073	Concentration temperature coeff B carrier set 1	-
-	-	Reference density product	R/W (C2)	-	0	31074	Concentration reference density product set 1	-
-	-	Temperature coeff A product	R/W (C2)	-	0	31075	Concentration temperature coeff A product set 1	-
-	-	Temperature coeff B product	R/W (C2)	-	0	31076	Concentration temperature coeff B product set 1	-
0x0021	STD_CONC_SE T_2	-	-	-	-	-	-	-
-	-	Reference temperature	R/W (C2)	-	25	31077	Concentration reference temperature set 2	-
-	-	Reference density carrier	R/W (C2)	-	0.997	31078	Concentration reference density carrier set 2	-
-	-	Temperature coeff A carrier	R/W (C2)	-	-0.000261	31079	Concentration temperature coeff A carrier set 2	-
-	-	Temperature coeff B carrier	R/W (C2)	-	-0.0000036	31080	Concentration temperature coeff B carrier set 2	-

-	-	Reference density product	R/W (C2)	-	0	31081	Concentration reference density product set 2	-
-	-	Temperature coeff A product	R/W (C2)	-	0	31082	Concentration temperature coeff A product set 2	-
-	-	Temperature coeff B product	R/W (C2)	-	0	31083	Concentration temperature coeff B product set 2	-
0x0022	STD_CONC_SE T_3	-	-	-	-	-	-	-
-	-	Reference temperature	R/W (C2)	-	25	31084	Concentration reference temperature set 3	-
-	-	Reference density carrier	R/W (C2)	-	0.997	31085	Concentration reference density carrier set 3	-
-	-	Temperature coeff A carrier	R/W (C2)	-	-0.000261	31086	Concentration temperature coeff A carrier set 3	-
-	-	Temperature coeff B carrier	R/W (C2)	-	-0.0000036	31087	Concentration temperature coeff B carrier set 3	-
-	-	Reference density product	R/W (C2)	-	0	31088	Concentration reference density product set 3	-
-	-	Temperature coeff A product	R/W (C2)	-	0	31089	Concentration temperature coeff A product set 3	-
-	-	Temperature coeff B product	R/W (C2)	-	0	31090	Concentration temperature coeff B product set 3	-
0x0023	STD_CONC_SE T_4	-	-	-	-	-	-	-

-	-	Reference temperature	R/W (C2)	-	25	31091	Concentration reference temperature set 4	-
-	-	Reference density carrier	R/W (C2)	-	0.997	31092	Concentration reference density carrier set 4	-
-	-	Temperature coeff A carrier	R/W (C2)	-	-0.000261	31093	Concentration temperature coeff A carrier set 4	-
-	-	Temperature coeff B carrier	R/W (C2)	-	-0.0000036	31094	Concentration temperature coeff B carrier set 4	-
-	-	Reference density product	R/W (C2)	-	0	31095	Concentration reference density product set 4	-
-	-	Temperature coeff A product	R/W (C2)	-	0	31096	Concentration temperature coeff A product set 4	-
-	-	Temperature coeff B product	R/W (C2)	-	0	31097	Concentration temperature coeff B product set 4	-
0x0027	ADV_CONC_TEMPERATURE_NUM_SET_1	-	R/W (C2)	-	8	30890	Concentration temperature set 1 number	-
0x0028	ADV_CONC_SET_1	-	-	-	-	-	-	-
-	-	Temperature 1	R/W (C2)	-	0	30891	Concentration temperature 1 set 1	-
-	-	A 1	R/W (C2)	-	0	30892	Concentration A 1 set 1	-
-	-	B 1	R/W (C2)	-	0	30893	Concentration B 1 set 1	-
-	-	C 1	R/W (C2)	-	0	30894	Concentration C 1 set 1	-

-	-	D 1	R/W (C2)	-	0	30895	Concentra- tion D 1 set 1	-
-	-	Tempera- ture 2	R/W (C2)	-	0	30896	Concentra- tion tem- perature 2 set 1	-
-	-	A 2	R/W (C2)	-	0	30897	Concentra- tion A 2 set 1	-
-	-	B 2	R/W (C2)	-	0	30898	Concentra- tion B 2 set 1	-
-	-	C 2	R/W (C2)	-	0	30899	Concentra- tion C 2 set 1	-
-	-	D 2	R/W (C2)	-	0	30900	Concentra- tion D 2 set 1	-
-	-	Tempera- ture 3	R/W (C2)	-	0	30901	Concentra- tion tem- perature 3 set 1	-
-	-	A 3	R/W (C2)	-	0	30902	Concentra- tion A 3 set 1	-
-	-	B 3	R/W (C2)	-	0	30903	Concentra- tion B 3 set 1	-
-	-	C 3	R/W (C2)	-	0	30904	Concentra- tion C 3 set 1	-
-	-	D 3	R/W (C2)	-	0	30905	Concentra- tion D 3 set 1	-
-	-	Tempera- ture 4	R/W (C2)	-	0	30906	Concentra- tion tem- perature 4 set 1	-
-	-	A 4	R/W (C2)	-	0	30907	Concentra- tion A 4 set 1	-
-	-	B 4	R/W (C2)	-	0	30908	Concentra- tion B 4 set 1	-
-	-	C 4	R/W (C2)	-	0	30909	Concentra- tion C 4 set 1	-
-	-	D 4	R/W (C2)	-	0	30910	Concentra- tion D 4 set 1	-
-	-	Tempera- ture 5	R/W (C2)	-	0	30911	Concentra- tion tem- perature 5 set 1	-
-	-	A 5	R/W (C2)	-	0	30912	Concentra- tion A 5 set 1	-

-	-	B 5	R/W (C2)	-	0	30913	Concentra- tion B 5 set 1	-
-	-	C 5	R/W (C2)	-	0	30914	Concentra- tion C 5 set 1	-
-	-	D 5	R/W (C2)	-	0	30915	Concentra- tion D 5 set 1	-
-	-	Tempera- ture 6	R/W (C2)	-	0	30916	Concentra- tion tem- perature 6 set 1	-
-	-	A 6	R/W (C2)	-	0	30917	Concentra- tion A 6 set 1	-
-	-	B 6	R/W (C2)	-	0	30918	Concentra- tion B 6 set 1	-
-	-	C 6	R/W (C2)	-	0	30919	Concentra- tion C 6 set 1	-
-	-	D 6	R/W (C2)	-	0	30920	Concentra- tion D 6 set 1	-
-	-	Tempera- ture 7	R/W (C2)	-	0	30921	Concentra- tion tem- perature 7 set 1	-
-	-	A 7	R/W (C2)	-	0	30922	Concentra- tion A 7 set 1	-
-	-	B 7	R/W (C2)	-	0	30923	Concentra- tion B 7 set 1	-
-	-	C 7	R/W (C2)	-	0	30924	Concentra- tion C 7 set 1	-
-	-	D 7	R/W (C2)	-	0	30925	Concentra- tion D 7 set 1	-
-	-	Tempera- ture 8	R/W (C2)	-	0	30926	Concentra- tion tem- perature 8 set 1	-
-	-	A 8	R/W (C2)	-	0	30927	Concentra- tion A 8 set 1	-
-	-	B 8	R/W (C2)	-	0	30928	Concentra- tion B 8 set 1	-
-	-	C 8	R/W (C2)	-	0	30929	Concentra- tion C 8 set 1	-
-	-	D 8	R/W (C2)	-	0	30930	Concentra- tion D 8 set 1	-

0x0029	ADV_CONC_TEMPERATURE_NUM_SET_2	-	R/W (C2)	-	8	30931	Concentration temperature set 2 number	-
0x002A	ADV_CONC_SET_2	-	-	-	-	-	-	-
-	-	Temperature 1	R/W (C2)	-	0	30932	Concentration temperature 1 set 2	-
-	-	A 1	R/W (C2)	-	0	30933	Concentration A 1 set 2	-
-	-	B 1	R/W (C2)	-	0	30934	Concentration B 1 set 2	-
-	-	C 1	R/W (C2)	-	0	30935	Concentration C 1 set 2	-
-	-	D 1	R/W (C2)	-	0	30936	Concentration D 1 set 2	-
-	-	Temperature 2	R/W (C2)	-	0	30937	Concentration temperature 2 set 2	-
-	-	A 2	R/W (C2)	-	0	30938	Concentration A 2 set 2	-
-	-	B 2	R/W (C2)	-	0	30939	Concentration B 2 set 2	-
-	-	C 2	R/W (C2)	-	0	30940	Concentration C 2 set 2	-
-	-	D 2	R/W (C2)	-	0	30941	Concentration D 2 set 2	-
-	-	Temperature 3	R/W (C2)	-	0	30942	Concentration temperature 3 set 2	-
-	-	A 3	R/W (C2)	-	0	30943	Concentration A 3 set 2	-
-	-	B 3	R/W (C2)	-	0	30944	Concentration B 3 set 2	-
-	-	C 3	R/W (C2)	-	0	30945	Concentration C 3 set 2	-
-	-	D 3	R/W (C2)	-	0	30946	Concentration D 3 set 2	-

-	-	Temperature 4	R/W (C2)	-	0	30947	Concentration temperature 4 set 2	-
-	-	A 4	R/W (C2)	-	0	30948	Concentration A 4 set 2	-
-	-	B 4	R/W (C2)	-	0	30949	Concentration B 4 set 2	-
-	-	C 4	R/W (C2)	-	0	30950	Concentration C 4 set 2	-
-	-	D 4	R/W (C2)	-	0	30951	Concentration D 4 set 2	-
-	-	Temperature 5	R/W (C2)	-	0	30952	Concentration temperature 5 set 2	-
-	-	A 5	R/W (C2)	-	0	30953	Concentration A 5 set 2	-
-	-	B 5	R/W (C2)	-	0	30954	Concentration B 5 set 2	-
-	-	C 5	R/W (C2)	-	0	30955	Concentration C 5 set 2	-
-	-	D 5	R/W (C2)	-	0	30956	Concentration D 5 set 2	-
-	-	Temperature 6	R/W (C2)	-	0	30957	Concentration temperature 6 set 2	-
-	-	A 6	R/W (C2)	-	0	30958	Concentration A 6 set 2	-
-	-	B 6	R/W (C2)	-	0	30959	Concentration B 6 set 2	-
-	-	C 6	R/W (C2)	-	0	30960	Concentration C 6 set 2	-
-	-	D 6	R/W (C2)	-	0	30961	Concentration D 6 set 2	-
-	-	Temperature 7	R/W (C2)	-	0	30962	Concentration temperature 7 set 2	-
-	-	A 7	R/W (C2)	-	0	30963	Concentration A 7 set 2	-
-	-	B 7	R/W (C2)	-	0	30964	Concentration B 7 set 2	-

-	-	C 7	R/W (C2)	-	0	30965	Concentra- tion C 7 set 2	-
-	-	D 7	R/W (C2)	-	0	30966	Concentra- tion D 7 set 2	-
-	-	Tempera- ture 8	R/W (C2)	-	0	30967	Concentra- tion tem- perature 8 set 2	-
-	-	A 8	R/W (C2)	-	0	30968	Concentra- tion A 8 set 2	-
-	-	B 8	R/W (C2)	-	0	30969	Concentra- tion B 8 set 2	-
-	-	C 8	R/W (C2)	-	0	30970	Concentra- tion C 8 set 2	-
-	-	D 8	R/W (C2)	-	0	30971	Concentra- tion D 8 set 2	-
0x00 2B	ADV_CONC_TE MPERA- TURE_NUM_SE T_3	-	R/W (C2)	-	8	30972	Concentra- tion tem- perature set 3 num- ber	-
0x00 2C	ADV_CONC_SE T_3	-	-	-	-	-	-	-
-	-	Tempera- ture 1	R/W (C2)	-	0	30973	Concentra- tion tem- perature 1 set 3	-
-	-	A 1	R/W (C2)	-	0	30974	Concentra- tion A 1 set 3	-
-	-	B 1	R/W (C2)	-	0	30975	Concentra- tion B 1 set 3	-
-	-	C 1	R/W (C2)	-	0	30976	Concentra- tion C 1 set 3	-
-	-	D 1	R/W (C2)	-	0	30977	Concentra- tion D 1 set 3	-
-	-	Tempera- ture 2	R/W (C2)	-	0	30978	Concentra- tion tem- perature 2 set 3	-
-	-	A 2	R/W (C2)	-	0	30979	Concentra- tion A 2 set 3	-
-	-	B 2	R/W (C2)	-	0	30980	Concentra- tion B 2 set 3	-
-	-	C 2	R/W (C2)	-	0	30981	Concentra- tion C 2 set 3	-

-	-	D 2	R/W (C2)	-	0	30982	Concentra- tion D 2 set 3	-
-	-	Tempera- ture 3	R/W (C2)	-	0	30983	Concentra- tion tem- perature 3 set 3	-
-	-	A 3	R/W (C2)	-	0	30984	Concentra- tion A 3 set 3	-
-	-	B 3	R/W (C2)	-	0	30985	Concentra- tion B 3 set 3	-
-	-	C 3	R/W (C2)	-	0	30986	Concentra- tion C 3 set 3	-
-	-	D 3	R/W (C2)	-	0	30987	Concentra- tion D 3 set 3	-
-	-	Tempera- ture 4	R/W (C2)	-	0	30988	Concentra- tion tem- perature 4 set 3	-
-	-	A 4	R/W (C2)	-	0	30989	Concentra- tion A 4 set 3	-
-	-	B 4	R/W (C2)	-	0	30990	Concentra- tion B 4 set 3	-
-	-	C 4	R/W (C2)	-	0	30991	Concentra- tion C 4 set 3	-
-	-	D 4	R/W (C2)	-	0	30992	Concentra- tion D 4 set 3	-
-	-	Tempera- ture 5	R/W (C2)	-	0	30993	Concentra- tion tem- perature 5 set 3	-
-	-	A 5	R/W (C2)	-	0	30994	Concentra- tion A 5 set 3	-
-	-	B 5	R/W (C2)	-	0	30995	Concentra- tion B 5 set 3	-
-	-	C 5	R/W (C2)	-	0	30996	Concentra- tion C 5 set 3	-
-	-	D 5	R/W (C2)	-	0	30997	Concentra- tion D 5 set 3	-
-	-	Tempera- ture 6	R/ W(C2)	-	0	30998	Concentra- tion tem- perature 6 set 3	-
-	-	A 6	R/ W(C2)	-	0	30999	Concentra- tion A 6 set 3	-

-	-	B 6	R/W (C2)	-	0	31000	Concentra- tion B 6 set 3	-
-	-	C 6	R/W (C2)	-	0	31001	Concentra- tion C 6 set 3	-
-	-	D 6	R/W (C2)	-	0	31002	Concentra- tion D 6 set 3	-
-	-	Tempera- ture 7	R/W (C2)	-	0	31003	Concentra- tion tem- perature 7 set 3	-
-	-	A 7	R/W (C2)	-	0	31004	Concentra- tion A 7 set 3	-
-	-	B 7	R/W (C2)	-	0	31005	Concentra- tion B 7 set 3	-
-	-	C 7	R/W (C2)	-	0	31006	Concentra- tion C 7 set 3	-
-	-	D 7	R/W (C2)	-	0	31007	Concentra- tion D 7 set 3	-
-	-	Tempera- ture 8	R/W (C2)	-	0	31008	Concentra- tion tem- perature 8 set 3	-
-	-	A 8	R/W (C2)	-	0	31009	Concentra- tion A 8 set 3	-
-	-	B 8	R/W (C2)	-	0	31010	Concentra- tion B 8 set 3	-
-	-	C 8	R/W (C2)	-	0	31011	Concentra- tion C 8 set 3	-
-	-	D 8	R/W (C2)	-	0	31012	Concentra- tion D 8 set 3	-
0x00 2D	ADV_CONC_TE MPERA- TURE_NUM_SE T_4	-	R/W (C2)	-	8	31013	Concentra- tion tem- perature set 4 num- ber	-
0x00 2E	ADV_CONC_SE T_4	-	-	-	-	-	-	-
-	-	Tempera- ture 1	R/W (C2)	-	0	31014	Concentra- tion tem- perature 1 set 4	-
-	-	A 1	R/W (C2)	-	0	31015	Concentra- tion A 1 set 4	-
-	-	B 1	R/W (C2)	-	0	31016	Concentra- tion B 1 set 4	-

-	-	C 1	R/W (C2)	-	0	31017	Concentra- tion C 1 set 4	-
-	-	D 1	R/W (C2)	-	0	31018	Concentra- tion D 1 set 4	-
-	-	Tempera- ture 2	R/W (C2)	-	0	31019	Concentra- tion tem- perature 2 set 4	-
-	-	A 2	R/W (C2)	-	0	31020	Concentra- tion A 2 set 4	-
-	-	B 2	R/W (C2)	-	0	31021	Concentra- tion B 2 set 4	-
-	-	C 2	R/W (C2)	-	0	31022	Concentra- tion C 2 set 4	-
-	-	D 2	R/W (C2)	-	0	31023	Concentra- tion D 2 set 4	-
-	-	Tempera- ture 3	R/W (C2)	-	0	31024	Concentra- tion tem- perature 3 set 4	-
-	-	A 3	R/W (C2)	-	0	31025	Concentra- tion A 3 set 4	-
-	-	B 3	R/W (C2)	-	0	31026	Concentra- tion B 3 set 4	-
-	-	C 3	R/W (C2)	-	0	31027	Concentra- tion C 3 set 4	-
-	-	D 3	R/W (C2)	-	0	31028	Concentra- tion D 3 set 4	-
-	-	Tempera- ture 4	R/W (C2)	-	0	31029	Concentra- tion tem- perature 4 set 4	-
-	-	A 4	R/W (C2)	-	0	31030	Concentra- tion A 4 set 4	-
-	-	B 4	R/W (C2)	-	0	31031	Concentra- tion B 4 set 4	-
-	-	C 4	R/W (C2)	-	0	31032	Concentra- tion C 4 set 4	-
-	-	D 4	R/W (C2)	-	0	31033	Concentra- tion D 4 set 4	-
-	-	Tempera- ture 5	R/W (C2)	-	0	31034	Concentra- tion tem- perature 5 set 4	-

-	-	A 5	R/W (C2)	-	0	31035	Concentra- tion A 5 set 4	-
-	-	B 5	R/W (C2)	-	0	31036	Concentra- tion B 5 set 4	-
-	-	C 5	R/W (C2)	-	0	31037	Concentra- tion C 5 set 4	-
-	-	D 5	R/W (C2)	-	0	31038	Concentra- tion D 5 set 4	-
-	-	Tempera- ture 6	R/W (C2)	-	0	31039	Concentra- tion tem- perature 6 set 4	-
-	-	A 6	R/W (C2)	-	0	31040	Concentra- tion A 6 set 4	-
-	-	B 6	R/W (C2)	-	0	31041	Concentra- tion B 6 set 4	-
-	-	C 6	R/W (C2)	-	0	31042	Concentra- tion C 6 set 4	-
-	-	D 6	R/W (C2)	-	0	31043	Concentra- tion D 6 set 4	-
-	-	Tempera- ture 7	R/W (C2)	-	0	31044	Concentra- tion tem- perature 7 set 4	-
-	-	A 7	R/W (C2)	-	0	31045	Concentra- tion A 7 set 4	-
-	-	B 7	R/W (C2)	-	0	31046	Concentra- tion B 7 set 4	-
-	-	C 7	R/W (C2)	-	0	31047	Concentra- tion C 7 set 4	-
-	-	D 7	R/W (C2)	-	0	31048	Concentra- tion D 7 set 4	-
-	-	Tempera- ture 8	R/W (C2)	-	0	31049	Concentra- tion tem- perature 8 set 4	-
-	-	A 8	R/W (C2)	-	0	31050	Concentra- tion A 8 set 4	-
-	-	B 8	R/W (C2)	-	0	31051	Concentra- tion B 8 set 4	-
-	-	C 8	R/W (C2)	-	0	31052	Concentra- tion C 8 set 4	-

-	-	D 8	R/W (C2)	-	0	31053	Concentration D 8 set 4	-
0x0032	NOC_CONC_SELECT	-	R/W (C2)	-	0	3628	Concentration select	0: Concentration(mass) 1: Concentration(volume) 2: Water cut
0x0033	NOC_CONC_MASS_FLOW	-	R	-	0	3749	Mass concentration value	-
0x0034	NOC_CONC_VOLUME_FLOW	-	R	-	0	3624	Volume concentration value	-
0x0035	NOC_CONC_WATER_CUT	-	R	-	0	3623	Water cut value	-
0x0036	NOC_OIL_DENSITY	-	R	-	0	3621	Oil density	-
0x0037	NOC_WATER_DENSITY	-	R	-	0	3622	Water density	-
0x0038	GVF	-	R	-	0	3625	Gas void fraction	-
0x0039	GVF_SELECT	-	R/W (C2)	-	0	3629	GVF select	0: Disable 1: Enable
0x003A	NOC_CURRENT_THERMAL_EXP_FACTOR	-	R	-	0	3626	Current thermal expansion factor	-
0x003B	NOC_CURRENT_K0	-	R	-	0	3750	Current K0 coefficient	-
0x003C	NOC_CURRENT_K1	-	R	-	0	3751	Current K1 coefficient	-
0x003D	NOC_CURRENT_K2	-	R	-	0	3752	Current K2 coefficient	-
0x003E	NOC_PRESSURE_FIXED	-	R/W (C2)	-	0	3633	NOC pressure fixed value	-
0x003F	NOC_DENSITY_HYSTeresis	-	R/W (C2)	-	0	4149	NOC density hysteresis	-
0x0040	GVF_DENSITY_HYSTeresis	-	R/W (C2)	-	0	3631	GVF density hysteresis	-
0x0044	NOC_OIL_DENSITY_CALCULATOR_SET_1	-	R/W (C2)	-	1	3636	Oil density calculator set 1	0: Off 1: Crude oil 2: Products 3: Lubricating oil 4: Fixed thermal exp factor 5: Other
0x0045	NOC_WATER_DENSITY_CALCULATOR_SET_1	-	R/W (C2)	-	3	3641	Water density calculator set 1	0: SMOW 1: UNESCO1980 2: Fresh water 3: Produced water 4: Brine water 5: STD formula
0x0046	NOC_WATER_DENSITY_UNESCO1980_SET_1	-	R/W (C2)	-	0	3642	Water density UNESCO1980 set 1	0: SMOW 1: VSMOW

0x00 47	NOC_CONC_SE T_1	-	-	-	-	-	-	-
-	-	Reference oil density	R/W (C2)	-	0.8	3634	Reference oil density set 1	-
-	-	Reference water den- sity	R/W (C2)	-	1	3635	Reference water den- sity set 1	-
-	-	Thermal expansion factor	R/W (C2)	-	0.00075	3637	Thermal expansion factor set 1	-
-	-	K0	R/W (C2)	-	0	3638	K0 coeffi- cient set 1	-
-	-	K1	R/W (C2)	-	0	3639	K1 coeffi- cient set 1	-
-	-	K2	R/W (C2)	-	0	3640	K2 coeffi- cient set 1	-
-	-	Reference tempera- ture	R/W (C2)	-	15	3643	Reference tempera- ture set 1	-
-	-	Salinity ppt	R/W (C2)	-	100	3644	Salinity ppt set 1	-
-	-	Salinity fixed value	R/W (C2)	-	0	3645	Salinity fixed value set 1	-
0x00 48	NOC_OIL_DEN- SITY_CALCUL- ATOR_SET_2	-	R/W (C2)	-	1	3648	Oil density calculator set 2	0: Off 1: Crude oil 2: Products 3: Lubricating oil 4: Fixed thermal exp factor 5: Other
0x00 49	NOC_WA- TER_DEN- SITY_CALCUL- ATOR_SET_2	-	R/W (C2)	-	3	3653	Water den- sity calcul- ator set 2	0: SMOW 1: UNESCO1980 2: Fresh water 3: Produced water 4: Brine water 5: STD formula
0x00 4A	NOC_WA- TER_DEN- SITY_UN- ESCO1980_SET _2	-	R/W (C2)	-	0	3654	Water den- sity UN- ESCO1980 set 2	0: SMOW 1: VSMOW
0x00 4B	NOC_CONC_SE T_2	-	-	-	-	-	-	-
-	-	Reference oil density	R/W (C2)	-	0.8	3646	Reference oil density set 2	-
-	-	Reference water den- sity	R/W (C2)	-	1	3647	Reference water den- sity set 2	-
-	-	Thermal expansion factor	R/W (C2)	-	0.00075	3649	Thermal expansion factor set 2	-
-	-	K0	R/W (C2)	-	0	3650	K0 coeffi- cient set 2	-
-	-	K1	R/W (C2)	-	0	3651	K1 coeffi- cient set 2	-

-	-	K2	R/W (C2)	-	0	3652	K2 coefficient set 2	-
-	-	Reference temperature	R/W (C2)	-	15	3655	Reference temperature set 2	-
-	-	Salinity ppt	R/W (C2)	-	100	3656	Salinity ppt set 2	-
-	-	Salinity fixed value	R/W (C2)	-	0	3657	Salinity fixed value set 2	-
0x00 4C	NOC_OIL_DENSITY_CALCULATOR_SET_3	-	R/W (C2)	-	1	3660	Oil density calculator set 3	0: Off 1: Crude oil 2: Products 3: Lubricating oil 4: Fixed thermal exp factor 5: Other
0x00 4D	NOC_WATER_DENSITY_CALCULATOR_SET_3	-	R/W (C2)	-	3	3665	Water density calculator set 3	0: SMOW 1: UNESCO1980 2: Fresh water 3: Produced water 4: Brine water 5: STD formula
0x00 4E	NOC_WATER_DENSITY_UNESCO1980_SET_3	-	R/W (C2)	-	0	3666	Water density UNESCO1980 set 3	0: SMOW 1: VSMOW
0x00 4F	NOC_CONC_SET_3	-	-	-	-	-	-	-
-	-	Reference oil density	R/W (C2)	-	0.8	3658	Reference oil density set 3	-
-	-	Reference water density	R/W (C2)	-	1	3659	Reference water density set 3	-
-	-	Thermal expansion factor	R/W (C2)	-	0.00075	3661	Thermal expansion factor set 3	-
-	-	K0	R/W (C2)	-	0	3662	K0 coefficient set 3	-
-	-	K1	R/W (C2)	-	0	3663	K1 coefficient set 3	-
-	-	K2	R/W (C2)	-	0	3664	K2 coefficient set 3	-
-	-	Reference temperature	R/W (C2)	-	15	3667	Reference temperature set 3	-
-	-	Salinity ppt	R/W (C2)	-	100	3668	Salinity ppt set 3	-
-	-	Salinity fixed value	R/W (C2)	-	0	3669	Salinity fixed value set 3	-
0x00 50	NOC_OIL_DENSITY_CALCULATOR_SET_4	-	R/W (C2)	-	1	3672	Oil density calculator set 4	0: Off 1: Crude oil 2: Products 3: Lubricating oil 4: Fixed thermal exp factor 5: Other

0x0051	NOC_WATER_DENSITY_CALCULATOR_SET_4	-	R/W (C2)	-	3	3677	Water density calculator set 4	0: SMOW 1: UNESCO1980 2: Fresh water 3: Produced water 4: Brine water 5: STD formula
0x0052	NOC_WATER_DENSITY_UNESCO1980_SET_4	-	R/W (C2)	-	0	3678	Water density UNESCO1980 set 4	0: SMOW 1: VSMOW
0x0053	NOC_CONC_SET_4	-	-	-	-	-	-	-
-	-	Reference oil density	R/W (C2)	-	0.8	3670	Reference oil density set 4	-
-	-	Reference water density	R/W (C2)	-	1	3671	Reference water density set 4	-
-	-	Thermal expansion factor	R/W (C2)	-	0.00075	3673	Thermal expansion factor set 4	-
-	-	K0	R/W (C2)	-	0	3674	K0 coefficient set 4	-
-	-	K1	R/W (C2)	-	0	3675	K1 coefficient set 4	-
-	-	K2	R/W (C2)	-	0	3676	K2 coefficient set 4	-
-	-	Reference temperature	R/W (C2)	-	15	3679	Reference temperature set 4	-
-	-	Salinity ppt	R/W (C2)	-	100	3680	Salinity ppt set 4	-
-	-	Salinity fixed value	R/W (C2)	-	0	3681	Salinity fixed value set 4	-
0x0059	NET_MASS_FLOW_1	-	R	-	-	-	-	-
-	-	Value	R	-	0	11990	Net mass flow 1	-
-	-	Status	R	-	0	-	Net mass flow 1.status	-

0x005A	NET_MASS_FLOW_1_UNITS	-	R/W (C2)	-	1328	31172	Net mass flow 1 unit	1318: g/s 1319: g/min 1320: g/h 1322: kg/s 1323: kg/min 1324: kg/h 1325: kg/d 1327: t/min 1328: t/h 1329: t/d 1330: lb/s 1331: lb/min 1332: lb/h 1333: lb/d 32799: User unit 1335: STon/min 1336: STon/h 1337: STon/d 1339: LTon/min 1340: LTon/h 1341: LTon/d
0x005B	NET_MASS_FLOW_1_LO_LIMIT	-	R/W (C2)	-	0	31166	Net mass flow 1 LRV	-
0x005C	NET_MASS_FLOW_1_HI_LIMIT	-	R/W (C2)	-	10	31167	Net mass flow 1 URV	-
0x005D	NET_MASS_FLOW_1_DAMPING	-	R/W (C2)	-	3	31163	Net mass flow 1 damping	-
0x005E	NET_MASS_FLOW_1_LOW_CUT_OFF	-	R/W (C2)	-	0.005	31165	Net mass flow 1 low-cut	-
0x005F	NET_MASS_FLOW_1_USER_UNIT	-	R/W (C2)	-	" "	31173	Net mass flow 1 user unit	-
0x0060	NET_MASS_FLOW_1_USER_UNIT_CONV_FACTOR	-	R/W (C2)	-	1	31175	Net mass flow 1 user unit conversion factor	-
0x0061	NET_MASS_FLOW_1_TRIM_SELECT	-	R/W (C2)	-	0	31160	Net mass flow 1 trim select	0: Inhibit 1: Enable
0x0062	NET_MASS_FLOW_1_TRIM_OFFSET	-	R/W (C2)	-	0	31161	Net mass flow 1 trim offset	-
0x0063	NET_MASS_FLOW_1_TRIM_GAIN	-	R/W (C2)	-	1	31162	Net mass flow 1 trim gain	-
0x0069	NET_MASS_FLOW_2	-	R	-	-	-	-	-
-	-	Value	R	-	0	11991	Net mass flow 2	-
-	-	Status	R	-	0	-	Net mass flow 2 status	-

0x00 6A	NET_MASS_FLOW_2_UNITS	-	R/W (C2)	-	1328	31202	Net mass flow 2 unit	1318: g/s 1319: g/min 1320: g/h 1322: kg/s 1323: kg/min 1324: kg/h 1325: kg/d 1327: t/min 1328: t/h 1329: t/d 1330: lb/s 1331: lb/min 1332: lb/h 1333: lb/d 32800: User unit 1335: STon/min 1336: STon/h 1337: STon/d 1339: LTon/min 1340: LTon/h 1341: LTon/d
0x00 6B	NET_MASS_FLOW_2_LO_LIMIT	-	R/W (C2)	-	0	31196	Net mass flow 2 LRV	-
0x00 6C	NET_MASS_FLOW_2_HI_LIMIT	-	R/W (C2)	-	10	31197	Net mass flow 2 URV	-
0x00 6D	NET_MASS_FLOW_2_DAMPING	-	R/W (C2)	-	3	31193	Net mass flow 2 damping	-
0x00 6E	NET_MASS_FLOW_2_LOW_CUT_OFF	-	R/W (C2)	-	0.005	31195	Net mass flow 2 low-cut	-
0x00 6F	NET_MASS_FLOW_2_USER_UNIT	-	R/W (C2)	-	Concentration damping	31203	Net mass flow 2 user unit	-
0x00 70	NET_MASS_FLOW_2_USER_UNIT_CONV_FACTOR	-	R/W (C2)	-	1	31205	Net mass flow 2 user unit conversion factor	-
0x00 71	NET_MASS_FLOW_2_TRIM_SELECT	-	R/W (C2)	-	0	31190	Net mass flow 2 trim select	0: Inhibit 1: Enable
0x00 72	NET_MASS_FLOW_2_TRIM_OFFSET	-	R/W (C2)	-	0	31191	Net mass flow 2 trim offset	-
0x00 73	NET_MASS_FLOW_2_TRIM_GAIN	-	R/W (C2)	-	1	31192	Net mass flow 2 trim gain	-
0x00 79	NET_VOLUME_FLOW_1	-	R	-	-	-	-	-
-	-	Value	R	-	0	11992	Net volume flow 1	-
-	-	Status	R	-	0	-	Net volume flow 1.status	-

0x007A	NET_VOL- UME_FLOW_1_ UNITS	-	R/W (C2)	-	1349	31232	Net vol- ume flow 1 unit	1511: cm3/s 1512: cm3/min 1513: cm3/h 1351: L/s 1352: L/min 1353: L/h 1354: L/d 1347: m3/s 1348: m3/min 1349: m3/h 1350: m3/d 1362: gal/s 1363: gal/min (gallon (U.S.) per minute) 1364: gal/h 1365: gal/d 1356: ft3/s (cubic foot per second) 1357: ft3/min 1358: ft3/h 1359: ft3/d 1371: bbl/s 1372: bbl/min 1373: bbl/h 1374: bbl/d 1367: Impgal/s 1368: Impgal/min 1369: Impgal/h 1370: Impgal/d 32801: User unit
0x007B	NET_VOL- UME_FLOW_1_ LO_LIMIT	-	R/W (C2)	-	0	31226	Net vol- ume flow 1 LRV	-
0x007C	NET_VOL- UME_FLOW_1_ HI_LIMIT	-	R/W (C2)	-	10	31227	Net vol- ume flow 1 URV	-
0x007D	NET_VOL- UME_FLOW_1_ DAMPING	-	R/W (C2)	-	3	31223	Net vol- ume flow 1 damping	-
0x007E	NET_VOL- UME_FLOW_1_ LOW_CUT_OFF	-	R/W (C2)	-	0	31225	Net vol- ume flow 1 lowcut	-
0x007F	NET_VOL- UME_FLOW_1_ USER_UNIT	-	R/W (C2)	-	" "	31233	Net vol- ume flow 1 user unit	-
0x0080	NET_VOL- UME_FLOW_1_ USER_UNIT_C ONV_FACTOR	-	R/W (C2)	-	1	31235	Net vol- ume flow 1 user unit conversion factor	-
0x0081	NET_VOL- UME_FLOW_1_ TRIM_SEL	-	R/W (C2)	-	0	31220	Net vol- ume flow 1 trim select	0: Inhibit 1: Enable
0x0082	NET_VOL- UME_FLOW_1_ TRIM_OFFSET	-	R/W (C2)	-	0	31221	Net vol- ume flow 1 trim offset	-
0x0083	NET_VOL- UME_FLOW_1_ TRIM_GAIN	-	R/W (C2)	-	1	31222	Net vol- ume flow 1 trim gain	-

0x0089	NET_VOLUME_FLOW_2	-	R	-	-	-	-	-
-	-	Value	R	-	0	11993	Net volume flow 2	-
-	-	Status	R	-	0	-	Net volume flow 2.status	-
0x008A	NET_VOLUME_FLOW_2_UNITS	-	R/W (C2)	-	1349	31262	Net volume flow 2 unit	1511: cm3/s 1512: cm3/min 1513: cm3/h 1351: L/s 1352: L/min 1353: L/h 1354: L/d 1347: m3/s 1348: m3/min 1349: m3/h 1350: m3/d 1362: gal/s 1363: gal/min (gallon (U.S.) per minute) 1364: gal/h 1365: gal/d 1356: ft3/s (cubic foot per second) 1357: ft3/min 1358: ft3/h 1359: ft3/d 1371: bbl/s 1372: bbl/min 1373: bbl/h 1374: bbl/d 1367: Impgal/s 1368: Impgal/min 1369: Impgal/h 1370: Impgal/d 32802: User unit
0x008B	NET_VOLUME_FLOW_2_LO_LIMIT	-	R/W (C2)	-	0	31256	Net volume flow 2 LRV	-
0x008C	NET_VOLUME_FLOW_2_HI_LIMIT	-	R/W (C2)	-	10	31257	Net volume flow 2 URV	-
0x008D	NET_VOLUME_FLOW_2_DAMPING	-	R/W (C2)	-	3	31253	Net volume flow 2 damping	-
0x008E	NET_VOLUME_FLOW_2_LOW_CUT_OFF	-	R/W (C2)	-	0	31255	Net volume flow 2 lowcut	-
0x008F	NET_VOLUME_FLOW_2_USER_UNIT	-	R/W (C2)	-	" "	31263	Net volume flow 2 user unit	-
0x0090	NET_VOLUME_FLOW_2_USER_UNIT_CONVERSION_FACTOR	-	R/W (C2)	-	1	31265	Net volume flow 2 user unit conversion factor	-
0x0091	NET_VOLUME_FLOW_2_TRIM_SEL	-	R/W (C2)	-	0	31250	Net volume flow 2 trim select	0: Inhibit 1: Enable

0x0092	NET_VOL- UME_FLOW_2_ TRIM_OFFSET	-	R/W (C2)	-	0	31251	Net vol- ume flow 2 trim offset	-
0x0093	NET_VOL- UME_FLOW_2_ TRIM_GAIN	-	R/W (C2)	-	1	31252	Net vol- ume flow 2 trim gain	-
0x0099	NET_CORR_VO LUME_FLOW	-	R	-	-	-	-	-
-	-	Value	R	-	0	11994	Net cor- rected vol- ume flow	-
-	-	Status	R	-	0	-	Net cor- rected vol- ume flow.status	-
0x009B	NET_CORR_VO L- UME_FLOW_UN ITS	-	R/W (C2)	-	1598	31292	Net cor- rected vol- ume flow unit	1600: Std L/s 1601: Std L/min 1602: Std L/h 1603: Std L/d 1604: Std ft3/s 1360: Std ft3/min 1361: Std ft3/h 1605: Std ft3/d 1596: Std m3/s 1597: Std m3/min 1598: Std m3/h 1599: Std m3/d 32773: mmscfh 32774: mmscfd 32803: User unit
0x009C	NET_CORR_VO L- UME_FLOW_LO _LIMIT	-	R/W (C2)	-	0	31286	Net cor- rected vol- ume flow LRV	-
0x009D	NET_CORR_VO L- UME_FLOW_HI _LIMIT	-	R/W (C2)	-	10	31287	Net cor- rected vol- ume flow URV	-
0x009E	NET_CORR_VO L- UME_FLOW_DA MPING	-	R/W (C2)	-	3	31283	Net cor- rected vol- ume flow damping	-
0x009F	NET_CORR_VO L- UME_FLOW_LO W_CUT_OFF	-	R/W (C2)	-	0	31285	Net cor- rected vol- ume flow lowcut	-
0x00A0	NET_CORR_VO L- UME_FLOW_US ER_UNIT	-	R/W (C2)	-	" "	31293	Net cor- rected vol- ume flow user unit	-
0x00A1	NET_CORR_VO L- UME_FLOW_US ER_UNIT_CON V_FACTOR	-	R/W (C2)	-	1	31295	Net cor- rected vol- ume flow user unit conversion factor	-

0x00 A2	NET_CORR_VO L- UME_FLOW_TR IM_SEL	-	R/W (C2)	-	0	31280	Net cor- rected vol- ume flow trim select	0: Inhibit 1: Enable
0x00 A3	NET_CORR_VO L- UME_FLOW_TR IM_OFFSET	-	R/W (C2)	-	0	31281	Net cor- rected vol- ume flow trim offset	-
0x00 A4	NET_CORR_VO L- UME_FLOW_TR IM_GAIN	-	R/W (C2)	-	1	31282	Net cor- rected vol- ume flow trim gain	-
0x00 AA	NET_MASS_FL OW_1_DAMP- ING_PULSE_TO- TAL	-	R/W (C2)	-	0	31164	Net mass flow 1 damping pulse/total	-
0x00 AB	NET_MASS_FL OW_2_DAMP- ING_PULSE_TO- TAL	-	R/W (C2)	-	0	31194	Net mass flow 2 damping pulse/total	-
0x00 AC	NET_VOL- UME_FLOW_1_ DAMP- ING_PULSE_TO- TAL	-	R/W (C2)	-	0	31224	Net vol- ume flow 1 damping pulse/total	-
0x00 AD	NET_VOL- UME_FLOW_2_ DAMP- ING_PULSE_TO- TAL	-	R/W (C2)	-	0	31254	Net vol- ume flow 2 damping pulse/total	-
0x00 AE	NET_CORR_VO L- UME_FLOW_DA MP- ING_PULSE_TO- TAL	-	R/W (C2)	-	0	31284	Net cor- rected vol- ume flow damping pulse/total	-

7.2.5 Maintenance Transducer Block

Ⓐ	Submodule Index	Ⓘ	Initial Value
Ⓑ	Parameter	ⓖ	ID
Ⓒ	Sub-Parameter	ⓓ	Parameter Label
Ⓓ	Access	Ⓢ	Enum/Array description
Ⓔ	Write Mode		

Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	Ⓕ	ⓖ	ⓓ	Ⓢ
0xB0 00	BLOCK_OB- JECT	-	R	-	-	-	-	-
-	-	Reserved	R	-	250	-	Reserved	250(0xFA):Not used
-	-	Block Ob- ject	R	-	0x03	-	Block Ob- ject	0x03:Transducer Block
-	-	Parent Class	R	-	0x03	-	Parent Class	0x03:Flow
-	-	Class	R	-	0x81	-	Class	0x81:manufacturer specific
-	-	Dev_Rev	R	-	1	9070	Device Re- vision	-

-	-	Dev_Rev_Comp	R	-	1	9071	Device Revision Compatibility	-
-	-	DD Revision	R	-	65534	-	DD Revision	-
-	-	Profile	R	-	0x40FA	-	Profile	-
-	-	Profile Revision	R	-	0x0402	-	Profile Revision	-
-	-	Execution Time	R	-	254	-	Execution Time	-
-	-	Number of Parameters	R	-	243	-	Number of Parameters	-
-	-	Reserved by PI	R	-	-	-	Reserved by PI	-
-	-	Reserved by PI	R	-	-	-	Reserved by PI	-
0xB001	CURRENT_MODE	-	R	-	0x08	-	Current mode	0x08:AUTO 0x80: Out of Service (O/S)
0x0001	CURRENT_DATE	-	R	-	0,0,0,1,1,15	12250	Current date	-
0x0002	SET_CURRENT_DATE	-	R/W (C1)	-	0,0,0,1,1,15	32250	Set current date	-
0x0003	OPERATION_TIME	-	R	-	" "	12163	Operation time	-
0x0007	PULSE_OUT_SELECT	-	R/W (C1)	-	0	31611	Pulse output select	0: Mass flow 1: Volume flow 2: Corrected volume flow 3: Energy 4: Net mass flow 1 5: Net mass flow 2 6: Net volume flow 1 7: Net volume flow 2 8: Net corrected volume flow
0x0008	FREQUENCY_OUT_SELECT	-	R/W (C1)	-	0	31619	Frequency output select	0: Mass flow 1: Density 2: Temperature 3: Pressure 4: Volume flow 5: Reference density 6: Relative density 7: Corrected volume flow 8: Concentration 9: Net mass flow 1 10: Net mass flow 2 11: Net volume flow 1 12: Net volume flow 2 13: Net corrected volume flow 14: Viscosity 15: Drive current
0x0009	TEST_MODE	-	R/W (C1)	-	0	30020	Test mode	0: Off 1: On
0x000A	TEST_FREQUENCY_OUT	-	R/W (C1)	-	0	30028	Frequency output test	-

0x00 0B	TEST_AUTO_RELEASE_TIME	-	R/W (C1)	-	0	30034	Test auto release time	0: 10min 1: 30min 2: 60min 3: 3hour 4: 6hour 5: 12hour
0x00 0C	PULSE_FREQUENCY_OUTPUT_MODE	-	R/W (C1)	-	0	31610	Pulse/Status output mode	0: No function 1: Fixed pulse output 2: Frequency output
0x00 0D	PULSE_UNIT	-	R/W (C1)	-	1	31613	Pulse output unit select	0: g/P 1: kg/P 2: t/P 40: ton(US)/P 41: ton(UK)/P 3: lb/P 4: P/g 5: P/kg 6: P/t 42: P/ton(US) 43: P/ton(UK) 7: P/lb 8: cm3/P 9: L/P 10: m3/P 11: gal/P 12: kgal/P 13: ft3/P 14: bbl/P 15: Impgal/P 16: kImpgal/P 17: P/cm3 18: P/L 19: P/m3 20: P/gal 21: P/kgal 22: P/ft3 23: P/bbl 24: P/Impgal 25: P/kImpgal 26: NL/P 27: Nm3/P 28: SL/P 29: Sft3/P 30: Sm3/P 31: P/NL 32: P/Nm3 33: P/SL 34: P/Sft3 35: P/Sm3 36: MJ/P 37: Btu/P 38: P/MJ 39: P/Btu
0x00 0E	PULSE_ACTIVE_MODE	-	R/W (C2)	-	1	31614	Pulse output active mode	0: Off active 1: On active

0x00 0F	PULSE_WIDTH	-	R/W (C1)	-	3	31615	Pulse out- put width	0: 0.05ms 1: 0.1ms 2: 0.5ms 3: 1ms 4: 5ms 5: 10ms 6: 20ms 7: 33ms 8: 50ms 9: 100ms 10: 200ms 11: 330ms 12: 500ms 13: 1000ms 14: 2000ms
0x00 10	PULSE_RATE	-	R/W (C1)	-	1	31617	Pulse out- put rate	-
0x00 11	MAX_FRE- QUENCY	-	R/W (C1)	-	10000	31622	Max fre- quency	-
0x00 12	MIN_FRE- QUENCY	-	R/W (C1)	-	0	31623	Min fre- quency	-
0x00 16	LOG- GING_FILE_NA ME	-	R/W (C2)	-	"TRD_FIL E"	1349	Logging file name	-
0x00 17	LOG- GING_1_SE- LECT	-	R/W (C2)	-	1	1351	Logging 1 select	0: None 1: Mass flow 2: Density 3: Temperature 4: Volume flow 5: Pressure 6: Concentration 7: Net mass flow 1 8: Net volume flow 1 16: Viscosity 9: Phase difference 10: Resonance frequency 11: Drive gain 12: Drive current 15: Transmitter temperature
0x00 18	LOG- GING_2_SE- LECT	-	R/W (C2)	-	2	1356	Logging 2 select	0: None 1: Mass flow 2: Density 3: Temperature 4: Volume flow 5: Pressure 6: Concentration 7: Net mass flow 1 8: Net volume flow 1 16: Viscosity 9: Phase difference 10: Resonance frequency 11: Drive gain 12: Drive current 15: Transmitter temperature

0x00 19	LOG- GING_3_SE- LECT	-	R/W (C2)	-	3	1361	Logging 3 select	0: None 1: Mass flow 2: Density 3: Temperature 4: Volume flow 5: Pressure 6: Concentration 7: Net mass flow 1 8: Net volume flow 1 16: Viscosity 9: Phase difference 10: Resonance frequency 11: Drive gain 12: Drive current 15: Transmitter temperature
0x00 1A	LOG- GING_4_SE- LECT	-	R/W (C2)	-	4	1366	Logging 4 select	0: None 1: Mass flow 2: Density 3: Temperature 4: Volume flow 5: Pressure 6: Concentration 7: Net mass flow 1 8: Net volume flow 1 16: Viscosity 9: Phase difference 10: Resonance frequency 11: Drive gain 12: Drive current 15: Transmitter temperature
0x00 1B	LOGGING_IN- TERVAL_TIME	-	R/W (C2)	-	0	1350	Logging in- terval time	0: 1s 1: 10s 2: 30s 3: 1min 4: 5min 5: 30min 6: 60min
0x00 1C	LOG- GING_END_TIM E	-	R/W (C2)	-	0	1354	Logging end time	0: 10min 1: 30min 2: 60min 3: 3hour 4: 12hour 5: 24hour 6: 72hour 7: 240hour 8: 720hour
0x00 1D	LOGGING_EXE- CUTE	-	R/W (C2)	-	0	1352	Logging execute	0: Not execute 1: Execute 2: Execute with monitor event
0x00 1E	LOG- GING_START_D ATE	-	R	-	01/01/2015	1353	Logging start date	-
0x00 1F	WRITE_PRO- TECT_NEW_PA SSWORD	-	R/W (C1)	-	*****	3538	Write pro- tect new password	-
0x00 20	WRITE_PRO- TECT_EN- ABLE_10MIN	-	R/W (C0)	-	*****	3539	Enable write 10min	-

0x00 21	WRITE_PRO- TECT_SOFT- WARE_SEAL	-	R	-	1	12291	Write pro- tect soft- ware seal	0: break 1: keep
0x00 22	WEB_SOFT- WARE_SEAL	-	R	-	1	-	Web soft- ware seal	0: break 1: keep
0x00 23	BACKUP_FILE_ NAME	-	R/W (C2)	-	"PAR_FIL E"	1379	Backup file name	-
0x00 24	USER_CONFIG- URATION_BACKUP	-	R/W (C2)	-	0	32228	User con- figuration backup	0: Not execute 1: Store to 1 2: Store to 2 3: Store to 3 4: Store to microSD 5: Store from 1 to microSD 6: Store from 2 to microSD 7: Store from 3 to microSD
0x00 25	USER_CONFIG- URATION_BACKUP_ NAME_1	-	R	-	"Backup 1"	32222	User con- figuration backup name 1	-
0x00 26	USER_CONFIG- URATION_BACKUP_ DATE_1	-	R	-	01/01/2015	32223	User con- figuration backup date 1	-
0x00 27	USER_CONFIG- URATION_BACKUP_ NAME_2	-	R	-	"Backup 2"	32224	User con- figuration backup name 2	-
0x00 28	USER_CONFIG- URATION_BACKUP_ DATE_2	-	R	-	01/01/2015	32225	User con- figuration backup date 2	-
0x00 29	USER_CONFIG- URATION_BACKUP_ NAME_3	-	R	-	"Backup 3"	32226	User con- figuration backup name 3	-
0x00 2A	USER_CONFIG- URATION_BACKUP_ DATE_3	-	R	-	01/01/2015	32227	User con- figuration backup date 3	-
0x00 2B	FAC- TORY_BACKUP_ NAME	-	R	-	"Factory Delivery"	32220	Factory backup name	-
0x00 2C	FAC- TORY_BACKUP_ DATE	-	R	-	01/01/2015	32221	Factory backup date	-

0x00 2D	RESTORATION	-	R/W (C2)	-	0	32229	Restora- tion	0: Not execute 1: Duplicate user configura- tion 1 2: Duplicate user configura- tion 2 3: Duplicate user configura- tion 3 4: Duplicate from microSD 5: Restore user configuration 1 6: Restore user configuration 2 7: Restore user configuration 3 8: Restore from microSD 9: Restore factory default 10: Download sensor con- stant from user configuration 1 11: Download sensor con- stant from microSD
0x00 2E	EVENT_FILE_N AME	-	R/W (C2)	-	"EVT_FILE "	1329	Event file name	-
0x00 2F	MONI- TOR_FILE_NAM E	-	R/W (C2)	-	"MON_FIL E"	3558	Monitor file name	-
0x00 31	WRITE_AC- CESS_STATUS	-	R	-	0	14690	Write ac- cess status	0: All locked 1: Display only 2: Autozero only 3: Display + Autozero 4: Not locked
0x00 32	WRITE_LOCK_ SETTING	-	R/W (C2)	-	0	1336	Write lock setting	0: All locked 1: Display only 2: Autozero only 3: Display + Autozero
0x00 33	TAG	-	R/W (C2)	-	" "	30440	Tag	-
0x00 34	LONG_TAG	-	R/W (C2)	-	"FT2001"	30441	Long tag	-
0x00 35	MS_CODE_1	-	R/W (C2)	-	" "	30460	MS code 1	-
0x00 36	MS_CODE_2	-	R/W (C2)	-	" "	30461	MS code 2	-
0x00 37	MS_CODE_3	-	R/W (C2)	-	" "	30462	MS code 3	-
0x00 38	RE- LEASE_DATE	-	R	-	01/01/2015	1377	Release date	-
0x00 39	TRANSMIT- TER_TYPE	-	R	-	1	30463	Transmit- ter type	0: Essential 1: Ultimate
0x00 3A	CONC_MEAS_S ELECT	-	R	-	0	30467	Concentra- tion mea- surement select	0: Inhibit 1: Standard 2: Advanced 3: Net oil computing API 4: Net oil computing API and GVF

0x003B	FUNCTION_OPTION_CODE	-	R	-	0x00, 0x00	5000	Function option code	0x0001: Tube Health Check 0x0004: Tube leakage detection 0x0008: External input calorific value 0x0010: Viscosity
0x003C	FUNCTION_OPTION_STATUS	-	R	-	0x00, 0x00	3547	Function option status	0x0001: Tube Health Check 0x0004: Tube leakage detection 0x0008: External input calorific value 0x0010: Viscosity 0x0020: Concentration standard 0x0040: Concentration advanced 0x0080: Net oil computing API 0x0100: Net oil computing API and GVF
0x003D	OPTION_ACTIVATION_KEY	-	R/W (C2)	-	" "	30468	Option activation key	-
0x003E	EXTRA_NUMBER_1	-	R	-	" "	32163	Extra number 1	-
0x003F	EXTRA_NUMBER_2	-	R	-	" "	1468	Extra number 2	-
0x0040	MAX_PERMISSIBLE_TEMPERATURE	-	R	-	0	32190	Max permissible temperature	-
0x0041	MAX_PERMISSIBLE_PRESSURE	-	R	-	0	32191	Max permissible pressure	-
0x0042	TEMPERATURE_LOWER_LIMIT	-	R	-	-200	32470	Temperature lower limit	-
0x0043	TEMPERATURE_UPPER_LIMIT	-	R	-	350	32471	Temperature upper limit	-
0x0044	SENSOR_SERIAL_NUM	-	R/W (C2)	-	" "	30469	Sensor serial number	-
0x0045	COMPLETE_DEVICE_SERIAL_NUM	-	R	-	" "	32160	Complete device serial number	-
0x0046	TRANSMITTER_SPARE_SERIAL_NUM	-	R	-	" "	32161	Transmitter spare serial number	-
0x0047	SENSOR_SPARE_SERIAL_NUM	-	R	-	" "	32162	Sensor spare serial number	-
0x0048	MAIN_SOFTWARE_REVISION	-	R	-	"R1.01.01"	12160	Main software revision	-
0x0049	SENSOR_SOFTWARE_REVISION	-	R	-	"R1.01.04"	12161	Sensor software revision	-

0x004A	INDICA-TOR_SOFT-WARE_REVI-SION	-	R	-	"R1.01.01"	12162	Indicator software revision	-
0x004B	HARD-WARE_REVI-SION	-	R	-	"S1.01 "	32164	Hardware revision	-
0x004C	MEMO_1	-	R/W (C1)	-	" "	32166	Memo 1	-
0x004D	MEMO_2	-	R/W (C1)	-	" "	32167	Memo 2	-
0x004E	MEMO_3	-	R/W (C1)	-	" "	32168	Memo 3	-
0x004F	AUTO_PROV-ING_SETTING	-	R/W (C1)	-	0	3872	Auto prov-ing setting	0: Not execute 1: Execute 2: Restore
0x0050	KEY_CODE	-	R/W (C0)	-	0	32270	Key code	-
0x0051	EVENT_SET-TING_DATE_TI ME_NOT_SET	-	R/W (C2)	-	0	32765	Event set-ting date/ time not set	0: Ignore 1: History only 2: Generate 4: Monitor
0x0052	EVENT_SET-TING_DE-VICE_CONFIG-URA-TION_LOCKED	-	R/W (C2)	-	2	32766	Event set-ting device configura-tion locked	0: Ignore 1: History only 2: Generate 4: Monitor
0x0053	EVENT_SET-TING_DE-VICE_CONFIG-URA-TION_NOT_LOC KED	-	R/W (C2)	-	0	32767	Event set-ting device configura-tion not locked	0: Ignore 1: History only 2: Generate 4: Monitor

0x0054	DEVICE_STATUS_OPTION_INFO	-	R	-	0x00000000	9067	Option board information	0x80000 000: (reserved) 0x40000 000: (reserved) 0x20000 000: (reserved) 0x10000 000: (reserved) 0x08000 000: (reserved) 0x04000 000: (reserved) 0x02000 000: (reserved) 0x01000 000: (reserved) 0x00800 000: (reserved) 0x00400 000: 931: Option board power on 0x00200 000: 932: Option board watchdog reset executed 0x00100 000: (reserved) 0x00080 000: (reserved) 0x00040 000: (reserved) 0x00020 000: (reserved) 0x00010 000: (reserved) 0x00008 000: (reserved) 0x00004 000: (reserved) 0x00002 000: (reserved) 0x00001 000: (reserved) 0x00000 800: (reserved) 0x00000 400: (reserved) 0x00000 200: (reserved) 0x00000 100: (reserved) 0x00000 080: (reserved) 0x00000 040: (reserved) 0x00000 020: (reserved) 0x00000 010: (reserved) 0x00000 008: (reserved) 0x00000 004: (reserved) 0x00000 002: (reserved) 0x00000 001: (reserved)
0x0055	OPTION_SOFTWARE_REVISION	-	R	-	"R1.01.01"	9088	Option board software revision	-
0x0056	WEB_ENABLE	-	R/W (C1)	-	1	9084	Web enable	0: Disable 1: Enable
0x005A	QMAX	-	R	-	17	30400	Qmax	-
0x005B	QNOM	-	R	-	10	30401	Qnom	-
0x005C	TEST_1	-	R	-	0.990789	1072	Test 1	-
0x005D	TEST_2	-	R	-	3.57036E-07	1073	Test 2	-

0x005E	TEST_3	-	R	-	0.0000346	1069	Test 3	-
0x005F	TEST_4	-	R	-	0	1070	Test 4	-
0x0060	TEST_5	-	R	-	0.0000173	1074	Test 5	-
0x0061	TEST_6	-	R	-	0.000000002	1075	Test 6	-
0x0062	TEST_7	-	R	-	-4.08E-12	1076	Test 7	-
0x0063	TEST_8	-	R	-	0	15351	Test 8	-
0x0064	TEST_9	-	R	-	0	15352	Test 9	-
0x0065	TEST_10	-	R	-	0	15090	Test 10	-
0x0066	TEST_11	-	R	-	4	1029	Test 11	-
0x0067	TEST_12	-	R	-	4	1030	Test 12	-
0x0068	TEST_13	-	R	-	3	1031	Test 13	-
0x0069	TEST_14	-	R	-	0.5	1032	Test 14	-
0x006A	TEST_15	-	R	-	60	1022	Test 15	-
0x006B	TEST_16	-	R	-	10	1024	Test 16	-
0x006C	TEST_17	-	R	-	5	1023	Test 17	-
0x006D	TEST_18	-	R	-	0	1025	Test 18	0: Enum 0 1: Enum 1
0x006E	TEST_19	-	R	-	0	1026	Test 19	0: Enum 0 1: Enum 1
0x006F	TEST_20	-	R	-	1	1046	Test 20	-
0x0070	TEST_21	-	R	-	01/01/2015	18430	Test 21	-
0x0071	TEST_22	-	R	-	" "	15091	Test 22	-
0x0072	TEST_23	-	R	-	0	1014	Test 23	0: Enum 0 1: Enum 1
0x0073	TEST_24	-	R	-	0	1376	Test 24	0: Enum 0 1: Enum 1
0x007A	TEST_31	-	R	-	333	1041	Test 31	-
0x007B	TEST_32	-	R	-	0	1042	Test 32	-
0x007C	TEST_33	-	R	-	744	1039	Test 33	-
0x007D	TEST_34	-	R	-	65	1040	Test 34	-
0x007E	TEST_35	-	R	-	35	1036	Test 35	-

0x007F	TEST_36	-	R	-	5	1038	Test 36	-
0x0080	TEST_37	-	R	-	210	32510	Test 37	-
0x0081	TEST_38	-	R	-	17	3685	Test 38	-
0x0082	TEST_39	-	R	-	70	1045	Test 39	-
0x0083	TEST_40	-	R	-	13.4	30471	Test 40	-
0x0084	TEST_41	-	R	-	1000	1081	Test 41	-
0x0085	TEST_42	-	R	-	100	1082	Test 42	-
0x0086	TEST_43	-	R	-	0.05	3761	Test 43	-
0x0087	TEST_44	-	R	-	100	32610	Test 44	-
0x0088	TEST_45	-	R	-	1	3701	Test 45	0: Enum 0 1: Enum 1
0x0089	TEST_46	-	R	-	10.1	1049	Test 46	-
0x008A	TEST_47	-	R	-	77	1050	Test 47	-
0x008B	TEST_48	-	R	-	1.10436	1051	Test 48	-
0x008C	TEST_49	-	R	-	0	1052	Test 49	-
0x008D	TEST_50	-	R	-	300	1054	Test 50	-
0x008E	TEST_51	-	R	-	50	1055	Test 51	-
0x008F	TEST_52	-	R	-	110	1056	Test 52	-
0x0090	TEST_53	-	R	-	0.05	3596	Test 53	-
0x0096	TEST_59	-	R	-	0	6090	Test 59	0x0001: BitEnum 0x0001 0x0002: BitEnum 0x0002 0x0004: BitEnum 0x0004 0x0008: BitEnum 0x0008 0x0010: BitEnum 0x0010 0x0020: BitEnum 0x0020 0x0040: BitEnum 0x0040 0x0080: BitEnum 0x0080
0x0097	TEST_60	-	R	-	0	1373	Test 60	-
0x0098	TEST_61	-	R	-	0	1374	Test 61	-
0x0099	TEST_62	-	R	-	0	1375	Test 62	-
0x009A	TEST_63	-	R	-	" "	30470	Test 63	-
0x009B	TEST_64	-	R	-	0.02	1176	Test 64	-
0x009C	TEST_65	-	R	-	0.0235121	1170	Test 65	-

0x009D	TEST_66	-	R	-	53.84641	1171	Test 66	-
0x009E	TEST_67	-	R	-	0.9306544	1172	Test 67	-
0x009F	TEST_68	-	R	-	0.4430383	1173	Test 68	-
0x00A0	TEST_69	-	R	-	0.04700663	1174	Test 69	-
0x00A1	TEST_70	-	R	-	0.7937328	1175	Test 70	-
0x00A2	TEST_71	-	R	-	3.17	8111	Test 71	-
0x00A3	TEST_72	-	-	-	-	-	-	-
-	-	Element 0	R	-	0	19510	Test 72 Element 0	-
-	-	Element 1	R	-	0	19511	Test 72 Element 1	-
-	-	Element 2	R	-	0	19512	Test 72 Element 2	-
-	-	Element 3	R	-	0	19513	Test 72 Element 3	-
-	-	Element 4	R	-	0	19514	Test 72 Element 4	-
-	-	Element 5	R	-	0	19515	Test 72 Element 5	-
-	-	Element 6	R	-	0	19516	Test 72 Element 6	-
-	-	Element 7	R	-	0	19517	Test 72 Element 7	-
-	-	Element 8	R	-	0	19518	Test 72 Element 8	-
-	-	Element 9	R	-	0	19519	Test 72 Element 9	-
-	-	Element 10	R	-	0	19530	Test 72 Element 10	-
-	-	Element 11	R	-	0	19531	Test 72 Element 11	-
0x00A4	TEST_73	-	-	-	-	-	-	-
-	-	Element 0	R	-	0	3232	Test 73 Element 0	-
-	-	Element 1	R	-	0	3525	Test 73 Element 1	-
-	-	Element 2	R	-	0	3526	Test 73 Element 2	-
-	-	Element 3	R	-	0	3527	Test 73 Element 3	-
-	-	Element 4	R	-	0	3528	Test 73 Element 4	-
-	-	Element 5	R	-	0	3529	Test 73 Element 5	-
-	-	Element 6	R	-	0	3530	Test 73 Element 6	-

-	-	Element 7	R	-	0	3531	Test 73 Element 7	-
-	-	Element 8	R	-	0	3532	Test 73 Element 8	-
-	-	Element 9	R	-	0	3533	Test 73 Element 9	-
-	-	Element 10	R	-	0	3534	Test 73 Element 10	-
-	-	Element 11	R	-	0	3535	Test 73 Element 11	-
-	-	Element 12	R	-	0	3536	Test 73 Element 12	-
-	-	Element 13	R	-	0	3537	Test 73 Element 13	-
0x00A5	TEST_74	-	R	-	0	1048	Test 74	0: Enum 0 1: Enum 1
0x00A6	TEST_75	-	R	-	0	17122	Test 75	-
0x00A7	TEST_76	-	R	-	0	17121	Test 76	-
0x00A8	TEST_77	-	R	-	0	1124	Test 77	-
0x00A9	TEST_78	-	R	-	0	18780	Test 78	-
0x00AA	TEST_79	-	R	-	0	19710	Test 79	-
0x00AB	TEST_80	-	R	-	0	19711	Test 80	-
0x00AC	TEST_81	-	R	-	0	19712	Test 81	-
0x00AD	TEST_82	-	R	-	0	19713	Test 82	-
0x00AE	TEST_83	-	R	-	0	19714	Test 83	-
0x00AF	TEST_84	-	R	-	0	19715	Test 84	-
0x00B0	TEST_85	-	R	-	0	19716	Test 85	-
0x00B1	TEST_86	-	R	-	0	19717	Test 86	-
0x00B2	TEST_87	-	-	-	-	-	-	-
-	-	Element 0	R	-	0	2400	Test 87 Element 0	0x0001: BitEnum 0x0001 0x0002: BitEnum 0x0002 0x0004: BitEnum 0x0004 0x0008: BitEnum 0x0008 0x0010: BitEnum 0x0010 0x0020: BitEnum 0x0020 0x0040: BitEnum 0x0040 0x0080: BitEnum 0x0080

-	-	Element 1	R	-	0	2401	Test 87 Element 1	0x0001: BitEnum 0x0001 0x0002: BitEnum 0x0002 0x0004: BitEnum 0x0004 0x0008: BitEnum 0x0008 0x0010: BitEnum 0x0010 0x0020: BitEnum 0x0020 0x0040: BitEnum 0x0040 0x0080: BitEnum 0x0080
-	-	Element 2	R	-	0	2402	Test 87 Element 2	0x0001: BitEnum 0x0001 0x0002: BitEnum 0x0002 0x0004: BitEnum 0x0004 0x0008: BitEnum 0x0008 0x0010: BitEnum 0x0010 0x0020: BitEnum 0x0020 0x0040: BitEnum 0x0040 0x0080: BitEnum 0x0080
-	-	Element 3	R	-	0	2403	Test 87 Element 3	0x0001: BitEnum 0x0001 0x0002: BitEnum 0x0002 0x0004: BitEnum 0x0004 0x0008: BitEnum 0x0008 0x0010: BitEnum 0x0010 0x0020: BitEnum 0x0020 0x0040: BitEnum 0x0040 0x0080: BitEnum 0x0080
-	-	Element 4	R	-	0	2405	Test 87 Element 4	0x0001: BitEnum 0x0001 0x0002: BitEnum 0x0002 0x0004: BitEnum 0x0004 0x0008: BitEnum 0x0008 0x0010: BitEnum 0x0010 0x0020: BitEnum 0x0020 0x0040: BitEnum 0x0040 0x0080: BitEnum 0x0080
-	-	Element 5	R	-	0	2406	Test 87 Element 5	0x0001: BitEnum 0x0001 0x0002: BitEnum 0x0002 0x0004: BitEnum 0x0004 0x0008: BitEnum 0x0008 0x0010: BitEnum 0x0010 0x0020: BitEnum 0x0020 0x0040: BitEnum 0x0040 0x0080: BitEnum 0x0080
-	-	Element 6	R	-	0	2407	Test 87 Element 6	0x0001: BitEnum 0x0001 0x0002: BitEnum 0x0002 0x0004: BitEnum 0x0004 0x0008: BitEnum 0x0008 0x0010: BitEnum 0x0010 0x0020: BitEnum 0x0020 0x0040: BitEnum 0x0040 0x0080: BitEnum 0x0080
-	-	Element 7	R	-	0	2408	Test 87 Element 7	0x0001: BitEnum 0x0001 0x0002: BitEnum 0x0002 0x0004: BitEnum 0x0004 0x0008: BitEnum 0x0008 0x0010: BitEnum 0x0010 0x0020: BitEnum 0x0020 0x0040: BitEnum 0x0040 0x0080: BitEnum 0x0080

-	-	Element 8	R	-	0	2409	Test 87 Element 8	0x0001: BitEnum 0x0001 0x0002: BitEnum 0x0002 0x0004: BitEnum 0x0004 0x0008: BitEnum 0x0008 0x0010: BitEnum 0x0010 0x0020: BitEnum 0x0020 0x0040: BitEnum 0x0040 0x0080: BitEnum 0x0080
-	-	Element 9	R	-	0	2411	Test 87 Element 9	0x0001: BitEnum 0x0001 0x0002: BitEnum 0x0002 0x0004: BitEnum 0x0004 0x0008: BitEnum 0x0008 0x0010: BitEnum 0x0010 0x0020: BitEnum 0x0020 0x0040: BitEnum 0x0040 0x0080: BitEnum 0x0080
-	-	Element 10	R	-	0	2412	Test 87 Element 10	0x0001: BitEnum 0x0001 0x0002: BitEnum 0x0002 0x0004: BitEnum 0x0004 0x0008: BitEnum 0x0008 0x0010: BitEnum 0x0010 0x0020: BitEnum 0x0020 0x0040: BitEnum 0x0040 0x0080: BitEnum 0x0080
-	-	Element 11	R	-	0	2413	Test 87 Element 11	0x0001: BitEnum 0x0001 0x0002: BitEnum 0x0002 0x0004: BitEnum 0x0004 0x0008: BitEnum 0x0008 0x0010: BitEnum 0x0010 0x0020: BitEnum 0x0020 0x0040: BitEnum 0x0040 0x0080: BitEnum 0x0080
-	-	Element 12	R	-	0	2414	Test 87 Element 12	0x0001: BitEnum 0x0001 0x0002: BitEnum 0x0002 0x0004: BitEnum 0x0004 0x0008: BitEnum 0x0008 0x0010: BitEnum 0x0010 0x0020: BitEnum 0x0020 0x0040: BitEnum 0x0040 0x0080: BitEnum 0x0080
-	-	Element 13	R	-	0	2415	Test 87 Element 13	0x0001: BitEnum 0x0001 0x0002: BitEnum 0x0002 0x0004: BitEnum 0x0004 0x0008: BitEnum 0x0008 0x0010: BitEnum 0x0010 0x0020: BitEnum 0x0020 0x0040: BitEnum 0x0040 0x0080: BitEnum 0x0080
-	-	Element 14	R	-	0	2416	Test 87 Element 14	0x0001: BitEnum 0x0001 0x0002: BitEnum 0x0002 0x0004: BitEnum 0x0004 0x0008: BitEnum 0x0008 0x0010: BitEnum 0x0010 0x0020: BitEnum 0x0020 0x0040: BitEnum 0x0040 0x0080: BitEnum 0x0080

-	-	Element 15	R	-	0	2417	Test 87 Element 15	0x0001: BitEnum 0x0001 0x0002: BitEnum 0x0002 0x0004: BitEnum 0x0004 0x0008: BitEnum 0x0008 0x0010: BitEnum 0x0010 0x0020: BitEnum 0x0020 0x0040: BitEnum 0x0040 0x0080: BitEnum 0x0080
-	-	Element 16	R	-	0	2419	Test 87 Element 16	0x0001: BitEnum 0x0001 0x0002: BitEnum 0x0002 0x0004: BitEnum 0x0004 0x0008: BitEnum 0x0008 0x0010: BitEnum 0x0010 0x0020: BitEnum 0x0020 0x0040: BitEnum 0x0040 0x0080: BitEnum 0x0080
-	-	Element 17	R	-	0	2420	Test 87 Element 17	0x0001: BitEnum 0x0001 0x0002: BitEnum 0x0002 0x0004: BitEnum 0x0004 0x0008: BitEnum 0x0008 0x0010: BitEnum 0x0010 0x0020: BitEnum 0x0020 0x0040: BitEnum 0x0040 0x0080: BitEnum 0x0080
-	-	Element 18	R	-	0	2421	Test 87 Element 18	0x0001: BitEnum 0x0001 0x0002: BitEnum 0x0002 0x0004: BitEnum 0x0004 0x0008: BitEnum 0x0008 0x0010: BitEnum 0x0010 0x0020: BitEnum 0x0020 0x0040: BitEnum 0x0040 0x0080: BitEnum 0x0080
-	-	Element 19	R	-	0	2422	Test 87 Element 19	0x0001: BitEnum 0x0001 0x0002: BitEnum 0x0002 0x0004: BitEnum 0x0004 0x0008: BitEnum 0x0008 0x0010: BitEnum 0x0010 0x0020: BitEnum 0x0020 0x0040: BitEnum 0x0040 0x0080: BitEnum 0x0080
-	-	Element 20	R	-	0	2423	Test 87 Element 20	0x0001: BitEnum 0x0001 0x0002: BitEnum 0x0002 0x0004: BitEnum 0x0004 0x0008: BitEnum 0x0008 0x0010: BitEnum 0x0010 0x0020: BitEnum 0x0020 0x0040: BitEnum 0x0040 0x0080: BitEnum 0x0080
-	-	Element 21	R	-	0	2425	Test 87 Element 21	0x0001: BitEnum 0x0001 0x0002: BitEnum 0x0002 0x0004: BitEnum 0x0004 0x0008: BitEnum 0x0008 0x0010: BitEnum 0x0010 0x0020: BitEnum 0x0020 0x0040: BitEnum 0x0040 0x0080: BitEnum 0x0080

-	-	Element 22	R	-	0	2426	Test 87 Element 22	0x0001: BitEnum 0x0001 0x0002: BitEnum 0x0002 0x0004: BitEnum 0x0004 0x0008: BitEnum 0x0008 0x0010: BitEnum 0x0010 0x0020: BitEnum 0x0020 0x0040: BitEnum 0x0040 0x0080: BitEnum 0x0080
0x00 B3	TEST_88	-	R	-	0	1188	Test 88	0: Enum 0 1: Enum 1
0x00 B4	TEST_89	-	R	-	5449	19760	Test 89	-
0x00 B6	TEST_152	-	R	-	0	3497	Test 152	0: Enum 0 1: Enum 1 2: Enum 2 3: Enum 3 4: Enum 4 5: Enum 5 6: Enum 6 7: Enum 7 8: Enum 8 9: Enum 9 10: Enum 10 11: Enum 11 12: Enum 12 13: Enum 13
0x00 B7	TEST_151	-	R	-	0	4302	Test 151	0: Enum 0 1: Enum 1 2: Enum 2
0x00 B8	TEST_93	-	R	-	0	1027	Test 93	-
0x00 B9	TEST_94	-	R	-	0	1028	Test 94	-
0x00 BA	TEST_95	-	R	-	0	1033	Test 95	0: Enum 0 1: Enum 1
0x00 BB	TEST_96	-	R	-	0	23540	Test 96	-
0x00 BC	TEST_97	-	R	-	0	1034	Test 97	-
0x00 BD	TEST_98	-	R	-	0	1035	Test 98	-
0x00 BE	TEST_99	-	R	-	0	23541	Test 99	-
0x00 BF	TEST_100	-	R	-	0	23542	Test 100	-
0x00 C0	TEST_101	-	R	-	0	23543	Test 101	-
0x00 C1	TEST_102	-	R	-	0	23544	Test 102	-
0x00 C2	TEST_103	-	R	-	0	23545	Test 103	-
0x00 C3	TEST_104	-	R	-	0	20160	Test 104	-
0x00 C4	TEST_105	-	R	-	0	20161	Test 105	-
0x00 C5	TEST_106	-	R	-	0	20162	Test 106	-

0x00 C6	TEST_107	-	R	-	0	20163	Test 107	-
0x00 C7	TEST_108	-	R	-	0	20164	Test 108	-
0x00 C8	TEST_109	-	R	-	0	20165	Test 109	-
0x00 C9	TEST_110	-	R	-	0	1125	Test 110	-
0x00 CA	TEST_111	-	R	-	0	3566	Test 111	-
0x00 CB	TEST_112	-	R	-	1	1126	Test 112	0: Enum 0 1: Enum 1
0x00 CC	TEST_113	-	R	-	0	1129	Test 113	0: Enum 0 1: Enum 1
0x00 CD	TEST_114	-	R	-	0	1013	Test 114	0: Enum 0 1: Enum 1 2: Enum 2
0x00 CE	TEST_115	-	R	-	0	1017	Test 115	-
0x00 CF	TEST_116	-	R	-	0	1015	Test 116	-
0x00 D0	TEST_117	-	R	-	200	1018	Test 117	-
0x00 D1	TEST_118	-	R	-	100	1016	Test 118	-
0x00 D2	TEST_119	-	R	-	1	1019	Test 119	-
0x00 D3	TEST_120	-	R	-	0	1020	Test 120	-
0x00 D4	TEST_121	-	R	-	0	1021	Test 121	-
0x00 D5	TEST_122	-	R	-	0	1053	Test 122	-
0x00 D6	TEST_123	-	R	-	0	1066	Test 123	0: Enum 0 1: Enum 1 2: Enum 2 3: Enum 3
0x00 D7	TEST_124	-	R	-	0	20351	Test 124	-
0x00 D8	TEST_125	-	R	-	0	20350	Test 125	-
0x00 D9	TEST_126	-	R	-	0	1047	Test 126	0: Enum 0 1: Enum 1
0x00 DA	TEST_127	-	R	-	0	20360	Test 127	-
0x00 DB	TEST_128	-	R	-	0	20361	Test 128	-
0x00 DC	TEST_129	-	R	-	0	20362	Test 129	-
0x00 DD	TEST_130	-	R	-	0	20363	Test 130	-
0x00 DE	TEST_131	-	R	-	250	1043	Test 131	-
0x00 DF	TEST_132	-	R	-	2	1044	Test 132	-

0x00 E0	TEST_133	-	R	-	0	21890	Test 133	-
0x00 E1	TEST_134	-	R	-	0	3071	Test 134	0x0001: BitEnum 0x0001 0x0002: BitEnum 0x0002 0x0004: BitEnum 0x0004 0x0008: BitEnum 0x0008 0x0010: BitEnum 0x0010 0x0020: BitEnum 0x0020 0x0040: BitEnum 0x0040 0x0080: BitEnum 0x0080
0x00 E2	TEST_135	-	R	-	10	1177	Test 135	-
0x00 E3	TEST_136	-	R	-	47	1114	Test 136	-
0x00 E4	TEST_137	-	R	-	1	1127	Test 137	0: Enum 0 1: Enum 1
0x00 E5	TEST_138	-	R	-	0	1372	Test 138	-
0x00 E6	TEST_150	-	R	-	0	26064	Test 150	0x0001: BitEnum 0x0001 0x0002: BitEnum 0x0002 0x0004: BitEnum 0x0004 0x0008: BitEnum 0x0008 0x0010: BitEnum 0x0010 0x0020: BitEnum 0x0020 0x0040: BitEnum 0x0040 0x0080: BitEnum 0x0080
0x00 E7	TEST_139	-	R	-	0	26030	Test 139	-
0x00 E8	TEST_140	-	R	-	0	26032	Test 140	-
0x00 E9	TEST_141	-	R	-	8000	26034	Test 141	-
0x00 EA	TEST_142	-	R	-	0	26046	Test 142	-
0x00 EB	TEST_143	-	R	-	1	26048	Test 143	-
0x00 EC	TEST_144	-	R	-	1	26050	Test 144	-
0x00 ED	TEST_145	-	R	-	-	-	-	-
-	-	Element 0	R	-	0	9027	Test 145 Element 0	-
-	-	Element 1	R	-	0	9028	Test 145 Element 1	-
-	-	Element 2	R	-	0	9029	Test 145 Element 2	-
-	-	Element 3	R	-	0	9030	Test 145 Element 3	-
-	-	Element 4	R	-	0	9031	Test 145 Element 4	-
-	-	Element 5	R	-	0	9032	Test 145 Element 5	-
0x00 EE	TEST_146	-	R	-	-	-	-	-
-	-	Element 0	R	-	0	9033	Test 146 Element 0	-

-	-	Element 1	R	-	0	9034	Test 146 Element 1	-
-	-	Element 2	R	-	0	9035	Test 146 Element 2	-
-	-	Element 3	R	-	0	9036	Test 146 Element 3	-
-	-	Element 4	R	-	0	9037	Test 146 Element 4	-
-	-	Element 5	R	-	0	9038	Test 146 Element 5	-
-	-	Element 6	R	-	0	9039	Test 146 Element 6	-
-	-	Element 7	R	-	0	9040	Test 146 Element 7	-
-	-	Element 8	R	-	0	9041	Test 146 Element 8	-
-	-	Element 9	R	-	0	9042	Test 146 Element 9	-
-	-	Element 10	R	-	0	9043	Test 146 Element 10	-
-	-	Element 11	R	-	0	9044	Test 146 Element 11	-
-	-	Element 12	R	-	0	9045	Test 146 Element 12	-
-	-	Element 13	R	-	0	9046	Test 146 Element 13	-
0x00 EF	TEST_147	-	R	-	0	9047	Test 147	0: Enum 0 1: Enum 1
0x00 F0	TEST_148	-	R	-	-	-	-	-
-	-	Element 0	R	-	0	-	Test 148 Element 0	-
-	-	Element 1	R	-	0	-	Test 148 Element 1	-
-	-	Element 2	R	-	0	-	Test 148 Element 2	-
-	-	Element 3	R	-	0	-	Test 148 Element 3	-
-	-	Element 4	R	-	0	-	Test 148 Element 4	-
-	-	Element 5	R	-	0	-	Test 148 Element 5	-
-	-	Element 7	R	-	0	-	Test 148 Element 7	-
-	-	Element 8	R	-	0	-	Test 148 Element 8	-
-	-	Element 9	R	-	0	-	Test 148 Element 9	-
-	-	Element 10	R	-	0	-	Test 148 Element 10	-

-	-	Element 11	R	-	0	-	Test 148 Element 11	-
-	-	Element 12	R	-	0	-	Test 148 Element 12	-
-	-	Element 13	R	-	0	-	Test 148 Element 13	-
-	-	Element 14	R	-	0	-	Test 148 Element 14	-
-	-	Element 15	R	-	0	-	Test 148 Element 15	-
0x00 F1	TEST_149	-	R	-	0	-	Test 149	0: Enum 0 1: Enum 1
0x00 F2	SNMP_ENABLE	-	R/ W(C1)	-	1	9126	SNMP enable	0: Disable 1: Enable
0x00 F3	SNMP_COMM- NAME_READ	-	R/ W(C1)	-	"public"	9128	SNMP community name for read	-
0x00 F4	SNMP_COMM- NAME_WRITE	-	R/ W(C1)	-	"private"	9130	SNMP community name for write	-

7.2.6 Advanced Diagnostics Transducer Block

Ⓐ	Submodule Index	Ⓘ	Initial Value
Ⓑ	Parameter	ⓖ	ID
Ⓒ	Sub-Parameter	ⓓ	Parameter Label
Ⓓ	Access	Ⓢ	Enum/Array description
Ⓔ	Write Mode		

Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	Ⓘ	ⓖ	ⓓ	Ⓢ
0xB000	BLOCK_OBJECT	-	R	-	-	-	-	-
-	-	Reserved	R	-	250	-	Reserved	250(0xFA):Not used
-	-	Block Object	R	-	0x03	-	Block Object	0x03:Transducer Block
-	-	Parent Class	R	-	0x03	-	Parent Class	0x03:Flow
-	-	Class	R	-	0x81	-	Class	0x81:manufacturer specific
-	-	Dev_Rev	R	-	1	9070	Device Revision	-
-	-	Dev_Rev_Comp	R	-	1	9071	Device Revision Compatibility	-
-	-	DD Revision	R	-	65534	-	DD Revision	-
-	-	Profile	R	-	0x40FA	-	Profile	-
-	-	Profile Revision	R	-	0x0402	-	Profile Revision	-
-	-	Execution Time	R	-	254	-	Execution Time	-
-	-	Number of Parameters	R	-	224	-	Number of Parameters	-
-	-	Reserved by PI	R	-	-	-	Reserved by PI	-
-	-	Reserved by PI	R	-	-	-	Reserved by PI	-
0xB001	CURRENT_MODE	-	R	-	0x08	-	Current mode	0x08: AUTO 0x80: Out of Service (O/S)
0x0000	TOTAL_HEALTH_RESULT	-	R	-	3	3873	Total health result	0: Good (with TuHC and No critical failure) 1: Good (No critical failure) 2: Warning 3: Bad 4: Start-up

0x0001	TUHC_ENABLE	-	R/W (C2)	-	0	32310	TuHC enable	0: Not running 1: Start Tube Health Check 2: Take Reference 3: AGC Test 4: Copy current result to reference 5: Copy reference from shipment to test 6: Initialize result and flags 7: Initialize counter 8: Initialize coeff for FDG 9: Clear reference 10: Clear all history 11: Start one TuHC as interrupt
0x0002	TUHC_HEALTH_RESULT	-	R	-	0	3544	TuHC health result	0: Not execute 1: Warning 2: Error 3: OK
0x0003	TUHC_RESULT_FLAG	-	R	-	0	1310	TuHC result flag	0x0001: Change of inlet stiffness is over threshold 0x0002: Change of outlet stiffness is over threshold 0x0004: Suspicious test (continue test) 0x0008: Skip test (continue test) 0x0010: Stop test 0x0020: Reserved 0x0040: Reserved 0x0080: Reserved
0x0004	TUHC_CHANGE_RATIO_INLET_STIFFNESS	-	-	-	-	-	-	-
-	-	Value	R	-	0	13870	TuHC change ratio of inlet stiffness	-
-	-	Status	R	-	0	-	TuHC change ratio of inlet stiffness.status	-
0x0005	TUHC_CHANGE_RATIO_OUTLET_STIFFNESS	-	-	-	-	-	-	-
-	-	Value	R	-	0	13871	TuHC change ratio of outlet stiffness	-
-	-	Status	R	-	0	-	TuHC change ratio of outlet stiffness.status	-

0x0006	TUHC_DATE_START	-	R	-	0,0,0,1,1,1 15	14990	TuHC date at start	-
0x0007	TUHC_OPERATION_TIME_START	-	R	-	0	13873	TuHC operation time at start	-
0x000D	TUHC_CONTINUE_INTERVAL	-	R/W (C2)	-	60	32312	TuHC continue interval	-
0x000E	TUHC_CONTINUE_NUM	-	R/W (C2)	-	1	32313	TuHC continue number	-
0x000F	TUHC_STIFFNESS_CHANGE_LIMIT	-	R/W (C2)	-	4	32314	TuHC stiffness change limit	-
0x0010	TUHC_RETRY_NUM	-	R/W (C2)	-	3	1405	TuHC retry number	-
0x0011	TUHC_RETRY_INTERVAL	-	R/W (C2)	-	2	1406	TuHC retry interval	-
0x0012	TUHC_SETTING_RETRY	-	R/W (C2)	-	2	1411	TuHC setting retry	0: No retry 1: Retry when skip test 2: Retry when suspicious test 3: Retry by force
0x0013	TUHC_REFERENCE_NUM_COPY_FROM	-	R/W (C2)	-	1	1381	TuHC reference number copy from	0: Test 1: Air 2: Water
0x0014	TUHC_MAGNET_TEMPERATURE_SELECTION	-	R/W (C2)	-	0	1413	TuHC magnet temperature selection	0: Use temperature on sensor 1: Compensate with fixed temperature 2: Compensate with indicator temperature 3: Compensate with transmitter temperature
0x0015	TUHC_FIXED_TEMPERATURE	-	R/W (C2)	-	20	1414	TuHC fixed temperature	-
0x0016	TUHC_TEMPERATURE_RATIO_MAGNET_1	-	R/W (C2)	-	0.1	1415	TuHC temperature ratio for magnet 1	-
0x0017	TUHC_TEMPERATURE_RATIO_MAGNET_2	-	R/W (C2)	-	0.1	1416	TuHC temperature ratio for magnet 2	-
0x001D	TUHC_PROGRESS_PERCENTAGE	-	R	-	0	12310	TuHC progress percentage	-
0x001E	TUHC_TEST_COUNTER	-	R	-	0	12311	TuHC test counter	-

0x00 1F	TUHC_ALARM	-	R	-	0	13990	TuHC alarm	0: No error 1: S1 amplitude is zero at AGC 2: S2 amplitude is zero at AGC 3: Drive current is zero at AGC 4: Drive gain is zero at AGC 5: Amplitude is zero at fixed drive gain 6: No reference data 7: Different sensor parameters to reference 8: Unable to copy bad result to reference 9: Next test was started to copy reference 10: Parameter error
0x00 20	TUHC_WARNING	-	R	-	0	1300	TuHC warning	0x0001: Suspicious test 0x0002: Unstable condition at AGC1 & AGC2 0x0004: Unstable condition at test & reference 0x0008: Fluctuation of condition at AGC1 0x0010: Change threshold level 0x0020: Temperature or Pressure is out of range 0x0040: Fluctuation of condition at scan 0x0080: No cross thresholds 0x0100: Deviation of slope 0x0200: Unstable condition at AGC1 & scan 0x0400: Skip test 0x0800: Slope control error 0x1000: Amplitude is out of limit 0x2000: Data trans error 0x4000: Calculation error 0x8000: Reserved
0x00 26	TUHC_DATE_A T_REFER- ENCE_1	-	R	-	01/01/2015	14970	TuHC date at refer- ence 1	-
0x00 27	TUHC_OPERA- TION_TIME_AT _REFER- ENCE_1	-	R	-	0	14090	TuHC op- eration time at ref- erence 1	-
0x00 28	TUHC_TEM- PERA- TURE_AT_REF- ERENCE_1	-	R	-	0	12455	TuHC tem- perature at reference 1	-
0x00 29	TUHC_MASS_F LOW_AT_REF- ERENCE_1	-	R	-	0	12458	TuHC mass flow at refer- ence 1	-
0x00 2A	TUHC_DEN- SITY_AT_REF- ERENCE_1	-	R	-	0	12461	TuHC den- sity at ref- erence 1	-

0x00 30	AD_TEST_IN- LET	-	R	-	0	26036	TuHC inlet stiffness selected result cal- culation method at reference	-
0x00 31	AD_TEST_OUT- LET	-	R	-	0	26037	TuHC out- let stiffness selected result cal- culation method at reference	-
0x00 32	AD_TEST_1	-	R	-	0	2570	AD test 1	0x0001: BitEnum 0x0001 0x0002: BitEnum 0x0002 0x0004: BitEnum 0x0004 0x0008: BitEnum 0x0008 0x0010: BitEnum 0x0010 0x0020: BitEnum 0x0020 0x0040: BitEnum 0x0040 0x0080: BitEnum 0x0080 0x0100: BitEnum 0x0100 0x0200: BitEnum 0x0200 0x0400: BitEnum 0x0400 0x0800: BitEnum 0x0800 0x1000: BitEnum 0x1000 0x2000: BitEnum 0x2000 0x4000: BitEnum 0x4000 0x8000: BitEnum 0x8000
0x00 33	AD_TEST_2	-	R	-	0	2571	AD test 2	0x0001: BitEnum 0x0001 0x0002: BitEnum 0x0002 0x0004: BitEnum 0x0004 0x0008: BitEnum 0x0008 0x0010: BitEnum 0x0010 0x0020: BitEnum 0x0020 0x0040: BitEnum 0x0040 0x0080: BitEnum 0x0080 0x0100: BitEnum 0x0100 0x0200: BitEnum 0x0200 0x0400: BitEnum 0x0400 0x0800: BitEnum 0x0800 0x1000: BitEnum 0x1000 0x2000: BitEnum 0x2000 0x4000: BitEnum 0x4000 0x8000: BitEnum 0x8000
0x00 34	AD_TEST_3	-	R	-	0	2590	AD test 3	0x0001: BitEnum 0x0001 0x0002: BitEnum 0x0002 0x0004: BitEnum 0x0004 0x0008: BitEnum 0x0008 0x0010: BitEnum 0x0010 0x0020: BitEnum 0x0020 0x0040: BitEnum 0x0040 0x0080: BitEnum 0x0080 0x0100: BitEnum 0x0100 0x0200: BitEnum 0x0200 0x0400: BitEnum 0x0400 0x0800: BitEnum 0x0800 0x1000: BitEnum 0x1000 0x2000: BitEnum 0x2000 0x4000: BitEnum 0x4000 0x8000: BitEnum 0x8000

0x0035	AD_TEST_4	-	R	-	0	2591	AD test 4	0x0001: BitEnum 0x0001 0x0002: BitEnum 0x0002 0x0004: BitEnum 0x0004 0x0008: BitEnum 0x0008 0x0010: BitEnum 0x0010 0x0020: BitEnum 0x0020 0x0040: BitEnum 0x0040 0x0080: BitEnum 0x0080 0x0100: BitEnum 0x0100 0x0200: BitEnum 0x0200 0x0400: BitEnum 0x0400 0x0800: BitEnum 0x0800 0x1000: BitEnum 0x1000 0x2000: BitEnum 0x2000 0x4000: BitEnum 0x4000 0x8000: BitEnum 0x8000
0x0036	AD_TEST_5	-	R	-	0	19410	AD test 5	0: Enum 0 1: Enum 1 2: Enum 2 3: Enum 3 4: Enum 4 5: Enum 5
0x0037	AD_TEST_6	-	R	-	9500	1393	AD test 6	-
0x0038	AD_TEST_7	-	R	-	2500	1394	AD test 7	-
0x0039	AD_TEST_8	-	R	-	0	1417	AD test 8	-
0x003A	AD_TEST_9	-	R	-	0	1418	AD test 9	-
0x003B	AD_TEST_10	-	R	-	0	1419	AD test 10	-
0x003C	AD_TEST_11	-	R	-	0	1420	AD test 11	-
0x003D	AD_TEST_12	-	R	-	0	1421	AD test 12	-
0x003E	AD_TEST_13	-	R	-	0	1422	AD test 13	-
0x003F	AD_TEST_14	-	R	-	0	1423	AD test 14	-
0x0040	AD_TEST_15	-	R	-	0	1424	AD test 15	-
0x0041	AD_TEST_16	-	R	-	0	1425	AD test 16	-
0x0042	AD_TEST_17	-	R	-	0	1426	AD test 17	-
0x0043	AD_TEST_18	-	R	-	0	1427	AD test 18	-
0x0044	AD_TEST_19	-	R	-	0	1428	AD test 19	-
0x0045	AD_TEST_20	-	R	-	0	1429	AD test 20	-
0x0046	AD_TEST_21	-	R	-	0	1430	AD test 21	-
0x0047	AD_TEST_22	-	R	-	0	1431	AD test 22	-

0x0048	AD_TEST_23	-	R	-	0	1432	AD test 23	-
0x0049	AD_TEST_24	-	R	-	0	1433	AD test 24	-
0x004A	AD_TEST_25	-	R	-	0	1434	AD test 25	-
0x0050	AD_TEST_31	-	R	-	0	17455	AD test 31	-
0x0051	AD_TEST_32	-	-	-	-	-	-	-
-	-	Element 0	R	-	0	17440	AD test 32 Element 0	-
-	-	Element 1	R	-	0	17443	AD test 32 Element 1	-
-	-	Element 2	R	-	0	17446	AD test 32 Element 2	-
-	-	Element 3	R	-	0	18900	AD test 32 Element 3	-
-	-	Element 4	R	-	0	18903	AD test 32 Element 4	-
-	-	Element 5	R	-	0	19392	AD test 32 Element 5	-
-	-	Element 6	R	-	0	17458	AD test 32 Element 6	-
-	-	Element 7	R	-	0	17461	AD test 32 Element 7	-
-	-	Element 8	R	-	0	17464	AD test 32 Element 8	-
-	-	Element 9	R	-	0	17467	AD test 32 Element 9	-
-	-	Element 10	R	-	0	17470	AD test 32 Element 10	-
-	-	Element 11	R	-	0	17473	AD test 32 Element 11	-
-	-	Element 12	R	-	0	17476	AD test 32 Element 12	-
-	-	Element 13	R	-	0	17479	AD test 32 Element 13	-
-	-	Element 14	R	-	0	19140	AD test 32 Element 14	-
-	-	Element 15	R	-	0	19143	AD test 32 Element 15	-
-	-	Element 16	R	-	0	19155	AD test 32 Element 16	-
-	-	Element 17	R	-	0	18906	AD test 32 Element 17	-

-	-	Element 18	R	-	0	19450	AD test 32 Element 18	-
0x0052	AD_TEST_33	-	R	-	01/01/2015	19980	AD test 33	-
0x0053	AD_TEST_34	-	R	-	0	19390	AD test 34	-
0x0054	AD_TEST_35	-	R	-	0	19147	AD test 35	-
0x0055	AD_TEST_36	-	R	-	0	19150	AD test 36	-
0x0056	AD_TEST_37	-	R	-	0	19153	AD test 37	-
0x0057	AD_TEST_38	-	R	-	0	17456	AD test 38	-
0x0058	AD_TEST_39	-	-	-	-	-	-	-
-	-	Element 0	R	-	0	17441	AD test 39 Element 0	-
-	-	Element 1	R	-	0	17444	AD test 39 Element 1	-
-	-	Element 2	R	-	0	17447	AD test 39 Element 2	-
-	-	Element 3	R	-	0	18901	AD test 39 Element 3	-
-	-	Element 4	R	-	0	18904	AD test 39 Element 4	-
-	-	Element 5	R	-	0	19393	AD test 39 Element 5	-
-	-	Element 6	R	-	0	17459	AD test 39 Element 6	-
-	-	Element 7	R	-	0	17462	AD test 39 Element 7	-
-	-	Element 8	R	-	0	17465	AD test 39 Element 8	-
-	-	Element 9	R	-	0	17468	AD test 39 Element 9	-
-	-	Element 10	R	-	0	17471	AD test 39 Element 10	-
-	-	Element 11	R	-	0	17474	AD test 39 Element 11	-
-	-	Element 12	R	-	0	17477	AD test 39 Element 12	-
-	-	Element 13	R	-	0	17480	AD test 39 Element 13	-
-	-	Element 14	R	-	0	19141	AD test 39 Element 14	-
-	-	Element 15	R	-	0	19144	AD test 39 Element 15	-

-	-	Element 16	R	-	0	19156	AD test 39 Element 16	-
-	-	Element 17	R	-	0	18907	AD test 39 Element 17	-
-	-	Element 18	R	-	0	19451	AD test 39 Element 18	-
0x00 59	AD_TEST_40	-	R	-	01/01/2015	19981	AD test 40	-
0x00 5A	AD_TEST_41	-	R	-	0	19391	AD test 41	-
0x00 5B	AD_TEST_42	-	R	-	0	19148	AD test 42	-
0x00 5C	AD_TEST_43	-	R	-	0	19151	AD test 43	-
0x00 5D	AD_TEST_44	-	R	-	0	19154	AD test 44	-
0x00 5E	AD_TEST_45	-	R	-	0	17457	AD test 45	-
0x00 5F	AD_TEST_46	-	-	-	-	-	-	-
-	-	Element 0	R	-	0	17442	AD test 46 Element 0	-
-	-	Element 1	R	-	0	17445	AD test 46 Element 1	-
-	-	Element 2	R	-	0	17448	AD test 46 Element 2	-
-	-	Element 3	R	-	0	18902	AD test 46 Element 3	-
-	-	Element 4	R	-	0	18905	AD test 46 Element 4	-
-	-	Element 5	R	-	0	19394	AD test 46 Element 5	-
-	-	Element 6	R	-	0	17460	AD test 46 Element 6	-
-	-	Element 7	R	-	0	17463	AD test 46 Element 7	-
-	-	Element 8	R	-	0	17466	AD test 46 Element 8	-
-	-	Element 9	R	-	0	17469	AD test 46 Element 9	-
-	-	Element 10	R	-	0	17472	AD test 46 Element 10	-
-	-	Element 11	R	-	0	17475	AD test 46 Element 11	-
-	-	Element 12	R	-	0	17478	AD test 46 Element 12	-
-	-	Element 13	R	-	0	17481	AD test 46 Element 13	-

-	-	Element 14	R	-	0	19142	AD test 46 Element 14	-
-	-	Element 15	R	-	0	19145	AD test 46 Element 15	-
-	-	Element 16	R	-	0	19157	AD test 46 Element 16	-
-	-	Element 17	R	-	0	18908	AD test 46 Element 17	-
-	-	Element 18	R	-	0	19452	AD test 46 Element 18	-
0x00 65	AD_TEST_51	-	R	-	0	19170	AD test 51	-
0x00 66	AD_TEST_52	-	R	-	01/01/2015	20000	AD test 52	-
0x00 67	AD_TEST_53	-	R	-	0	18990	AD test 53	-
0x00 68	AD_TEST_54	-	R	-	0	2540	AD test 54	0: Enum 0 1: Enum 1 2: Enum 2 3: Enum 3
0x00 69	AD_TEST_55	-	-	-	-	-	-	-
-	-	Parameter 1	R	-	0	19171	AD test 55 Element 0	-
-	-	Parameter 2	R	-	0	19191	AD test 55 Element 1	-
-	-	Parameter 3	R	-	0	19211	AD test 55 Element 2	-
-	-	Parameter 4	R	-	0	19231	AD test 55 Element 3	-
-	-	Parameter 5	R	-	0	19251	AD test 55 Element 4	-
-	-	Parameter 6	R	-	0	19271	AD test 55 Element 5	-
-	-	Parameter 7	R	-	0	19291	AD test 55 Element 6	-
0x00 6A	AD_TEST_56	-	R	-	01/01/2015	20001	AD test 56	-
0x00 6B	AD_TEST_57	-	R	-	0	18991	AD test 57	-
0x00 6C	AD_TEST_58	-	R	-	0	2541	AD test 58	0: Enum 0 1: Enum 1 2: Enum 2 3: Enum 3
0x00 6D	AD_TEST_59	-	-	-	-	-	-	-
-	-	Parameter 1	R	-	0	19172	AD test 59 Element 0	-
-	-	Parameter 2	R	-	0	19192	AD test 59 Element 1	-

-	-	Parameter 3	R	-	0	19212	AD test 59 Element 2	-
-	-	Parameter 4	R	-	0	19232	AD test 59 Element 3	-
-	-	Parameter 5	R	-	0	19252	AD test 59 Element 4	-
-	-	Parameter 6	R	-	0	19272	AD test 59 Element 5	-
-	-	Parameter 7	R	-	0	19292	AD test 59 Element 6	-
0x006E	AD_TEST_60	-	R	-	01/01/2015	20002	AD test 60	-
0x006F	AD_TEST_61	-	R	-	0	18992	AD test 61	-
0x0070	AD_TEST_62	-	R	-	0	2542	AD test 62	0: Enum 0 1: Enum 1 2: Enum 2 3: Enum 3
0x0071	AD_TEST_63	-	-	-	-	-	-	-
-	-	Parameter 1	R	-	0	19173	AD test 63 Element 0	-
-	-	Parameter 2	R	-	0	19193	AD test 63 Element 1	-
-	-	Parameter 3	R	-	0	19213	AD test 63 Element 2	-
-	-	Parameter 4	R	-	0	19233	AD test 63 Element 3	-
-	-	Parameter 5	R	-	0	19253	AD test 63 Element 4	-
-	-	Parameter 6	R	-	0	19273	AD test 63 Element 5	-
-	-	Parameter 7	R	-	0	19293	AD test 63 Element 6	-
0x0072	AD_TEST_64	-	R	-	01/01/2015	20003	AD test 64	-
0x0073	AD_TEST_65	-	R	-	0	18993	AD test 65	-
0x0074	AD_TEST_66	-	R	-	0	2543	AD test 66	0: Enum 0 1: Enum 1 2: Enum 2 3: Enum 3
0x0075	AD_TEST_67	-	-	-	-	-	-	-
-	-	Parameter 1	R	-	0	19174	AD test 67 Element 0	-
-	-	Parameter 2	R	-	0	19194	AD test 67 Element 1	-
-	-	Parameter 3	R	-	0	19214	AD test 67 Element 2	-
-	-	Parameter 4	R	-	0	19234	AD test 67 Element 3	-
-	-	Parameter 5	R	-	0	19254	AD test 67 Element 4	-
-	-	Parameter 6	R	-	0	19274	AD test 67 Element 5	-

-	-	Parameter 7	R	-	0	19294	AD test 67 Element 6	-
0x0076	AD_TEST_68	-	R	-	01/01/2015	20004	AD test 68	-
0x0077	AD_TEST_69	-	R	-	0	18994	AD test 69	-
0x0078	AD_TEST_70	-	R	-	0	2544	AD test 70	0: Enum 0 1: Enum 1 2: Enum 2 3: Enum 3
0x0079	AD_TEST_71	-	-	-	-	-	-	-
-	-	Parameter 1	R	-	0	19175	AD test 71 Element 0	-
-	-	Parameter 2	R	-	0	19195	AD test 71 Element 1	-
-	-	Parameter 3	R	-	0	19215	AD test 71 Element 2	-
-	-	Parameter 4	R	-	0	19235	AD test 71 Element 3	-
-	-	Parameter 5	R	-	0	19255	AD test 71 Element 4	-
-	-	Parameter 6	R	-	0	19275	AD test 71 Element 5	-
-	-	Parameter 7	R	-	0	19295	AD test 71 Element 6	-
0x007A	AD_TEST_72	-	R	-	01/01/2015	20005	AD test 72	-
0x007B	AD_TEST_73	-	R	-	0	18995	AD test 73	-
0x007C	AD_TEST_74	-	R	-	0	2545	AD test 74	0: Enum 0 1: Enum 1 2: Enum 2 3: Enum 3
0x007D	AD_TEST_75	-	-	-	-	-	-	-
-	-	Parameter 1	R	-	0	19176	AD test 75 Element 0	-
-	-	Parameter 2	R	-	0	19196	AD test 75 Element 1	-
-	-	Parameter 3	R	-	0	19216	AD test 75 Element 2	-
-	-	Parameter 4	R	-	0	19236	AD test 75 Element 3	-
-	-	Parameter 5	R	-	0	19256	AD test 75 Element 4	-
-	-	Parameter 6	R	-	0	19276	AD test 75 Element 5	-
-	-	Parameter 7	R	-	0	19296	AD test 75 Element 6	-
0x007E	AD_TEST_76	-	R	-	01/01/2015	20006	AD test 76	-
0x007F	AD_TEST_77	-	R	-	0	18996	AD test 77	-

0x0080	AD_TEST_78	-	R	-	0	2546	AD test 78	0: Enum 0 1: Enum 1 2: Enum 2 3: Enum 3
0x0081	AD_TEST_79	-	-	-	-	-	-	-
-	-	Parameter 1	R	-	0	19177	AD test 79 Element 0	-
-	-	Parameter 2	R	-	0	19197	AD test 79 Element 1	-
-	-	Parameter 3	R	-	0	19217	AD test 79 Element 2	-
-	-	Parameter 4	R	-	0	19237	AD test 79 Element 3	-
-	-	Parameter 5	R	-	0	19257	AD test 79 Element 4	-
-	-	Parameter 6	R	-	0	19277	AD test 79 Element 5	-
-	-	Parameter 7	R	-	0	19297	AD test 79 Element 6	-
0x0082	AD_TEST_80	-	R	-	01/01/2015	20007	AD test 80	-
0x0083	AD_TEST_81	-	R	-	0	18997	AD test 81	-
0x0084	AD_TEST_82	-	R	-	0	2547	AD test 82	0: Enum 0 1: Enum 1 2: Enum 2 3: Enum 3
0x0085	AD_TEST_83	-	-	-	-	-	-	-
-	-	Parameter 1	R	-	0	19178	AD test 83 Element 0	-
-	-	Parameter 2	R	-	0	19198	AD test 83 Element 1	-
-	-	Parameter 3	R	-	0	19218	AD test 83 Element 2	-
-	-	Parameter 4	R	-	0	19238	AD test 83 Element 3	-
-	-	Parameter 5	R	-	0	19258	AD test 83 Element 4	-
-	-	Parameter 6	R	-	0	19278	AD test 83 Element 5	-
-	-	Parameter 7	R	-	0	19298	AD test 83 Element 6	-
0x0086	AD_TEST_84	-	R	-	01/01/2015	20008	AD test 84	-
0x0087	AD_TEST_85	-	R	-	0	18998	AD test 85	-
0x0088	AD_TEST_86	-	R	-	0	2548	AD test 86	0: Enum 0 1: Enum 1 2: Enum 2 3: Enum 3
0x0089	AD_TEST_87	-	-	-	-	-	-	-
-	-	Parameter 1	R	-	0	19179	AD test 87 Element 0	-

-	-	Parameter 2	R	-	0	19199	AD test 87 Element 1	-
-	-	Parameter 3	R	-	0	19219	AD test 87 Element 2	-
-	-	Parameter 4	R	-	0	19239	AD test 87 Element 3	-
-	-	Parameter 5	R	-	0	19259	AD test 87 Element 4	-
-	-	Parameter 6	R	-	0	19279	AD test 87 Element 5	-
-	-	Parameter 7	R	-	0	19299	AD test 87 Element 6	-
0x008A	AD_TEST_88	-	R	-	01/01/2015	20009	AD test 88	-
0x008B	AD_TEST_89	-	R	-	0	18999	AD test 89	-
0x008C	AD_TEST_90	-	R	-	0	2549	AD test 90	0: Enum 0 1: Enum 1 2: Enum 2 3: Enum 3
0x008D	AD_TEST_91	-	-	-	-	-	-	-
-	-	Parameter 1	R	-	0	19180	AD test 91 Element 0	-
-	-	Parameter 2	R	-	0	19200	AD test 91 Element 1	-
-	-	Parameter 3	R	-	0	19220	AD test 91 Element 2	-
-	-	Parameter 4	R	-	0	19240	AD test 91 Element 3	-
-	-	Parameter 5	R	-	0	19260	AD test 91 Element 4	-
-	-	Parameter 6	R	-	0	19280	AD test 91 Element 5	-
-	-	Parameter 7	R	-	0	19300	AD test 91 Element 6	-
0x008E	AD_TEST_92	-	R	-	01/01/2015	20010	AD test 92	-
0x008F	AD_TEST_93	-	R	-	0	19000	AD test 93	-
0x0090	AD_TEST_94	-	R	-	0	2550	AD test 94	0: Enum 0 1: Enum 1 2: Enum 2 3: Enum 3
0x0091	AD_TEST_95	-	-	-	-	-	-	-
-	-	Parameter 1	R	-	0	19181	AD test 95 Element 0	-
-	-	Parameter 2	R	-	0	19201	AD test 95 Element 1	-
-	-	Parameter 3	R	-	0	19221	AD test 95 Element 2	-
-	-	Parameter 4	R	-	0	19241	AD test 95 Element 3	-
-	-	Parameter 5	R	-	0	19261	AD test 95 Element 4	-

-	-	Parameter 6	R	-	0	19281	AD test 95 Element 5	-
-	-	Parameter 7	R	-	0	19301	AD test 95 Element 6	-
0x0092	AD_TEST_96	-	R	-	01/01/2015	20011	AD test 96	-
0x0093	AD_TEST_97	-	R	-	0	19001	AD test 97	-
0x0094	AD_TEST_98	-	R	-	0	2551	AD test 98	0: Enum 0 1: Enum 1 2: Enum 2 3: Enum 3
0x0095	AD_TEST_99	-	-	-	-	-	-	-
-	-	Parameter 1	R	-	0	19182	AD test 99 Element 0	-
-	-	Parameter 2	R	-	0	19202	AD test 99 Element 1	-
-	-	Parameter 3	R	-	0	19222	AD test 99 Element 2	-
-	-	Parameter 4	R	-	0	19242	AD test 99 Element 3	-
-	-	Parameter 5	R	-	0	19262	AD test 99 Element 4	-
-	-	Parameter 6	R	-	0	19282	AD test 99 Element 5	-
-	-	Parameter 7	R	-	0	19302	AD test 99 Element 6	-
0x0096	AD_TEST_100	-	R	-	01/01/2015	20012	AD test 100	-
0x0097	AD_TEST_101	-	R	-	0	19002	AD test 101	-
0x0098	AD_TEST_102	-	R	-	0	2552	AD test 102	0: Enum 0 1: Enum 1 2: Enum 2 3: Enum 3
0x0099	AD_TEST_103	-	-	-	-	-	-	-
-	-	Parameter 1	R	-	0	19183	AD test 103 Element 0	-
-	-	Parameter 2	R	-	0	19203	AD test 103 Element 1	-
-	-	Parameter 3	R	-	0	19223	AD test 103 Element 2	-
-	-	Parameter 4	R	-	0	19243	AD test 103 Element 3	-
-	-	Parameter 5	R	-	0	19263	AD test 103 Element 4	-
-	-	Parameter 6	R	-	0	19283	AD test 103 Element 5	-

-	-	Parameter 7	R	-	0	19303	AD test 103 Element 6	-
0x009A	AD_TEST_104	-	R	-	01/01/2015	20013	AD test 104	-
0x009B	AD_TEST_105	-	R	-	0	19003	AD test 105	-
0x009C	AD_TEST_106	-	R	-	0	2553	AD test 106	0: Enum 0 1: Enum 1 2: Enum 2 3: Enum 3
0x009D	AD_TEST_107	-	-	-	-	-	-	-
-	-	Parameter 1	R	-	0	19184	AD test 107 Element 0	-
-	-	Parameter 2	R	-	0	19204	AD test 107 Element 1	-
-	-	Parameter 3	R	-	0	19224	AD test 107 Element 2	-
-	-	Parameter 4	R	-	0	19244	AD test 107 Element 3	-
-	-	Parameter 5	R	-	0	19264	AD test 107 Element 4	-
-	-	Parameter 6	R	-	0	19284	AD test 107 Element 5	-
-	-	Parameter 7	R	-	0	19304	AD test 107 Element 6	-
0x009E	AD_TEST_108	-	R	-	01/01/2015	20014	AD test 108	-
0x009F	AD_TEST_109	-	R	-	0	19004	AD test 109	-
0x00A0	AD_TEST_110	-	R	-	0	2554	AD test 110	0: Enum 0 1: Enum 1 2: Enum 2 3: Enum 3
0x00A1	AD_TEST_111	-	-	-	-	-	-	-
-	-	Parameter 1	R	-	0	19185	AD test 111 Element 0	-
-	-	Parameter 2	R	-	0	19205	AD test 111 Element 1	-
-	-	Parameter 3	R	-	0	19225	AD test 111 Element 2	-
-	-	Parameter 4	R	-	0	19245	AD test 111 Element 3	-

-	-	Parameter 5	R	-	0	19265	AD test 111 Element 4	-
-	-	Parameter 6	R	-	0	19285	AD test 111 Element 5	-
-	-	Parameter 7	R	-	0	19305	AD test 111 Element 6	-
0x00 A2	AD_TEST_112	-	R	-	01/01/2015	20015	AD test 112	-
0x00 A3	AD_TEST_113	-	R	-	0	19005	AD test 113	-
0x00 A4	AD_TEST_114	-	R	-	0	2555	AD test 114	0: Enum 0 1: Enum 1 2: Enum 2 3: Enum 3
0x00 A5	AD_TEST_115	-	-	-	-	-	-	-
-	-	Parameter 1	R	-	0	19186	AD test 115 Element 0	-
-	-	Parameter 2	R	-	0	19206	AD test 115 Element 1	-
-	-	Parameter 3	R	-	0	19226	AD test 115 Element 2	-
-	-	Parameter 4	R	-	0	19246	AD test 115 Element 3	-
-	-	Parameter 5	R	-	0	19266	AD test 115 Element 4	-
-	-	Parameter 6	R	-	0	19286	AD test 115 Element 5	-
-	-	Parameter 7	R	-	0	19306	AD test 115 Element 6	-
0x00 A6	AD_TEST_116	-	R	-	01/01/2015	20016	AD test 116	-
0x00 A7	AD_TEST_117	-	R	-	0	19006	AD test 117	-
0x00 A8	AD_TEST_118	-	R	-	0	2556	AD test 118	0: Enum 0 1: Enum 1 2: Enum 2 3: Enum 3
0x00 A9	AD_TEST_119	-	-	-	-	-	-	-
-	-	Parameter 1	R	-	0	19187	AD test 119 Element 0	-
-	-	Parameter 2	R	-	0	19207	AD test 119 Element 1	-

-	-	Parameter 3	R	-	0	19227	AD test 119 Element 2	-
-	-	Parameter 4	R	-	0	19247	AD test 119 Element 3	-
-	-	Parameter 5	R	-	0	19267	AD test 119 Element 4	-
-	-	Parameter 6	R	-	0	19287	AD test 119 Element 5	-
-	-	Parameter 7	R	-	0	19307	AD test 119 Element 6	-
0x00 AA	AD_TEST_120	-	R	-	01/01/2015	20017	AD test 120	-
0x00 AB	AD_TEST_121	-	R	-	0	19007	AD test 121	-
0x00 AC	AD_TEST_122	-	R	-	0	2557	AD test 122	0: Enum 0 1: Enum 1 2: Enum 2 3: Enum 3
0x00 AD	AD_TEST_123	-	-	-	-	-	-	-
-	-	Parameter 1	R	-	0	19188	AD test 123 Element 0	-
-	-	Parameter 2	R	-	0	19208	AD test 123 Element 1	-
-	-	Parameter 3	R	-	0	19228	AD test 123 Element 2	-
-	-	Parameter 4	R	-	0	19248	AD test 123 Element 3	-
-	-	Parameter 5	R	-	0	19268	AD test 123 Element 4	-
-	-	Parameter 6	R	-	0	19288	AD test 123 Element 5	-
-	-	Parameter 7	R	-	0	19308	AD test 123 Element 6	-
0x00 AE	AD_TEST_124	-	R	-	01/01/2015	20018	AD test 124	-
0x00 AF	AD_TEST_125	-	R	-	0	19008	AD test 125	-
0x00 B0	AD_TEST_126	-	R	-	0	2558	AD test 126	0: Enum 0 1: Enum 1 2: Enum 2 3: Enum 3
0x00 B1	AD_TEST_127	-	-	-	-	-	-	-

-	-	Parameter 1	R	-	0	19189	AD test 127 Element 0	-
-	-	Parameter 2	R	-	0	19209	AD test 127 Element 1	-
-	-	Parameter 3	R	-	0	19229	AD test 127 Element 2	-
-	-	Parameter 4	R	-	0	19249	AD test 127 Element 3	-
-	-	Parameter 5	R	-	0	19269	AD test 127 Element 4	-
-	-	Parameter 6	R	-	0	19289	AD test 127 Element 5	-
-	-	Parameter 7	R	-	0	19309	AD test 127 Element 6	-
0x00 B2	AD_TEST_128	-	R	-	01/01/2015	20019	AD test 128	-
0x00 B3	AD_TEST_129	-	R	-	0	19009	AD test 129	-
0x00 B4	AD_TEST_130	-	R	-	0	2559	AD test 130	0: Enum 0 1: Enum 1 2: Enum 2 3: Enum 3
0x00 B5	AD_TEST_131	-	-	-	-	-	-	-
-	-	Parameter 1	R	-	0	19190	AD test 131 Element 0	-
-	-	Parameter 2	R	-	0	19210	AD test 131 Element 1	-
-	-	Parameter 3	R	-	0	19230	AD test 131 Element 2	-
-	-	Parameter 4	R	-	0	19250	AD test 131 Element 3	-
-	-	Parameter 5	R	-	0	19270	AD test 131 Element 4	-
-	-	Parameter 6	R	-	0	19290	AD test 131 Element 5	-
-	-	Parameter 7	R	-	0	19310	AD test 131 Element 6	-
0x00 BB	AD_TEST_132	-	R	-	0	1380	AD test 132	0: Enum 0 1: Enum 1 2: Enum 2
0x00 BC	AD_TEST_133	-	R	-	-0.0375	1382	AD test 133	-

0x00 BD	AD_TEST_134	-	R	-	80	1383	AD test 134	-
0x00 BE	AD_TEST_135	-	R	-	50	1384	AD test 135	-
0x00 BF	AD_TEST_136	-	R	-	5	1385	AD test 136	-
0x00 C0	AD_TEST_137	-	R	-	5	1386	AD test 137	-
0x00 C1	AD_TEST_138	-	R	-	3	1387	AD test 138	-
0x00 C2	AD_TEST_139	-	R	-	40	1388	AD test 139	-
0x00 C3	AD_TEST_140	-	R	-	20	1389	AD test 140	-
0x00 C4	AD_TEST_141	-	R	-	200	1390	AD test 141	-
0x00 C5	AD_TEST_142	-	R	-	18	1391	AD test 142	-
0x00 C6	AD_TEST_143	-	R	-	3	1392	AD test 143	-
0x00 C7	AD_TEST_144	-	R	-	320	3524	AD test 144	-
0x00 C8	AD_TEST_145	-	-	-	-	-	-	-

-	-	1	R	-	0	1397	AD test 145 Element 0	0: Enum 0 1: Enum1 2: Enum2 3: Enum3 4: Enum4 5: Enum5 6: Enum6 7: Enum7 8: Enum8 9: Enum9 10: Enum10 11: Enum11 12: Enum12 13: Enum13 14: Enum14 15: Enum15 16: Enum16 17: Enum17 18: Enum18 19: Enum19 20: Enum20 21: Enum21 22: Enum22 23: Enum23 24: Enum24 25: Enum25 26: Enum26 27: Enum27 28: Enum28 29: Enum29 30: Enum30 31: Enum31 32: Enum32 33: Enum33 34: Enum34 35: Enum35 36: Enum36 37: Enum37 38: Enum38 39: Enum39 40: Enum40 41: Enum41 42: Enum42 43: Enum43 44: Enum44 45: Enum45 46: Enum46 47: Enum47 48: Enum48 49: Enum49 50: Enum50 51: Enum51 52: Enum52 53: Enum53 54: Enum54 55: Enum55 56: Enum56

-	-	2	R	-	1	1398	AD test 145 Element 1	0: Enum 0 1: Enum1 2: Enum2 3: Enum3 4: Enum4 5: Enum5 6: Enum6 7: Enum7 8: Enum8 9: Enum9 10: Enum10 11: Enum11 12: Enum12 13: Enum13 14: Enum14 15: Enum15 16: Enum16 17: Enum17 18: Enum18 19: Enum19 20: Enum20 21: Enum21 22: Enum22 23: Enum23 24: Enum24 25: Enum25 26: Enum26 27: Enum27 28: Enum28 29: Enum29 30: Enum30 31: Enum31 32: Enum32 33: Enum33 34: Enum34 35: Enum35 36: Enum36 37: Enum37 38: Enum38 39: Enum39 40: Enum40 41: Enum41 42: Enum42 43: Enum43 44: Enum44 45: Enum45 46: Enum46 47: Enum47 48: Enum48 49: Enum49 50: Enum50 51: Enum51 52: Enum52 53: Enum53 54: Enum54 55: Enum55 56: Enum56

-	-	3	R	-	4	1399	AD test 145 Ele- ment 2	0: Enum 0 1: Enum1 2: Enum2 3: Enum3 4: Enum4 5: Enum5 6: Enum6 7: Enum7 8: Enum8 9: Enum9 10: Enum10 11: Enum11 12: Enum12 13: Enum13 14: Enum14 15: Enum15 16: Enum16 17: Enum17 18: Enum18 19: Enum19 20: Enum20 21: Enum21 22: Enum22 23: Enum23 24: Enum24 25: Enum25 26: Enum26 27: Enum27 28: Enum28 29: Enum29 30: Enum30 31: Enum31 32: Enum32 33: Enum33 34: Enum34 35: Enum35 36: Enum36 37: Enum37 38: Enum38 39: Enum39 40: Enum40 41: Enum41 42: Enum42 43: Enum43 44: Enum44 45: Enum45 46: Enum46 47: Enum47 48: Enum48 49: Enum49 50: Enum50 51: Enum51 52: Enum52 53: Enum53 54: Enum54 55: Enum55 56: Enum56

-	-	4	R	-	6	1400	AD test 145 Ele- ment 3	0: Enum 0 1: Enum1 2: Enum2 3: Enum3 4: Enum4 5: Enum5 6: Enum6 7: Enum7 8: Enum8 9: Enum9 10: Enum10 11: Enum11 12: Enum12 13: Enum13 14: Enum14 15: Enum15 16: Enum16 17: Enum17 18: Enum18 19: Enum19 20: Enum20 21: Enum21 22: Enum22 23: Enum23 24: Enum24 25: Enum25 26: Enum26 27: Enum27 28: Enum28 29: Enum29 30: Enum30 31: Enum31 32: Enum32 33: Enum33 34: Enum34 35: Enum35 36: Enum36 37: Enum37 38: Enum38 39: Enum39 40: Enum40 41: Enum41 42: Enum42 43: Enum43 44: Enum44 45: Enum45 46: Enum46 47: Enum47 48: Enum48 49: Enum49 50: Enum50 51: Enum51 52: Enum52 53: Enum53 54: Enum54 55: Enum55 56: Enum56

-	-	5	R	-	9	1401	AD test 145 Ele- ment 4	0: Enum 0 1: Enum1 2: Enum2 3: Enum3 4: Enum4 5: Enum5 6: Enum6 7: Enum7 8: Enum8 9: Enum9 10: Enum10 11: Enum11 12: Enum12 13: Enum13 14: Enum14 15: Enum15 16: Enum16 17: Enum17 18: Enum18 19: Enum19 20: Enum20 21: Enum21 22: Enum22 23: Enum23 24: Enum24 25: Enum25 26: Enum26 27: Enum27 28: Enum28 29: Enum29 30: Enum30 31: Enum31 32: Enum32 33: Enum33 34: Enum34 35: Enum35 36: Enum36 37: Enum37 38: Enum38 39: Enum39 40: Enum40 41: Enum41 42: Enum42 43: Enum43 44: Enum44 45: Enum45 46: Enum46 47: Enum47 48: Enum48 49: Enum49 50: Enum50 51: Enum51 52: Enum52 53: Enum53 54: Enum54 55: Enum55 56: Enum56

-	-	6	R	-	10	1402	AD test 145 Ele- ment 5	0: Enum 0 1: Enum1 2: Enum2 3: Enum3 4: Enum4 5: Enum5 6: Enum6 7: Enum7 8: Enum8 9: Enum9 10: Enum10 11: Enum11 12: Enum12 13: Enum13 14: Enum14 15: Enum15 16: Enum16 17: Enum17 18: Enum18 19: Enum19 20: Enum20 21: Enum21 22: Enum22 23: Enum23 24: Enum24 25: Enum25 26: Enum26 27: Enum27 28: Enum28 29: Enum29 30: Enum30 31: Enum31 32: Enum32 33: Enum33 34: Enum34 35: Enum35 36: Enum36 37: Enum37 38: Enum38 39: Enum39 40: Enum40 41: Enum41 42: Enum42 43: Enum43 44: Enum44 45: Enum45 46: Enum46 47: Enum47 48: Enum48 49: Enum49 50: Enum50 51: Enum51 52: Enum52 53: Enum53 54: Enum54 55: Enum55 56: Enum56

-	-	7	R	-	11	1403	AD test 145 Ele- ment 6	0: Enum 0 1: Enum1 2: Enum2 3: Enum3 4: Enum4 5: Enum5 6: Enum6 7: Enum7 8: Enum8 9: Enum9 10: Enum10 11: Enum11 12: Enum12 13: Enum13 14: Enum14 15: Enum15 16: Enum16 17: Enum17 18: Enum18 19: Enum19 20: Enum20 21: Enum21 22: Enum22 23: Enum23 24: Enum24 25: Enum25 26: Enum26 27: Enum27 28: Enum28 29: Enum29 30: Enum30 31: Enum31 32: Enum32 33: Enum33 34: Enum34 35: Enum35 36: Enum36 37: Enum37 38: Enum38 39: Enum39 40: Enum40 41: Enum41 42: Enum42 43: Enum43 44: Enum44 45: Enum45 46: Enum46 47: Enum47 48: Enum48 49: Enum49 50: Enum50 51: Enum51 52: Enum52 53: Enum53 54: Enum54 55: Enum55 56: Enum56

0x00 C9	AD_TEST_146	-	R	-	0	1404	AD test 146	0: Enum0 1: Enum1 2: Enum2 16: Enum16 17: Enum17 18: Enum18 19: Enum19 20: Enum20 21: Enum21 22: Enum22 23: Enum23 24: Enum24 25: Enum25 26: Enum26 27: Enum27 28: Enum28 29: Enum29 30: Enum30 31: Enum31
0x00 CA	AD_TEST_147	-	R	-	8	1407	AD test 147	-
0x00 CB	AD_TEST_148	-	R	-	3	1408	AD test 148	-
0x00 CC	AD_TEST_149	-	R	-	10	1409	AD test 149	-
0x00 CD	AD_TEST_150	-	R	-	2	1410	AD test 150	-
0x00 CE	AD_TEST_151	-	R	-	102	7020	AD test 151	0x0001: BitEnum 0x0001 0x0002: BitEnum 0x0002 0x0004: BitEnum 0x0004 0x0008: BitEnum 0x0008 0x0010: BitEnum 0x0010 0x0020: BitEnum 0x0020 0x0040: BitEnum 0x0040 0x0080: BitEnum 0x0080

0x00 CF	AD_TEST_152	-	R	-	0	1412	AD test 152	0: Enum0
								1: Enum1
								2: Enum2
								3: Enum3
								4: Enum4
								5: Enum5
								6: Enum6
								7: Enum7
								8: Enum8
								9: Enum9
								10: Enum10
								11: Enum11
								12: Enum12
								13: Enum13
								14: Enum14
								15: Enum15
								16: Enum16
								17: Enum17
								18: Enum18
								19: Enum19
								20: Enum20
								21: Enum21
								22: Enum22
								23: Enum23
								24: Enum24
								25: Enum25
								26: Enum26
								27: Enum27
								28: Enum28
								29: Enum29
								30: Enum30
								31: Enum31
								32: Enum32
								33: Enum33
								34: Enum34
								35: Enum35
								36: Enum36
								37: Enum37
								38: Enum38
								39: Enum39
								40: Enum40
								41: Enum41
								42: Enum42
								43: Enum43
								44: Enum44
								45: Enum45
								46: Enum46
								47: Enum47
								48: Enum48
								49: Enum49
								50: Enum50
								51: Enum51
								52: Enum52
								53: Enum53
								54: Enum54
								55: Enum55
								56: Enum56
								57: Enum57
								58: Enum58
								59: Enum59
								60: Enum60

0x00 CF	AD_TEST_152	-	R	-	0	1412	AD test 152	61: Enum61 62: Enum62 63: Enum63 64: Enum64 65: Enum65 66: Enum66 67: Enum67 68: Enum68 69: Enum69 70: Enum70 71: Enum71 72: Enum72 73: Enum73 74: Enum74 75: Enum75 76: Enum76 77: Enum77 78: Enum78 79: Enum79 80: Enum80 81: Enum81
0x00 D5	AD_TEST_158	-	R	-	20	1435	AD test 158	-
0x00 D6	AD_TEST_159	-	R	-	2500	1436	AD test 159	-
0x00 D7	AD_TEST_160	-	R	-	1500	1437	AD test 160	-
0x00 D8	AD_TEST_161	-	-	-	-	-	-	-
-	-	Element 0	R	-	0.1	1443	AD test 161 Ele- ment 0	-
-	-	Element 1	R	-	0.1	1444	AD test 161 Ele- ment 1	-
-	-	Element 2	R	-	1	1445	AD test 161 Ele- ment 2	-
-	-	Element 3	R	-	0.1	1438	AD test 161 Ele- ment 3	-
-	-	Element 4	R	-	0.1	1439	AD test 161 Ele- ment 4	-
-	-	Element 5	R	-	1	1440	AD test 161 Ele- ment 5	-
-	-	Element 6	R	-	1	1441	AD test 161 Ele- ment 6	-
-	-	Element 7	R	-	1	1442	AD test 161 Ele- ment 7	-
-	-	Element 8	R	-	20	1447	AD test 161 Ele- ment 8	-
-	-	Element 9	R	-	0	1448	AD test 161 Ele- ment 9	-

-	-	Element 10	R	-	0	1449	AD test 161 Element 10	-
-	-	Element 11	R	-	0	1450	AD test 161 Element 11	-
-	-	Element 12	R	-	80	1446	AD test 161 Element 12	-
-	-	Element 13	R	-	0	1451	AD test 161 Element 13	-
-	-	Element 14	R	-	-50	1452	AD test 161 Element 14	-
-	-	Element 15	R	-	280	1453	AD test 161 Element 15	-
-	-	Element 16	R	-	0	1454	AD test 161 Element 16	-
-	-	Element 17	R	-	0.05	1455	AD test 161 Element 17	-

7.2.7 Analog Input Function Block

Ⓐ	Submodule Index	Ⓘ	Initial Value
Ⓑ	Parameter	ⓖ	ID
Ⓒ	Sub-Parameter	ⓓ	Parameter Label
Ⓓ	Access	Ⓢ	Enum/Array description
Ⓔ	Write Mode		

Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	Ⓙ	ⓖ	ⓓ	Ⓢ
0xB000	BLOCK_OBJECT	-	-	-	-	-	-	-
-	-	Reserved	R	-	250	-	Reserved	250(0xFA): Not used
-	-	Block Object	R	-	2	-	Block Object	02: Function Block
-	-	Parent Class	R	-	70	-	Parent Class	70: Mass Flow AI Function Block
-	-	Class	R	-	1	-	Class	01: Input
-	-	Dev_Rev	R	-	1	9070	Device Revision	-
-	-	Dev_Rev_Comp	R	-	1	9071	Device Revision Compatibility	-
-	-	DD Revision	R	-	65534	-	DD Revision	-
-	-	Profile	R	-	0x40FA	-	Profile	-
-	-	Profile Revision	R	-	0x0402	-	Profile Revision	-
-	-	Execution Time	R	-	254	-	Execution Time	-

-	-	Number of Parameters	R	-	17	-	Number of Parameters	-
0xB001	CURRENT_MODE	-	R	-	0x08	-	Current mode	0x08: AUTO 0x80: Out of Service (O/S)
0xB002	IM_Tag_function	-	R/W (C2)	-	" "	-	Tag	-
0xB006	FLOW	-	R	-	0	-	-	-
-	-	Value	R	-	0	-	AI1-6 Flow	-
-	-	Status	R	-	0	-	AI1-6 Flow status	-
0xB007	FLOW_UNIT	-	R	-	AI1:1328 AI2:1103 AI3:1001 AI4:1349 AI5:1103 AI6:1598	-	Flow unit	32769: kg/cm ³ 32770: g/cc 32773: mmscfh 32774: mmscfd 32775: MJ/m ³ 32776: Btu/gal 32777: MJ/Nml m ³ 32778: Btu/Std 32779: mPas 32780: Ns/m ² 32781: kg/ms 32783: cm ² /s 32784: mm ² /s 32785: dm ² /s 32790: Wt % 32768: User unit 32782: User unit(dynamic) 32786: User unit 32787: User unit 32788: User unit 32789: User unit 32791: Wt % User unit 32792: Vol % User unit 32799: User unit 32800: User unit 32801: User unit 32802: User unit 32803: User unit 32808: mApp 32810: mrad
0xB008	DAMPING	-	R/W (C2)	-	1	-	Damping	-
0xB00A	INPUT_SELECTOR	-	R/W (C1)	-	-	-	-	-

-	-	1	R/W (C1)	-	AI1-6:0x0001	AI1-6 9048-9053	AI1-6.Input selector.block	0x0001: FTB 0x0003: CTB 0x0005: ADTB
-	-	2	R/W (C1)	-	AI1:0xB00A AI2:0xB00E AI3:0xB012 AI4:0xB006 AI5:0x002A AI6:0x0047	AI1-6 9048-9053	AI1-6.Input selector	0xB00A: Mass Flow 0xB00E: Density 0xB012: Temperature 0x001F: Pressure 0xB006: Volume flow 0x002A: Reference density 0x0038: Relative density 0x0047: Corrected volume flow 0x0000: Concentration 0x0059: Net mass flow 1 0x0069: Net mass flow 2 0x0079: Net volume flow 1 0x0089: Net volume flow 2 0x0099: Net corrected volume flow 0x0056: Viscosity 0x00B8: Drive current 0x0004: TuHC change ratio of inlet stiffness 0x0005: TuHC change ratio of outlet stiffness
0xB00B	SIMULATE_ENABLE	-	R/W (C2)	-	0	-	Simulate enable	0: Disabled 1: Enabled
0xB00C	SIMULATE_VALUE	-	R/W (C2)	-	0	-	Simulate value	-

0xB0 0D	SIMU- LATE_STATUS	-	R/W (C2)	-	0x3C	-	Simulate status	0x00: BAD 0x08: BAD - not connected 0x20: BAD - passivated 0x24: BAD - maintenance alarm, more diagnosis avail- able 0x28 : BAD - process related, no maintenance 0x3C: BAD - function check/ local override, value not us- able 0x48: UNCERTAIN - substi- tute set 0x4C: UNCERTAIN - initial value 0x68: UNCERTAIN - mainte- nance demanded 0x78: UNCERTAIN - process related, no maintenance 0x80: GOOD 0xA0: GOOD - initiate fail safe 0xA4: GOOD - maintenance required 0xA8: GOOD - maintenance demanded 0x9C: GOOD - local override 0xBC: GOOD - function check
0xB0 0E	PROCESS_VAR IABLE	-	R	-	0x195	-	Process variable	-
0xB0 0F	View_1	-	R	-	-	-	View 1	-
0xB0 10	STARTUP_REC ORD	-	R/W (C2)	-	-	-	Startup record	-

7.2.8 Totalizer Function Block

Ⓐ	Submodule Index	Ⓘ	Initial Value
Ⓑ	Parameter	ⓖ	ID
Ⓒ	Sub-Parameter	ⓓ	Parameter Label
Ⓓ	Access	Ⓢ	Enum/Array description
Ⓔ	Write Mode		

Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	Ⓘ	ⓖ	ⓓ	Ⓢ
0xB000	BLOCK_OBJECT	-	R	-	-	-	-	-
-	-	Reserved	R	-	250	-	Reserved	250(0xFA): not used
-	-	Block Object	R	-	2	-	Block Object	02: Function Block
-	-	Parent Class	R	-	150	-	Parent Class	150: Totalizer
-	-	Class	R	-	1	-	Class	01: Input
-	-	Dev_Rev	R	-	-	9070	Device Revision	-
-	-	Dev_Rev_Comp	R	-	-	9071	Device Revision Compatibility	-
-	-	DD Revision	R	-	65534	-	DD Revision	-
-	-	Profile	R	-	0x40FA	-	Profile	-
-	-	Profile Revision	R	-	0x0402	-	Profile Revision	-
-	-	Execution Time	R	-	254	-	Execution Time	-
-	-	Number of Parameters	R	-	35	-	Number of Parameters	-
0xB001	CURRENT_MODE	-	R	-	0x08	-	Current mode	0x08: AUTO 0x80: Out of Service (O/S)
0xB002	IM_Tag_Function	-	R/W (C2)	-	" "	-	Tag	-
0xB006	FLOW	-	R	-	-	-	-	-
-	-	Value	R	-	0	TOT1: 11996 TOT2: 11997 TOT3: 11998	Totalizer 1-3	-
-	-	Status	R	-	0	-	Totalizer 1-3.status	-

0xB007	FLOW_UNIT	-	R/W (C1)	-	TOT1: 1088 TOT2: 1034 TOT3: 1575	TOT1: 31331 TOT2: 31361 TOT3: 31391	Total 1-3 unit	1089: g 1088: kg 1092: t 1095: ton(US) 1096: ton(UK) 1094: lb 1036: cm ³ 1038: L 1034: m ³ 1048: gal 32804: kgal 1043: ft ³ 1051: bbl 1049: Impgal 32805:klmpgal 1574: NL 1 573: Nm ³ 1576: SL 1053: Sft ³ 32806: MMSft ³ 1575: Sm ³ 1172: MJ 1183: Btu 32807: User unit
0xB008	SET_TOT	-	R/W (C1)	-	4	TOT1: 9054 TOT2: 9057 TOT3: 9060	Total 1-3 et	1: RESET 2: PRESET 3: HOLD 4: TOTALIZE
0xB009	MODE_TOT	-	R/W (C2)	-	1	TOT1: 31332 TOT2: 31362 TOT3: 31392	Total 1-3 option	0: BALANCED 1: POS_ONLY 2: NEG_ONLY
0xB00A	FAIL_TOT	-	R/W (C1)	-	0	TOT1: 31333 TOT2: 31363 TOT3: 31393	Total 1-3 failure option	0: RUN 1: HOLD 2: MEMORY
0xB00B	PRESET_TOT	-	R/W (C1)	-	0	TOT1: 31338 TOT2: 31368 TOT3: 31398	Total 1-3 preset value	-

0xB00C	INPUT_SELECTOR	-	R/W (C1)	-	TOT1: 0 TOT2: 1 TOT3: 2	TOT1: 31330 TOT2: 31360 TOT3: 31390	Total 1-3 Input selector	0: Mass flow 1: Volume flow 2: Corrected volume flow 128: Energy 129: Net mass flow 1 130: Net mass flow 2 131: Net volume flow 1 132: Net volume flow 2 133: Net corrected volume flow
0xB00D	FLOW_DOUBLE	-	R	-	0	-	-	-
-	-	Value	-	-	0	TOT1: 24210 TOT2: 24211 TOT3: 24212	Totalizer 1-3(double)	-
-	-	Status	-	-	-	-	Totalizer 1-3(double).status	-
0xB00E	SIMULATE_ENABLE	-	R/W (C2)	-	0	-	Simulate enable	-
0xB00F	SIMULATE_VALUE	-	R/W (C2)	-	0	-	Simulate value	-
0xB010	SIMULATE_STATUS	-	R/W (C2)	-	0x3C	-	Simulate status	-
0xB011	PROCESS_VARIABLE	-	R	-	0x0132	-	Process variable	0x0128: VOLUME 0x012B: STANDARD_VOLUME 0x012C: FRACTION_SUBSTANCE_1_VOLUME 0x012D: FRACTION_SUBSTANCE_2_VOLUME 0x012E: FRACTION_SUBSTANCE_1_STD_VOLUME 0x012F: FRACTION_SUBSTANCE_2_STD_VOLUME 0x0132: MASS 0x0133: NET MASS 0x0134: FRACTION_SUBSTANCE_1_MASS 0x0135: FRACTION_SUBSTANCE_2_MASS 0x016E: ENERGY
0xB012	View_1	-	R	-	-	-	View 1	-
0xB013	View_2	-	R/W (C2)	-	-	-	View 2	-
0xB014	STARTUP_RECORD	-	R/W (C2)	-	-	-	Startup record	-
0x0000	TOT_USER_UNIT	-	R/W (C2)	-	" "	TOT1: 31336 TOT2: 31366 TOT3: 31396	Total 1-3 user unit	-

0x0001	TOT_USER_UNIT_CONV_FACTOR	-	R/W (C2)	-	1	TOT1: 31337 TOT2: 31367 TOT3: 31397	Total 1-3 conversion factor	-
0x0002	MODE_TOT_DENSITY	-	R/W (C2)	-	13	TOT1: 31332 TOT2: 31362 TOT3: 31392	Total 1-3 mode total density	5: Density (Balanced) 7: Density (Positive only) 8: Density (Negative only) 9: Density + Temperature (Balanced) 11: Density + Temperature (Positive only) 12: Density + Temperature (Negative only) 13: Off
0x0003	TOT_DENSITY_LOWER_VALUE	-	R/W (C2)	-	0.8	TOT1: 3762 TOT2: 3771 TOT3: 3780	Total 1-3 density lower value	-
0x0004	TOT_DENSITY_UPPER_VALUE	-	R/W (C2)	-	1.2	TOT1: 3763 TOT2: 3772 TOT3: 3781	Total 1-3 density upper value	-
0x0005	TOT_DENSITY_HYS	-	R/W (C2)	-	0.1	3760	Total density hysteresis	-
0x0006	TOTAL_24HOURS	-	R	-	0	TOT1: 3770 TOT2: 3779 TOT3: 3788	Total 1-3 24hours value	-
0x0007	TOT_24HOURS_START_DATE	-	R	-	0,0,0,1,1,15	TOT1: 3764 TOT2: 3773 TOT3: 3782	Total 1-3 24hours start date	-
0x0008	TOT_24HOURS_START_OPERATION_TIME	-	R	-	" "	TOT1: 3766 TOT2: 3775 TOT3: 3784	Total 1-3 24hours start operation time	-
0x0009	TOT_24HOURS_UPDATE_DATE	-	R	-	0,0,0,1,1,15	TOT1: 3767 TOT2: 3776 TOT3: 3785	Total 1-3 24hours last update date	-

0x00 0A	TOT_24HOURS_UPDATE_OPERATION_TIME	-	R	-	" "	TOT1: 3769 TOT2: 3778 TOT3: 3787	Total 1-3 24hours last update operation time	-
0x00 0B	TEST_1	-	R/W (C2)	-	0	TOT1: 26012 TOT2: 26016 TOT3: 26020	Test 1	-
0x00 0C	TEST_2	-	R/W (C2)	-	100	TOT1: 26014 TOT2: 26018 TOT3: 26022	Test 2	-
0x00 0D	TEST_3	-	R/W (C2)	-	0.1	26038	Test 3	-

7.2.9 Analog Output Function Block

Ⓐ	Submodule Index	Ⓕ	Initial Value
Ⓑ	Parameter	Ⓖ	ID
Ⓒ	Sub-Parameter	Ⓗ	Parameter Label
Ⓓ	Access	Ⓘ	Enum/Array description
Ⓔ	Write Mode		

Ⓐ	Ⓑ	Ⓒ	Ⓓ	Ⓔ	Ⓕ	Ⓖ	Ⓗ	Ⓘ
0	BLOCK_OBJECT	-	-	-	-	-	-	-
-	-	Reserved	R	-	250	-	Reserved	250(0xFA):Not used
-	-	Block Object	R	-	0x02	-	Block Object	0x02: Function Block
-	-	Parent Class	R	-	1	-	Parent Class	01: Flexible AO
-	-	Class	R	-	4	-	Class	04: Further Outputs
-	-	Dev_Rev	R	-	-	9070	Device Revision	-
-	-	Dev_Rev_Comp	R	-	-	9071	Device Revision Compatibility	-
-	-	DD Revision	R	-	65535	-	DD Revision	-
-	-	Profile	R	-	0x40FA	-	Profile	-
-	-	Profile Revision	R	-	0x0401	-	Profile Revision	-
-	-	Execution Time	R	-	254	-	Execution Time	-
-	-	Number of Parameters	R	-	18	-	Number of Parameters	-

0xB001	CURRENT_MODE	-	R	-	0x08	-	Current mode	0x08: AUTO 0x10: MAN 0x80: Out of Service (O/S)
0xB002	IM_Tag_Function	-	R/W (C2)	-	" "	-	Tag	-
0xB006	FLOW	-	R/W (C2)	MAN	-	-	-	-
-	-	Value	R/W (C2)	MAN	0.0	-	Flow	-
-	-	Status	R/W (C2)	MAN	0	-	Flow.status	-
0xB007	FSAFE_TIME	-	R/W (C2)	-	0	-	FSafe time	-
0xB008	FSAFE_TYPE	-	R/W (C2)	-	2	-	FSafe type	0: FSAFE_VALUE 1: LUV 2: INVALID VALUE
0xB009	FSAFE_VALUE	-	R/W (C2)	-	0	-	FSafe Value	-
0xB00A	FLOW_OUT	-	R/W (C2)	MAN	-	-	-	-
-	-	Value	R/W (C2)	MAN	0	-	Out	-
-	-	Status	R/W (C2)	MAN	0	-	Out.status	-
0xB00B	FLOW_UNITS	-	R/W (C1)	-	1137	9063	Flow units	1148: inH2O@68degF 1155: inHg 1154: ftH2O@68degF 1151: mmH2O@68degF 1157: mmHg 1141: psi 1137: bar 1138: mbar 1144: g/cm2 1145: kg/cm2 1130: Pa 1133: kPa 1139: torr 1140: atm 1132: MPa 1146: inH2O 1149: mmH2O 1152: ftH2O 1136: hPa 1001: degC 1002: degF 1003: degR 1000: K 1207: MJ/kg 1516: Btu/lb 32775: MJ/m3 32776: Btu/gal 32777: MJ/Nml m3 32778: Btu/Std ft3
0xB00C	TARGET_MODE	-	R/W (C1)	-	0x08	9064	Target mode	0x08: AUTO 0x10: MAN 0x80: Out of Service (O/S)

0xB0 0D	View_1	-	R	-	-	-	View 1	-
0xB0 0E	View_2	-	R/W (C2)	-	-	-	View 1	-
0xB0 0F	STARTUP_REC ORD	-	R/W (C2)	-	-	-	Startup record	-
0x00 00	LO_LIMIT	-	R/W (C1)	-	0	9065	Lo limit	-
0x00 01	HI_LIMIT	-	R/W (C1)	-	200	9066	Hi limit	-

7.3 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				
Web page	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				
Web page	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				
Web page	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				
Web page	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 ³	kg/cm ³	✓	✓	kg/cm ³	kg/cm ³	kg/cm ³	kg/cm ³	kg/cm ³
kg/dm ³	kg/dm ³	✓	✓	kg/dm ³	kg/dm ³	kg/dm ³	kg/dm ³	kg/dm ³
kg/m ³	kg/m ³	✓	✓	kg/m ³	kg/m ³	kg/m ³	кг/м ³	kg/m ³
lb/gal	lb/gal	✓	✓		lb/gal	lb/gal	фунт/гал	
lb/ft ³	lb/ft ³	✓	✓		lb/Cuft	lb/ft ³	фунт/фут ³	
g/cm ³	g/cm ³	✓	✓	g/cm ³	g/cm ³	g/cm ³	г/см ³	g/cm ³
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				
Web page	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

Volume flow unit

Display of unit		Liquid gas select		Display unit selection				
Web page	Indicator	Liquid	Gas	Metric	US	UK	Russia	Japan
cm ³ /s	cm ³ /s	✓	✓	cm ³ /s	cc/s	cm ³ /s	см ³ /с	cm ³ /s
cm ³ /min	cm ³ /min	✓	✓	cm ³ /min	cc/min	cm ³ /min	см ³ /мин	cm ³ /min
cm ³ /h	cm ³ /h	✓	✓	cm ³ /h	cc/h	cm ³ /h	см ³ /ч	cm ³ /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 ³ /s	m ³ /s	✓	✓	m ³ /s	m ³ /s	m ³ /s	м ³ /с	m ³ /s
m ³ /min	m ³ /min	✓	✓	m ³ /min	m ³ /min	m ³ /min	м ³ /мин	m ³ /min
m ³ /h	m ³ /h	✓	✓	m ³ /h	m ³ /h	m ³ /h	м ³ /ч	m ³ /h
m ³ /d	m ³ /d	✓	✓	m ³ /d	m ³ /d	m ³ /d	м ³ /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	

Display of unit		Liquid gas select		Display unit selection				
Web page	Indicator	Liquid	Gas	Metric	US	UK	Russia	Japan
gal/d	gal/d	✓	✓		gal/d	gal/d	гал/сут	
ft ³ /s	ft ³ /s	✓	✓		Cuft/s	ft ³ /s	фут ³ /с	
ft ³ /min	ft ³ /min	✓	✓		Cuft/min	ft ³ /min	фут ³ /мин	
ft ³ /h	ft ³ /h	✓	✓		Cuft/h	ft ³ /h	фут ³ /ч	
ft ³ /d	ft ³ /d	✓	✓		Cuft/d	ft ³ /d	фут ³ /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				
Web page	Indicator	Liquid	Gas	Metric	US	UK	Russia	Japan
cm ³ /s	cm ³ /s	✓	N/A	cm ³ /s	cc/s	cm ³ /s	см ³ /с	cm ³ /s
cm ³ /min	cm ³ /min	✓	N/A	cm ³ /min	cc/min	cm ³ /min	см ³ /мин	cm ³ /min
cm ³ /h	cm ³ /h	✓	N/A	cm ³ /h	cc/h	cm ³ /h	см ³ /ч	cm ³ /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 ³ /s	m ³ /s	✓	N/A	m ³ /s	m ³ /s	m ³ /s	м ³ /с	m ³ /s
m ³ /min	m ³ /min	✓	N/A	m ³ /min	m ³ /min	m ³ /min	м ³ /мин	m ³ /min
m ³ /h	m ³ /h	✓	N/A	m ³ /h	m ³ /h	m ³ /h	м ³ /ч	m ³ /h
m ³ /d	m ³ /d	✓	N/A	m ³ /d	m ³ /d	m ³ /d	м ³ /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 ³ /s	ft ³ /s	✓	N/A		Cuft/s	ft ³ /s	фут ³ /с	
ft ³ /min	ft ³ /min	✓	N/A		Cuft/min	ft ³ /min	фут ³ /мин	
ft ³ /h	ft ³ /h	✓	N/A		Cuft/h	ft ³ /h	фут ³ /ч	
ft ³ /d	ft ³ /d	✓	N/A		Cuft/d	ft ³ /d	фут ³ /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				
Web page	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
degBaumhv	°Bé hv	✓	N/A	°Bé hv	°Bé hv	°Bé hv	°Bé >	°Bé hv
degBaumlt	°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				
Web page	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	
m³/s(normal)	Nm³/s	N/A	✓	Nm³/s	Nm³/s	Nm³/s	Н.м³/с	m³/s(N)
m³/min(normal)	Nm³/min	N/A	✓	Nm³/min	Nm³/min	Nm³/min	Н.м³/мин	m³/min(N)
m³/h(normal)	Nm³/h	N/A	✓	Nm³/h	Nm³/h	Nm³/h	Н.м³/ч	m³/h(N)
m³/d(normal)	Nm³/d	N/A	✓	Nm³/d	Nm³/d	Nm³/d	Н.м³/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	
ft³/s(standard)	Sft³/s	✓	✓		SCFS	Sft³/s	Ст.фут³/с	
ft³/min(standard)	Sft³/min	✓	✓		SCFM	Sft³/min	Ст.фут³/мин	

Display of unit		Liquid gas select		Display unit selection				
Web page	Indicator	Liquid	Gas	Metric	US	UK	Russia	Japan
ft ³ /h(standard)	Sft ³ /h	✓	✓		SCFH	Sft ³ /h	Ст.фут ³ /ч	
ft ³ /d(standard)	Sft ³ /d	✓	✓		SCFD	Sft ³ /d	Ст.фут ³ /сут	
m ³ /s(standard)	Sm ³ /s	✓	✓	Sm ³ /s	Sm ³ /s	Sm ³ /s	Ст.м ³ /с	m ³ /s(S)
m ³ /min(standard)	Sm ³ /min	✓	✓	Sm ³ /min	Sm ³ /min	Sm ³ /min	Ст.м ³ /мин	m ³ /min(S)
m ³ /h(standard)	Sm ³ /h	✓	✓	Sm ³ /h	Sm ³ /h	Sm ³ /h	Ст.м ³ /ч	m ³ /h(S)
m ³ /d(standard)	Sm ³ /d	✓	✓	Sm ³ /d	Sm ³ /d	Sm ³ /d	Ст.м ³ /сут	
MMSft ³ /h	MMSft ³ /h	✓	✓		mmscfh	MMSft ³ /h		
MMSft ³ /d	MMSft ³ /d	✓	✓		mmscfd	MMSft ³ /h		

Net corrected volume flow unit

Display of unit		Liquid gas select		Display unit selection				
Web page	Indicator	Liquid	Gas	Metric	US	UK	Russia	Japan
L/s(standard)	SL/s	✓	N/A	SL/s	Sl/s	Sl/s	Ст.л/с	L/s(S)
L/min(standard)	SL/min	✓	N/A	SL/min	Sl/min	Sl/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	Sl/d	Sl/d	Ст.л/сут	
ft ³ /s(standard)	Sft ³ /s	✓	N/A		SCFS	Sft ³ /s	Ст.фут ³ /с	
ft ³ /min(standard)	Sft ³ /min	✓	N/A		SCFM	Sft ³ /min	Ст.фут ³ /мин	
ft ³ /h(standard)	Sft ³ /h	✓	N/A		SCFH	Sft ³ /h	Ст.фут ³ /ч	
ft ³ /d(standard)	Sft ³ /d	✓	N/A		SCFD	Sft ³ /d	Ст.фут ³ /сут	
m ³ /s(standard)	Sm ³ /s	✓	N/A	Sm ³ /s	Sm ³ /s	Sm ³ /s	Ст.м ³ /с	m ³ /s(S)
m ³ /min(standard)	Sm ³ /min	✓	N/A	Sm ³ /min	Sm ³ /min	Sm ³ /min	Ст.м ³ /мин	m ³ /min(S)
m ³ /h(standard)	Sm ³ /h	✓	N/A	Sm ³ /h	Sm ³ /h	Sm ³ /h	Ст.м ³ /ч	m ³ /h(S)
m ³ /d(standard)	Sm ³ /d	✓	N/A	Sm ³ /d	Sm ³ /d	Sm ³ /d	Ст.м ³ /сут	
MMSft ³ /h	MMSft ³ /h	✓	✓		mmscfh	MMSft ³ /h		
MMSft ³ /d	MMSft ³ /d	✓	✓		mmscfd	MMSft ³ /h		

Concentration measurement unit set 1 – 4

Display of unit		Liquid gas select		Display unit selection				
Web page	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				
Web page	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/m³	✓	✓	MJ/m³	MJ/m³	MJ/m³	МДж/м³	MJ/m³
Btu/gal	Btu/gal	✓	✓		Btu/gal	Btu/gal	БТЕ/гал	
MJ/Nml-Cum	MJ/Nm³	N/A	✓	MJ/Nm³	MJ/Nm³	MJ/Nm³	МДж/Норм.м³	MJ/m³(N)
Btu/Std-cuft	Btu/Sft³	✓	✓		Btu/Sft³	Btu/Sft³	БТЕ/ст.фут³	

Total 1 – 3 unit

Display of unit		Liquid gas select		Display unit selection				
Web page	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	
cm³	cm³	✓	✓	cm³	cm³	cm³	см³	cm³
L	L	✓	✓	L	l	l	л	L
m³	m³	✓	✓	m³	m³	m³	м³	m³
gal	gal	✓	✓		gal	gal	гал	
kgal	kgal	✓	✓		kgal	kgal	кгал	
ft³	ft³	✓	✓		Cuft	ft³	фут³	
bbl	bbl	✓	✓		bbl		bbl	
Impgal	Impgal	✓	✓		Impgal	Impgal	Impgal	
kImpgal	kImpgal	✓	✓		kImpgal	kImpgal	kImpgal	
L(normal)	NL	N/A	✓	NL	NI	NI	Норм.л	L(N)
m³(normal)	Nm³	N/A	✓	Nm³	Nm³	Nm³	Норм.м³	m³(N)
L(standard)	SL	✓	✓	SL	SI	SI	Ст.л	L(S)
ft³(standard)	Sft³	✓	✓		Scuft	Sft³	Ст.фут³	
MMscuft	MSft³	✓	✓		MMscuft	MSft³	Млн.Ст.фут³	

Display of unit		Liquid gas select		Display unit selection				
Web page	Indicator	Liquid	Gas	Metric	US	UK	Russia	Japan
m ³ (standard)	Sm ³	✓	✓	Sm ³	Sm ³	Sm ³	Ст.м ³	m ³ (S)
MJ	MJ	✓	✓	MJ	MJ	MJ	МДж	MJ
Btu	Btu	✓	✓		Btu	Btu	БТЕ	

Pulse output unit select

Display of unit		Liquid gas select		Display unit selection				
Web page	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 ³ /P	cm ³ /P	✓	✓	cm ³ /P	cm ³ /P	cm ³ /P	см ³ /имп.	cm ³ /P
L/P	L/P	✓	✓	L/P	l/P	l/P	л/имп.	L/P
m ³ /P	m ³ /P	✓	✓	m ³ /P	m ³ /P	m ³ /P	м ³ /имп.	m ³ /P
gal/P	gal/P	✓	✓		gal/P	gal/P	гал/имп.	
kgal/P	kgal/P	✓	✓		kgal/P	kgal/P	кгал/имп.	
ft ³ /P	ft ³ /P	✓	✓		Cuft/P	ft ³ /P	фут ³ /имп.	
bbl/P	bbl/P	✓	✓		bbl/P		bbl/имп.	
Impgal/P	Impgal/P	✓	✓		Impgal/P	Impgal/P	Impgal/имп.	
kImpgal/P	kImpgal/P	✓	✓		kImpgal/P	kImpgal/P	kImpgal/имп.	
P/Cucm	P/cm ³	✓	✓		P/cm ³	P/cm ³	имп./см ³	P/cm ³
P/L	P/L	✓	✓		P/l	P/l	имп./л	P/L
P/Cum	P/m ³	✓	✓		P/m ³	P/m ³	имп./м ³	P/m ³
P/gal	P/gal	✓	✓		P/gal	P/gal	имп./гал	
P/kgal	P/kgal	✓	✓		P/kgal	P/kgal	имп./кгал	
P/Cuft	P/ft ³	✓	✓		P/Cuft	P/ft ³	имп./фут ³	
P/bbl	P/bbl	✓	✓		P/bbl		имп./bbl	
P/Impgal	P/Impgal	✓	✓		P/Impgal	P/Impgal	имп./Impgal	
P/kImpgal	P/kImpgal	✓	✓		P/kImpgal	P/kImpgal	имп./kImpgal	
Nml L/P	NL/P	N/A	✓	NL/P	NI/P	NI/P	Норм.л/имп.	L/P(N)
NmlCum/P	Nm ³ /P	N/A	✓	Nm ³ /P	Nm ³ /P	Nm ³ /P	Норм.м ³ /имп.	m ³ /P(N)
Std L/P	SL/P	✓	✓	SL/P	SI/P	SI/P	Ст.л/имп.	L/P(S)

Display of unit		Liquid gas select		Display unit selection				
Web page	Indicator	Liquid	Gas	Metric	US	UK	Russia	Japan
StdCuft/P	Sft ³ /P	✓	✓		Scuft/P	Sft ³ /P	Ст.фут ³ /имп.	
StdCum/P	Sm ³ /P	✓	✓	Sm ³ /P	Sm ³ /P	Sm ³ /P	Ст.м ³ /имп.	м ³ /P(S)
P/Nml L	P/NL	N/A	✓	P/NL	P/NI	P/NI	имп./Норм.л	P/L(N)
P/NmlCum	P/Nm ³	N/A	✓	P/Nm ³	P/Nm ³	P/Nm ³	имп./Норм.м ³	P/m ³ (N)
P/Std L	P/SL	✓	✓	P/SL	P/Sl	P/Sl	имп./Ст.л	P/L(S)
P/StdCuft	P/Sft ³	✓	✓		P/Scuft	P/Sft ³	имп./Ст.фут ³	
P/StdCum	P/Sm ³	✓	✓	P/Sm ³	P/Sm ³	P/Sm ³	имп./Ст.м ³	P/m ³ (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				
Web page	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	

Viscosity unit

Display of unit		Liquid gas select		Display unit selection				
Web page	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 ²	Ns/m ²	✓	N/A	Ns/m ²	Ns/m ²	Ns/m ²	Ns/m ²	Ns/m ²
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 ² /s	mm ² /s	✓	N/A	mm ² /s	mm ² /s	mm ² /s	мм ²	mm ² /s
cm ² /s	cm ² /s	✓	N/A	cm ² /s	cm ² /s	cm ² /s	см ²	cm ² /s
dm ² /s	dm ² /s	✓	N/A	dm ² /s	dm ² /s	dm ² /s	dm ² /s	dm ² /s
m ² /s	m ² /s	✓	N/A	m ² /s	m ² /s	m ² /s	м ²	m ² /s

7.4 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. °API = 141.5 / SG (60/60 °F) - 131.5 Dimensionless
atm	Atmospheres
bar	Bars

Value	Name / Description
bbbl/d	Barrels per day
bbbl/h	Barrels per hour
bbbl/min	Barrels per minute
bbbl/pulse	Barrels per pulse
bbbl/s	Barrels per second
Bé hv	°Baumé heavy is used for liquids heavier than water °Bé hv = $145 - 145 / (SG (60/60 \text{ °F}))$ Dimensionless
Bh	°Baumé heavy for JIS Z 8804:2012 Bh = $144.3 - 144.3 / (SG (15 / 4 \text{ °C}))$ Dimensionless
Bé lt	°Baumé light °Bé lt = $140 / (SG (60 / 60 \text{ °F})) - 130$ Dimensionless
Bl	°Baumé light for JIS Z 8804:2012 Bl = $144.3 / (SG (15 / 4 \text{ °C})) - 134.3$
bbbl	Barrels
bbbl/d	Barrels per day
bbbl/h	Barrels per hour
bbbl/min	Barrels per minute
bbbl/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 ² /s	Square centimeter per second
cm ³	Cubic centimeters
cm ³ /h	Cubic centimeters per hour
cm ³ /min	Cubic centimeters per minute
cm ³ /pulse	Cubic centimeters per pulse
cm ³ /s	Cubic centimeters per second
cP	Centipoise
cSt	Centistokes
dm ² /s	Square decimeter per second
degC	Degrees Celsius
degF	Degrees Fahrenheit
degR	Degrees Rankine
ft ³	Cubic feet
ft ³ /d	Cubic feet per day
ft ³ /h	Cubic feet per hour
ft ³ /min	Cubic feet per minute
ft ³ /pulse	Cubic feet per pulse
ft ³ /s	Cubic feet per second

Value	Name / Description
ftH2O@4degC	Feet of water at 4 degrees Celsius
ftH2O@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 ²	Grams per square centimeter
g/cm ³	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
inH2O@4degC	Inches of water at 4 degrees Celsius
inH2O@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 ²	Kilograms per square centimeter
kg/cm ³	Kilogram per cubic centimeters
kg/d	Kilograms per day
kg/dm ³	Kilogram per cubic decimeters
kg/h	Kilograms per hour
kg/L	Kilograms per liter
kg/m ³	Kilograms per cubic meter
kg/min	Kilograms per minute
Kg/ms	Kilograms per meter second
kg/s	Kilograms per second
kImpgal	Kilo imperial gallons
kImpgal/pulse	Kilo imperial gallons per pulse
kPa	Kilo pascals
L	Liters
lb	Pounds
lb/gal	Pounds per gallon

Value	Name / Description
lb/ft ³	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 ² /s	Square meter per second
m ³	Cubic meters
m ³ /d	Cubic meters per day
m ³ /h	Cubic meters per hour
m ³ /min	Cubic meters per minute
m ³ /s	Cubic meters per second
m ³ /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 ³	Mega joules per normal cubic meter MJ/m ³ ≡ N
MJ/min	Mega joules per minute
MJ/pulse	Mega joules per pulse
MJ/s	Mega joules per second
mmH ₂ O@4degC	Millimeters of water at 4 degrees Celsius
mmH ₂ O@68degF	Millimeters of water at 68 degrees Fahrenheit
mmHg	Millimeters of mercury at 0 degrees Fahrenheit
MMsft ³	Million standard cubic feet
mm ² /s	Square millimeter per second
MPa	Megapascals
m/s	Meters per second
NmL	Normal liters
NmL/d	Normal liters per day
NmL/h	Normal liters per hour
NmL/min	Normal liters per minute
NmL/pulse	Normal liters per pulse
NmL/s	Normal liters per second
Nmlm ³	Normal cubic meters
Nmlm ³ /d	Normal cubic meters per day
Nmlm ³ /h	Normal cubic meters per hour

Value	Name / Description
Nmlm ³ /min	Normal cubic meters per minute
Nmlm ³ /pulse	Normal cubic meters per pulse
Nmlm ³ /s	Normal cubic meters per second
NS/m ²	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 ³	Pulse per cubic centimeter
pulse/ft ³	Pulse per cubic foot
pulse/gal	Pulse per gallon
pulse/kgal	Pulse per kilo gallon
pulse/kImpgal	Pulse per kilo imperial gallon
pulse/L	Pulse per liter
pulse/m ³	Pulse per cubic meter
pulse/MJ	Pulse per mega joule
pulse/NmL	Pulse per normal liter
pulse/Nmlm ³	Pulse per normal meter
pulse/Sft ³	Pulse per standard cubic foot
pulse/StdL	Pulse per standard liter
pulse/StdM ³	Pulse per standard cubic meter
pulse/Impgal	Pulse per imperial gallon
°Sake	°Sake units are used for quantifying the mass densities of sake. °Sake = 1443 / (SG (15 / 4 °C)) - 1443 Dimensionless
SG 4 °C	SG 4 °C Specific gravity Specific gravity relative to 4 °C water. Dimensionless
SG 15 °C	SG 15 °C Specific gravity Specific gravity relative to 15 °C water. Dimensionless
SG 20 °C	SG 20 °C Specific gravity Specific gravity relative to 20 °C water. Dimensionless
SG 60 °F	SG 60 °F Specific gravity Specific gravity relative to 60 °F (15.56 °C) water. Dimensionless
Stdft ³	Standard cubic feet
Stdft ³ /d	Standard cubic feet per day
Stdft ³ /h	Standard cubic feet per hour
Stdft ³ /min	Standard cubic feet per minute
Sft ³ /pulse	Standard cubic feet per pulse
St	Stokes
Stdft ³ /s	Standard cubic feet per second
StdL	Standard liters

Value	Name / Description
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 ³	Standard cubic meters
Stdm ³ /d	Standard cubic meters per day
Stdm ³ /h	Standard cubic meters per hour
Stdm ³ /min	Standard cubic meters per minute
Stdm ³ /pulse	Standard cubic meters per pulse
Stdm ³ /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. 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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