

**Model IR202
Infrared Gas Analyzer
Communication Functions
(MODBUS)**

IM 11G02Q02-51EN

◆ Safety Precautions

■ Safety, Protection, and Modification of the Product

- In order to protect the system controlled by the product and the product itself and ensure safe operation, observe the safety precautions described in this user's manual. We assume no liability for safety if users fail to observe these instructions when operating the product.
- If this product is used in a manner not specified in this user's manual, the protection provided by this product may be impaired.
- If any protection or safety circuit is required for the system controlled by the product or for the product itself, prepare it separately.
- Be sure to use the spare parts approved by Yokogawa Electric Corporation (hereafter simply referred to as YOKOGAWA) when replacing parts or consumables.
- Modification of the product is strictly prohibited.
- The following safety symbols are used on the product as well as in this manual.



WARNING

This symbol indicates that an operator must follow the instructions laid out in this manual in order to avoid the risks for the human body and health including risk of injury, electric shock, or fatalities. or the damages to products. The manual describes what special care the operator must take to avoid such risks.



CAUTION

This symbol indicates that the operator must refer to the instructions in this manual in order to prevent the product (hardware) or software from being damaged, or a system failure from occurring.

The following are signal words to be found only in our instruction manuals.

CAUTION

This symbol gives information essential for understanding the operations and functions.

NOTE

This symbol indicates information that complements the present topic.

■ Notes on Handling User's Manuals

- Please hand over the user's manuals to your end users so that they can keep the user's manuals on hand for convenient reference.
- Please read the information thoroughly before using the product.
- The purpose of these user's manuals is not to warrant that the product is well suited to any particular purpose but rather to describe the functional details of the product.
- No part of the user's manuals may be transferred or reproduced without prior written consent from YOKOGAWA.
- YOKOGAWA reserves the right to make improvements in the user's manuals and product at any time, without notice or obligation.
- If you have any questions, or you find mistakes or omissions in the user's manuals, please contact our sales representative or your local distributor.

■ Drawing Conventions

Some drawings may be partially emphasized, simplified, or omitted, for the convenience of description.

Some screen images depicted in the user's manual may have different display positions or character types (e.g., the upper / lower case). Also note that some of the images contained in this user's manual are display examples.

■ Authorized Representative in EEA

The Authorized Representative for this product in EEA is Yokogawa Europe B.V. (Euroweg 2, 3825 HD Amersfoort, The Netherlands).

■ Trademark policy

- All names of company, brand of product used in this manual are registered trademarks.
- TM or ® to signify brand or trademarks are not used in this manual.

◆ After-Sales Warranty

- **Do not modify the product.**
- **Yokogawa warrants the product for the period stated in the pre-purchase quotation. Yokogawa shall conduct defined warranty service based on its standard. When the customer site is located outside of the service area, a fee for dispatching the maintenance engineer will be charged to the customer.**
- **During the warranty period, for repair under warranty carry or send the product to the local sales representative or service office. Yokogawa will replace or repair any damaged parts and return the product to you.**
 - Before returning a product for repair under warranty, provide us with the model name and serial number and a description of the problem. Any diagrams or data explaining the problem would also be appreciated.
 - If we replace the product with a new one, we won't provide you with a repair report.
- **In the following cases, customer will be charged repair fee regardless of warranty period.**
 - Failure of components which are out of scope of warranty stated in instruction manual.
 - Failure caused by usage of software, hardware or auxiliary equipment, which Yokogawa did not supply.
 - Failure due to improper or insufficient maintenance by user.
 - Failure due to misoperation, misuse or modification which Yokogawa does not authorize.
 - Failure due to power supply (voltage, frequency) being outside specifications or abnormal.
 - Failure caused by any usage out of scope of recommended usage
 - Any damage from fire, earthquake, a storm and flood, lightning, disturbance, riot, warfare, radiation and other natural changes.
- **Yokogawa does not warrant conformance with the specific application at the user site. Yokogawa will not bear direct/indirect responsibility for damage due to a specific application.**
- **Yokogawa will not bear responsibility when the user configures the product into systems or resells the product.**
- **Maintenance service and supplying repair parts will be covered for five years after the production ends. For repair this product, please contact the nearest sales office described in this instruction manual.**

Model IR202

Infrared Gas Analyzer

Communication Functions (MODBUS)

IM 11G02Q02-51EN 3rd Edition

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1. GENERAL

■ IR202-A (RS-232C)

- This unit comes with an RS-232C communication interface, enabling data transfer to and from a host computer.
- The communication system consists of a master and slave. This unit operates as a single slave and can be connected to one master.

It can also be used in RS-485 interface environments by utilizing an RS-232C to RS-485 converter. In this type of environment, up to 31 of these units can be connected to a single master as slaves.

- Because the master station can communicate with only one slave station at a time, the destination can be identified by the "Station No" set for each slave station.
- In order that the master station and the slave station can communicate, the format of the transmit/receive data must coincide. In this instrument, the format of the communication data is determined by the MODBUS protocol.

[RS-232C <=> RS-485 converter] (recommended article)

Type: K3SC-10 (isolated type)/OMRON Corporation.

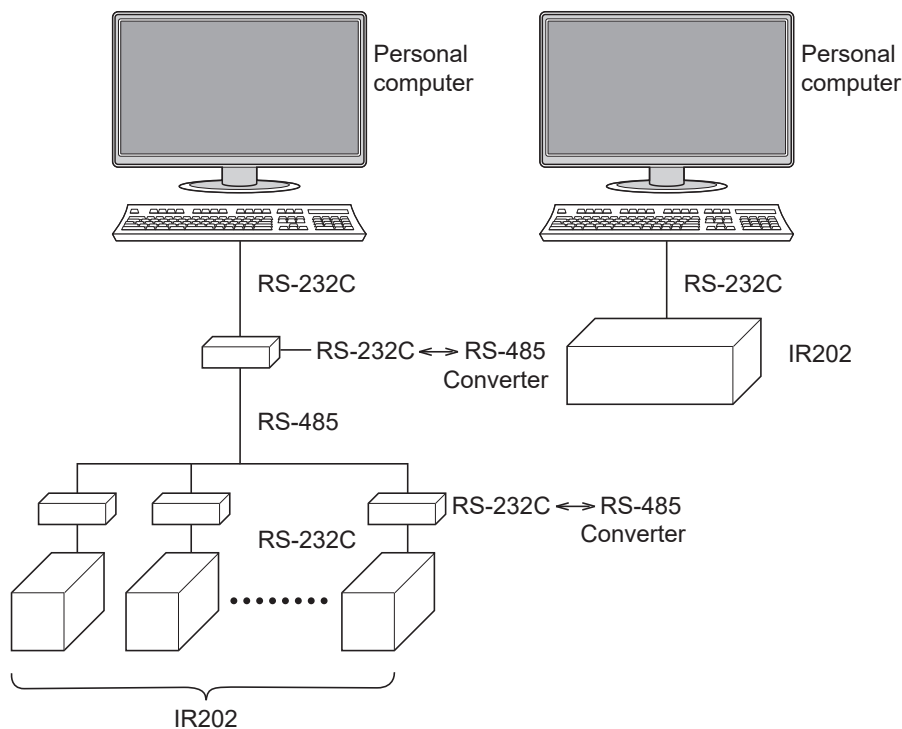


Figure1.1 Configuration between master and slave devices

■ IR202-C, IR202-D (RS-485)

- This product provides a communication function through RS-485 interface, which allows data transmit to or receive from the host computer and other devices.
- The communication system is comprised of a master station and slave stations. Up to 31 of slave station (present instrument) can be connected per master station (host computer, programmable controller, graphic display panel, etc.) through RS-485 interface.
- Because the master station can communicate with only one slave station at a time, the destination can be identified by the “Station No” set for each slave station.
- In order that the master station and the slave station can communicate, the format of the transmit/receive data must coincide. The format of the communication data is determined by the MODBUS protocol

[RS-232 <=> RS-485 converter] (recommended)

Type: K3SC-10 (isolated type)/OMRON Corporation

[USB <=> RS-485 converter] (recommended article)

Type: USB-485I / SYSTEM SACOM Corp.

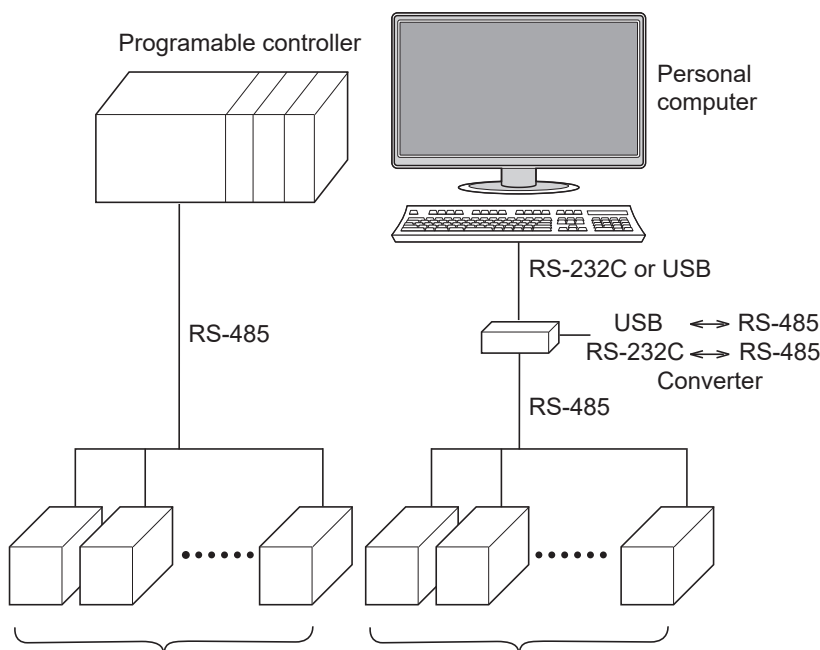


Figure1.2 Configuration between master and slave devices

■ RS-232C Interface (IR202-A)

Electrical specification :	Based on EIA RS-232C
Transmission system :	2-wire, semi-duplicate
Synchronizing system :	Start-stop synchronous system
Connection format :	1*1
Maximum connectable units :	Single unit (31 units when used with an RS-485 interface)
Transmission distance :	500 m max.(total extension distance)
Transmission speed :	38400 bps
Data format	
Data length ;	8 bits
Stop bit ;	1 bit
Parity ;	None
X flow control ;	None
Transmission code :	HEX value (MODBUS RTU mode)
Error detection :	CRC-16
Isolation :	Isolation from internal circuit
	Functional isolation between signal line and ground

■ RS-485 Interface (IR202-C, IR202-D)

Electrical specification :	Based on EIA RS-485
Transmission system :	2-wire, semi-duplicate
Synchronizing system :	Start-stop synchronous system
Connection format :	1*N
Maximum connectable units :	31 units
Transmission distance :	500 m max.(total extension distance)
Transmission speed :	38400 bps
Data format	
Data length ;	8 bits
Stop bit ;	1 bit
Parity ;	None
X flow control ;	None
Transmission code :	HEX value (MODBUS RTU mode)
Error detection :	CRC-16
Isolation :	Isolation from internal circuit
	Functional isolation between signal line and ground

2. CONNECTION

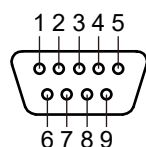


WARNING

Do not turn on the power supply until all wiring have been completed, otherwise electric shock or malfunctions may occur.

■ RS-232C Interface (IR202-A)

The terminal allocation of RS-232C (at the rear panel)



2: Receive Data
3: Transmit Data
5: Signal GND
Others: NC

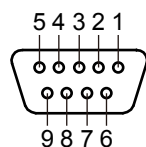
9-pin D-Sub (male)

Use a commercial cable for RS-232C reverse cable.



■ RS-485 Interface (IR202-C, IR202-D)

The terminal allocation of RS-485 (at the rear panel)

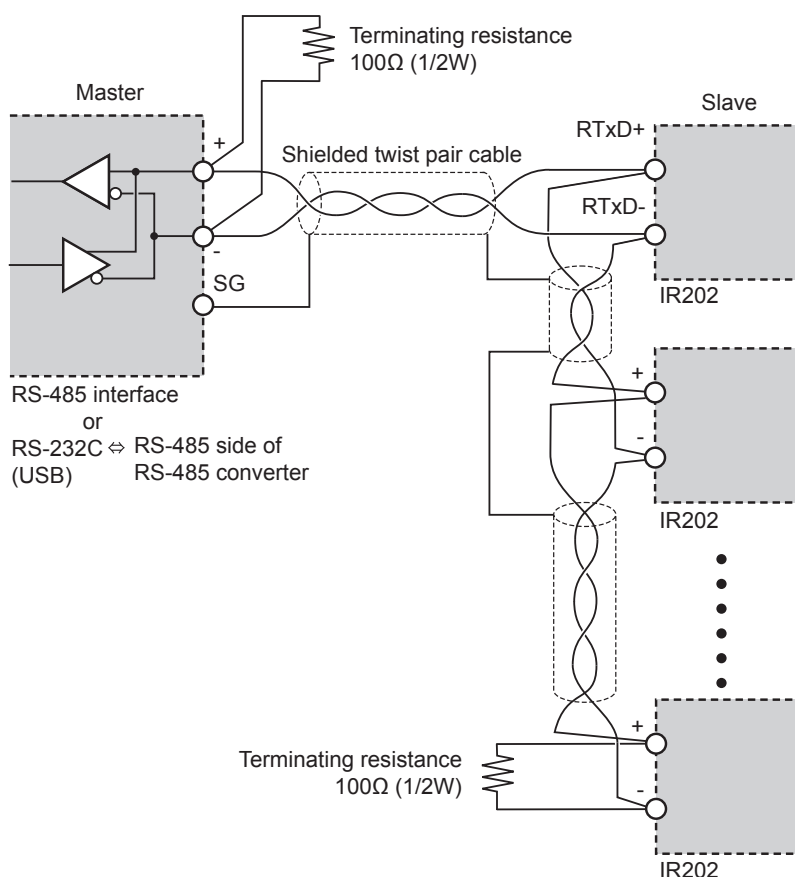


1: Signal ground
2: RTxD+
3: RTxD-
4 to 9: NC

9-pin D-Sub (female)

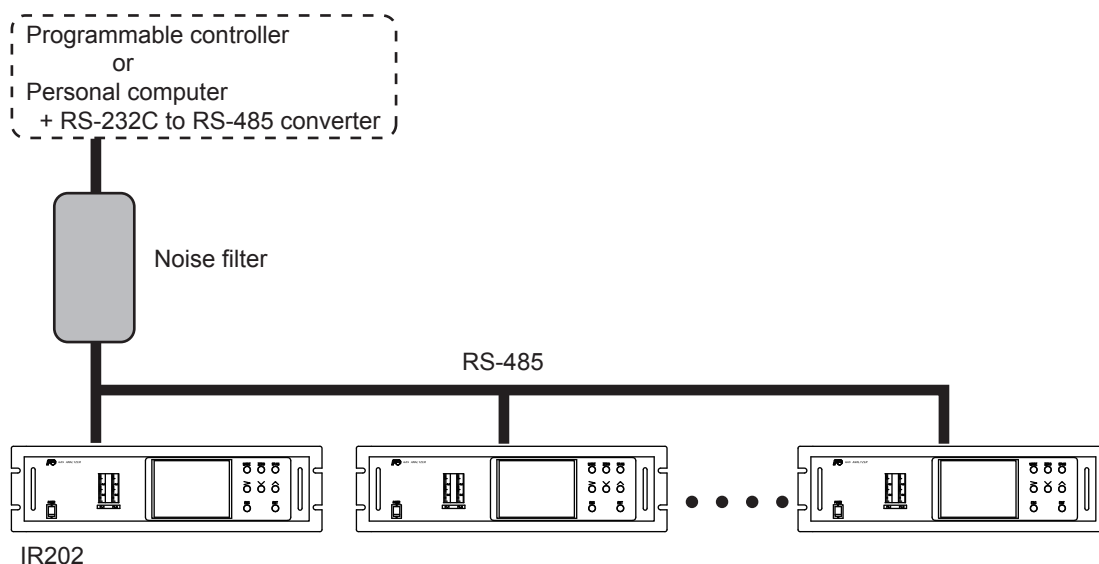
RS-485 interface requires

- Use a shielded twist pair cable. (Recommended cable: KPEV-SB (made by The Furukawa Electric Co., Ltd.))
- The maximum cable length should be 500m. One master and up to thirty-one micro controllers (slaves) can be connected per circuit.
- Terminate both ends of the circuit with a terminating resistance of 100Ω (1/2W or more).
- Ground the shielded cable once towards the master side



- SG does not have to be connected, but it can be used as an effective countermeasure against communication errors due to noise.
- When using the micro controller in an area where the imposed noise level is expected to exceed 500V, we recommend using a noise filter on the master side as seen in the figure below.

We recommend RSHN-2003 (made by TDK Corporation) as a noise filter.



- If there are problems with EMC during communication, the noise level can be reduced by using a communication cable with a ferrite core.
Ferrite core (recommended): ZCAT series (made by TDK Corporation)
MSFC series (made by Morimiya Electric Co., Ltd.)

■ SETTING OF COMMUNICATION CONDITION

The following list shows the required setting to establish communication between a master device and IR202.

- Set up correctly so that the communication conditions of all IR202s must be same as master's.
- Each IR202 in a line must be assigned different Station No. from each other. Station No. is never shared with any other IR202 in the same line.

The table below shows the items to setup. Set them by operating the front panel keys.

Item	Value at delivery	Setting range	Remarks
Transmission speed	38400bps	Fixed (can not be changed)	Set up correctly so that the communication conditions of all IR202s must be same as master's.
Data length	8 bits	Fixed (can not be changed)	
Stop bit	1 bit	Fixed (can not be changed)	
Parity setting	None	Fixed (can not be changed)	
Station No.	1	0 to 31 (0 : communication function stop)	Each IR202 in a line must be assigned different Station No. from each other. Station No. is never shared with any other IR202 in the same line.

Set the station No. in the maintenance mode of IR202. (See the user's manual IM 12G02Q02-01EN.)

3. MODBUS PROTOCOL

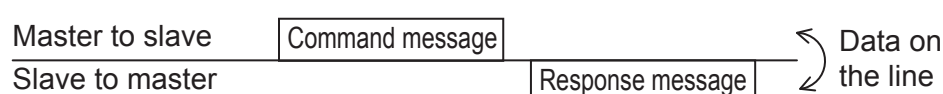
According to MODBUS protocol, devices communicate using a master-slave technique, in which only one device (the master) can initiate transactions. The other devices (the slaves) respond by supplying the requested data to the master, or by taking the action requested.

<Message transaction between Master and Slave>

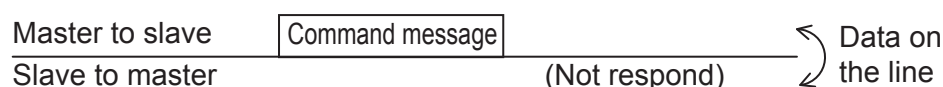
- (1) The master station sends out a command message to a slave station.
- (2) The slave station tries to identify the station No. in the received message with its own station No..
- (3) If the slave station finds those numbers matched, it executes the action requested in the received command and sends back a response message.

If those numbers are mismatched, the slave station leaves the command message and waits for next command message

- When the station No. in the received command message matches with the own slave station



- When the station No. in the received command message mismatches with the own slave station No.



The master station can individually communicate with any one of slave stations connected on the same line upon setting the station No. in the command message.

3.1 Composition of message

Command message and response message consist of 4 fields ; Station No., Function code, Data and Error check code, which are sent in the following order:

Station No. (1 byte)
Function code (1 byte)
Data (2 to 133 bytes)
Error check code (CRC-16)(2 bytes)

Figure.3-1 Composition of message

(1) Station No.

Station No. is slave address or a number specifying a slave station. Station No. are set in the maintenance mode display. Only a slave with the same number as this Station No. set in the maintenance mode can respond to the message and take action requested in the received message.

(2) Function code

This is a code to designate a function to request slaves to execute. For details, refer to section "3.3 Function code".

(3) Data

Data field is required to execute function codes. The data construction depends on function code. For details, refer to “4. DETAILS OF MESSAGE”

A register number is assigned to each data in IR202. For reading / writing the data by communication, designate the register number.

Note that the register number transmitted on message is expressed as its relative address.

The relative address is calculated by the following expression.

$$\text{Relative address} = (\text{The lower 4 digits of (the registered number or coil)}) - 1$$

For example, when the registered number designated by a function code is 40003,

$$\text{Relative address} = (\text{lower 4 digits of 40003}) - 1 = 0002$$

is used on the message.

(4) Error check code

This is the code to detect message errors (change in bit) in the signal transmission.

On the MODBUS protocol (RTU mode), CRC-16 (Cyclic Redundancy Check) is applied.

For CRC calculation method, refer to “”

3.2 Response of slave station

(1) Response to normal command

To a relevant message, the slave station creates and sends back a response message which corresponds to the command message. The composition of message in this case is the same as in section 3.2.

Contents of the data field depend on the function code. For details, refer to “4. DETAILS OF MESSAGE”

(2) Response to abnormal command

If a command message contains an abnormality (for example, non-actual function code is designated) other than transmission error, the slave station does not execute that command but creates and sends back a response message at error detection.

The composition of response message at an error detection is as shown in Figure 3-2. To fill in the field of function code, sum the values of Function code in the received command message and 80_H, then put the value into the field of function code.

Station No.
Function code +80 _H
Error Code
Error check (CRC-16)

Figure3-2 Response message at error detection

Table3-1 Error code

Error code	Contents	Description
01H	Illegal function	Non-actual function code is designated. Check for the function code.
02H	Illegal function	A relative address of a register number to which the designated function code can not be used.
03H	Illegal function	Because the designation of number is too much, the area where register numbers do not exist is designated.

(3) No response

Under any of the following conditions, the slave station takes no action to the command message and sends back no response.

- A station number transmitted in the command message differs from the Station No. (station number) specified to the slave station.
- An error check code is not matched, or a transmission error (parity error, etc.) is detected.
- The time interval between the composition data of the message becomes longer than the time corresponding to 24 bits. (Refer to “”)

3.3 Function code

According to MODBUS protocol, register numbers are assigned by function codes.

Each function code acts on specific register number.

This correspondence is shown in Table 3-2, and the message length by function is shown in Table 3-3.

Table 3-2 Correspondence between function codes and objective address

Function code			↔	Register No.	
No.	Function	Object		No.	Description
03 _H	Read-out (continuously)	Holding register		4xxxx	Read-out / write-in word data
04 _H	Read-out (continuously)	Input register		3xxxx	Read-out word data
06 _H	Write-in	Holding register		4xxxx	Read-pit / wrote in word data
10 _H	Write-in (continuously)	Holding register		4xxxx	Read-out / write-in word data

Table 3-3 Function code and message length

(Unit : byte)

Function Code	Contents	Number of designatable data	Command message		Response message	
			Minimum	Maximum	Minimum	Maximum
03 _H	Read-out of word data	64 words	8	8	7	133
04 _H	Read-out of word data (read-out only)	64 words	8	8	7	133
06 _H	Write-in of word data	1 word	8	8	8	8
10 _H	Write-in of continuous word data	64 words	11	137	8	8

3.4 Calculation of error check code (CRC-16)

CRC-16 is the 2-byte (16-bits) error check code. From the top of the message (station No.) to the end of the data field are calculated.

The slave station calculates the CRC of the received message, and does not respond if the calculated CRC is different from the contents of the received CRC code

The following shows the calculation procedure for CRC-16.

- (1) Store FFFF_H into 16 bit register (CRC register).
- (2) Subject the 1st byte (8 bits) of transmit message and CRC register contents to an exclusive logical summation (XOR), and store the result into the CRC register.
- (3) Shift the CRC register contents 1 bit to the right. Store 0 at MSB.
- (4) If LSB before shifting is 0, do nothing. If LSB before shifting is 1, subject it and A001H to XOR, and store the result into the CRC register.
- (5) Repeat the steps (c) and (d) 8 times (shift by 8 bits).
- (6) Execute steps (b) to (e) for the next byte of the transmit message. Likewise, successively repeat the steps to each byte of the transmit message.
- (7) The CRC code that is retained is the value of CRC register that stands when the processing has ended for latest byte (latest data except error code) of the transmit message.
- (8) As error check code of the transmit message, store this CRC value in the order of lower 8 bits and upper 8 bits

Transmit message (ex.)

Transmit message (ex.)

01 _H
06 _H
00 _H
05 _H
03 _H
E8 _H
99 _H
75 _H

Successively calculate data included hereto obtain CRC.
In this case, CRC = 75 99_H.

Attach the error check code to message upon interchanging the upper and lower orders.

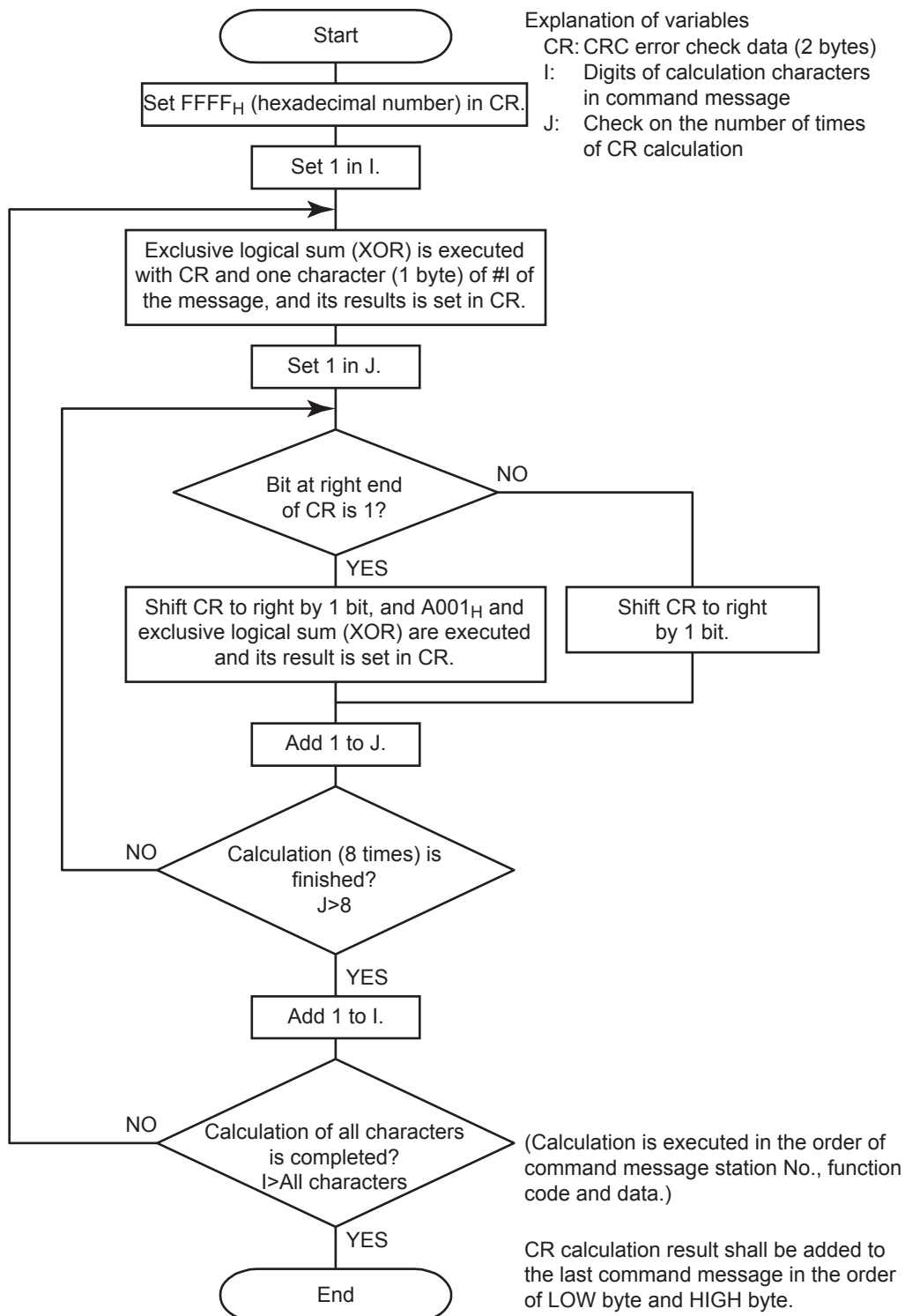


Figure 3-3 CRC-16 calculation flow chart

3.5 Transmission control procedure

(1) Transmission procedure of master station

The master station must proceed to a communication upon conforming to the following items.

- Before sending a command message, provide 48 bits time or more vacant status. (a)
- For sending, the interval between bytes of a command message is below 24 bits time. (b)
- Within 24 bits time after sending a command message, the receiving status is posted. (c)
- Provide 48 bits time or more vacant status between the end of response message reception and beginning of next command message sending [same as in (a)].
- For ensuring the safety, make a confirmation of the response message and make an arrangement so as to provide 3 times or more retries in case of no response, error occurrence, etc.

NOTE

The above definition is for most unfavorable value. For ensuring the safety, it's recommended the program of the master to work with safety factors of 2 to 3. Concretely, it is advised to arrange the program for 38400 bps with 5 ms or more for vacant status (a), and within 1 ms for byte interval (b) and changeover from sending to receiving (c).

(2) Description

(1) Detection of the message frame

The status on the line of the communication system is one of the 2 below.

- (a) Vacant status (no data on line)
- (b) Communication status (data is existing)

Instruments connected on the line are initially at a receiving status and monitoring the line. When 24 bits time or more vacant status has appeared on the line, the end of preceding frame is assumed and, within following 24 bits time, a receiving status is posted. When data appears on the line, instruments receive it while 24 bits time or more vacant status is detected again, and the end of that frame is assumed. I.e., data which appeared on the line from the first 24 bits time or more vacant status to the next 24 bits time or more vacant status is fetched as one frame. Therefore, one frame (command message) must be sent upon confirming the following.

- 48 bits time or more vacant status precedes before the command message sending.
- Interval between bytes of 1 command message is smaller than 24 bits time.

(2) Response of IR202

After a frame detection (24 bits time or more vacant status), IR202 carries out processing with that frame as a command message. If the command message is destined to the own station, a response message is returned. Its processing time is 1 to 30 ms (depends on contents of command message). After sending a command message, therefore, the master station must observe the following.

- Receiving status is posted within 24 bits time after sending a command message

4. DETAILS OF MESSAGE

4.1 Read-out word data (Function code : 03_H)

Function code	Max.word number read-out in one message	Relative data address	Register No.	Contents
03 _H	64 word	0000-00AB _H	40001-40172	User setting

(1) Message composition

Command message composition (byte)

Station No	
Function code	
Read-out start No. (relative address)	Upper
	Lower
Read-out word number	Upper
	Lower
CRC data	Lower
	Upper

} 1 to 60

Response message composition (byte)

Station No	
Function code	
Read-out byte number	
Contents of the first word data	Upper
	Lower
Contents of the next word data	Upper
	Lower
≈	
Contents of the last word data	Upper
	Lower
CRC data	Lower
	Upper

Read-out word number x 2

* Arrangement of read-out word data

MSB	LSB
Upper byte of contents of the first word data	
Lower byte of contents of the first word data	
Upper byte of contents of the next word data	
Lower byte of contents of the next word data	
≈	
Upper byte of contents of the last word data	
Lower byte of contents of the last word data	

(2) Function

Word data of continuous word numbers from the read-out start No. can be read. Read-out word data are transmitted from the slave station in the order of upper and lower bytes.

(3) Message transmission (example)

The following shows an example of reading out from No. 1 station the setting Ch2 (2nd component) range-1 zero and span calibration concentration.

Relative address of Ch2 range-1 zero calibration concentration setting: 0004_H Data number: 02_H

Command message			Response message		
Station No.		01 _H	Station No.		01 _H
Function code		03 _H	Function code		03 _H
Read-out start No. (relative address)	Upper	00 _H	Read-out byte number		04 _H
	Lower	04 _H	Contents of the first word data	Upper	00 _H
Read-out word number	Upper	00 _H		Lower	00 _H
	Lower	02 _H	Contents of the next word data	Upper	03 _H
CRC data	Lower	85 _H		Lower	E8 _H
	Upper	CA _H	CRC data	Lower	FA _H
				Upper	8D _H

- The following describes how read-out data is compiled.

Ch2 range-1 zero calibration concentration setting 00. 00H = 0

(contents of first word data)

Ch2 range-1 span calibration concentration setting 03 E8H = 1000

(contents of next word data)

Provided decimal point position = 1, measurement unit = 1,

Ch2 range-1 zero calibration concentration setting = 0.0 ppm

Ch2 range-1 span calibration concentration setting = 100.0 ppm

For handling of decimal point and unit, refer to “5.1.1 Handling of decimal point position and measurement unit”.

4.2 Read-out word data (Read-out only) (Function code : 04_H)

Function code	Max.word number read-out in one message	Relative data address	Register No.	Description
04 _H	64 words	0000 _H —00C1 _H	30001—30194	Measurement value and status
		0425 _H —0469 _H	31062—31130	Fixed setting
		047A _H —047C _H	31147—31149	Fixed setting
		1000 _H —1707 _H	34097—35896	Measurement value and status

(1) Message composition

Command message composition (byte)

Station No.	
Function code	
Read-out start No. (relative address)	Upper
	Lower
Read-out word number	Upper
	Lower
CRC data	Lower
	Upper

Response message composition (byte)

Station No.	
Function code	
Read-out byte number	
Contents of the first word data	Upper
	Lower
Contents of the next word data	Upper
	Lower
≈	
Contents of the last word data	Upper
	Lower
CRC data	Lower
	Upper

Read-out word number x 2

* Arrangement of read-out word data

MSB	LSB
Upper byte of contents of the first word data	
Lower byte of contents of the first word data	
Upper byte of contents of the next word data	
Lower byte of contents of the next word data	
≈	
Upper byte of contents of the last word data	
Lower byte of contents of the last word data	

(2) Function

Word data of continuous word numbers from the read-out start No. can be read. Read-out word data are transmitted from the slave station in the order of upper and lower bytes.

(3) Description of longword data

Composition of longword response messages (in bytes)

Station No.	
Function code	
Number of bytes to read	
Initial longword data	Low-order word ②
	①
	High-order word ④
	③
Next longword data	Low-order word ②
	①
	High-order word ④
	③
≈	
Last longword data	Low-order word ②
	①
	High-order word ④
	③
CRC data	

Number of words to
read x 2

* Sequence of reading longwords

MSB				LSB
31~24	23~16	15~8	7~0	
④	③	②	①	

(4) Message transmission (example)

The following shows an example of reading out from No. 1 station the Ch5 measurement concentration, decimal point position and measurement unit.

Relative address of Ch5 measurement concentration: 000C_H Data number: 03_H

Command message

Station No.		01H
Function code		03H
Read-out start No. (relative address)	Upper	00H
	Lower	0CH
Read-out word number	Upper	00H
	Lower	03H
CRC data	Lower	70H
	Upper	08H

Response message

Station No.		01H
Function code		03H
Read-out byte number		06H
Contents of the first word data	Upper	04H
	Lower	B0H
Next word data contents	Upper	00H
	Lower	02H
Latest word data contents	Upper	00H
	Lower	00H
CRC data	Lower	81H
	Upper	0DH

• **Meaning of read-out data**

First word data contents 04 B0_H = 1200
 Next word data contents 00 02_H = 2 (decimal point position)
 Latest word data contents 00 00_H = 0 (vol %)
 In the above case, measurement concentration = 12.00 vol%

4.3 Write-in word data (1 word) (Function code : 06_H)

Function code	Max.word number write-in one message	Relative data address	Register No.	Description
06 _H	1 word	0000 _H —00AB _H	40001—40172	User setting
		07D0 _H —07D4 _H	42001—42005	Operation command

(1) **Message composition**

Command message

Station No.	
Function code	
Write-in designate No. (relative address)	Upper
	Lower
Write-in word data	Upper
	Lower
CRC data	Lower
	Upper

Response message

Station No.	
Function code	
Write-in designate No. (relative address)	Upper
	Lower
Write-in word data	Upper
	Lower
CRC data	Lower
	Upper

(2) **Function**

Designated word data is written in write-in designate No. Write-in data are transmitted from master station in the order of upper and lower bytes.

(3) **Message transmission (example)**

The following shows an example of transmitting the “ZERO” key command to No. 1 station. Key operation command Relative address: 07D0_H

Command message composition (byte)

Station No.		01 _H
Function code		06 _H
Write-in designate No. (relative address)	Upper	07 _H
	Lower	D0 _H
Write-in word data	Upper	00 _H
	Lower	40 _H
CRC data	Lower	88 _H
	Upper	B7 _H

} ZERO key
command

Response message composition (byte)

Station No.		01 _H
Function code		06 _H
Write-in designate No. (relative address)	Upper	07 _H
	Lower	D0 _H
Write-in word data	Upper	00 _H
	Lower	40 _H
CRC data	Lower	88 _H
	Upper	B7 _H

4.4 Write-in continuous word data (Function code ; 10_H)

Function code	Max.word number write-in per message	Relative data address	Register No.	Descriptions
10 _H	64 words	0000 _H -00AB _H	40001-40172	User setting

(1) Message composition

Command message composition (byte)

Station No.	
Function code	
Write-in start No. (relative address)	Upper
	Lower
Write-in word number	Upper
	Lower
} 1 to 64	
Write-in byte number	
} Write-in word number x 2	
First write-in word data	Upper
	Lower
Next write-in word data	Upper
	Lower
≈	
Last write-in word data	Upper
	Lower
CRC data	Lower
	Upper

Response message composition (byte)

Station No.	
Function code	
Write-in start No. (relative address)	Upper
	Lower
Write-in word number	Upper
	Lower
CRC data	Lower
	Upper

* Arrangement of read-out word data

MSB	LSB
Upper byte of contents of the first word data	
Lower byte of contents of the first word data	
Upper byte of contents of the next word data	
Lower byte of contents of the next word data	
≈	
Upper byte of contents of the last word data	
Lower byte of contents of the last word data	

(2) Function

Word data of continuous word number is written from write-in start address. Write-in word data are transmitted from master station in the order of upper and lower bytes.

(3) Message transmission (example)

The following shows an example of writing the Ch1 (1st component) alarm settings to No. 1 station.

Ch1 range-1 high alarm setting = 1388_H (= 5000_D)

Ch1 range-1 low alarm setting = 000A_H (= 10_D)

Ch1 range-2 high alarm setting = 03E8_H (= 1000_D)

Ch1 range-2 low alarm setting = 000A_H (= 10_D)

Ch1 range-1 high alarm setting Relative address: 0023_H Data number: 04_H

Command message

Station No.		01 _H
Function code		10 _H
Write-in start No.	Upper	00 _H
	Lower	23 _H
Write-in word number	Upper	00 _H
	Lower	04 _H
Write-in byte number		08 _H
First write-in word data	Upper	13 _H
	Lower	88 _H
Next write-in word data	Upper	00 _H
	Lower	0A _H
Next write-in word data	Upper	03 _H
	Lower	E8 _H
Last write-in word data	Upper	00 _H
	Lower	0A _H
CRC data	Lower	E2 _H
	Upper	A6 _H

Response message

Station No.		01 _H
Function code		10 _H
Write-in start No.	Upper	00 _H
	Lower	23 _H
Write-in word number	Upper	00 _H
	Lower	04 _H
CRC data	Lower	30 _H
	Upper	00 _H

Since the transmission data do not include a decimal point, data of 500.0 is transmitted as "5000".

For transmission format of each data, refer to "5. ADDRESS MAP AND DATA FORMAT".

5. ADDRESS MAP AND DATA FORMAT

5.1 Data format

IR202 communicate on a MODBUS network using RTU (Remote Terminal Unit) mode.

Transmitted data is numeric value, not ASCII code.

5.1.1 Handling of decimal point position and measurement unit

When transmitted, the calibration concentration setting, alarm's high and low limits, the data of measurement concentration value and range value have no decimal point nor measurement unit.

Calculate exact values of data upon point positioning as shown below.

- (a) Calibration concentration setting (register No. 40001 to 40020)

Alarm setting (register No. 40036 to 40055)

Range value (register No. 31077 to 31086)

The decimal point position data (register No. 31087 to 31096) indicates point position for each Ch (channel) and each range, and unit data (register No. 31067 to 31076) indicates each unit.

The decimal point position data has a value of 0, 1, 2 or 3. You can obtain an exact value by the following calculation.

- Case 0: Calibration concentration setting data /1
- Case 1: Calibration concentration setting data /10
- Case 2: Calibration concentration setting data /100
- Case 3: Calibration concentration setting data /1000

The unit data has a value of 0, 1, 2 or 3, that corresponds as follows.

- Case 0: vol%
- Case 1: ppm
- Case 2: mg/m³
- Case 3: g/m³

For example, if:

Ch1 range-1 span calibration concentration setting (register No. 40002) = 2000,
Ch1 range-1 decimal point position (register No. 31087) = 1, and
Ch1 range-1 unit (register No. 31067) = 1,
the value is 200.0 ppm.

For writing-in, proceed in the reverse. To obtain 200.0 ppm, write 2000 as calibration concentration setting.

The decimal point position and unit are unchangeable because fixed to each Ch and each range

- (b) Measurement concentration (register No. 30001 to 30036)

The decimal point position and measurement unit for each concentration are stored in registers following that of concentration, and can be known by reading them in.

The meaning of decimal point position data and measurement unit data values are the same as in (a) above.

For example, if:

Ch3 measurement concentration (register No. 30007) = 1270,
Ch3 decimal point position (register No. 30008) = 2,
Ch3 measurement unit (register No. 30009) = 0,
the value is 12.70 vol%

5.1.2 Handling at measurement data over-range

Even if the measurement data is at over-range, with “— — — —” displayed on the screen, the data that stands then is transmitted as read-out measurement concentration

5.2 Address map

For details of functions and settable ranges of different parameters, refer to the user's manual for IR202.

Word data [read-out/write-in]: Function code [03_H, 06_H, 10_H]
User settings

Relative address	Register No.	Data type	Memory contents	Read-out/write-in data	Remarks or corresponding parameter
0000 _H	40001	Word	Ch1 range-1 zero calibration concentration	0 to 9999 Decimal point position depends on range	Calibration value
0001 _H	40002	Word	Ch1 range-1 span calibration concentration		
0002 _H	40003	Word	Ch1 range-2 zero calibration concentration		
0003 _H	40004	Word	Ch1 range-2 span calibration concentration		
0004 _H	40005	Word	Ch2 range-1 zero calibration concentration		
0005 _H	40006	Word	Ch2 range-1 span calibration concentration		
0006 _H	40007	Word	Ch2 range-2 zero calibration concentration		
0007 _H	40008	Word	Ch2 range-2 span calibration concentration		
0008 _H	40009	Word	Ch3 range-1 zero calibration concentration		
0009 _H	40010	Word	Ch3 range-1 span calibration concentration		
000A _H	40011	Word	Ch3 range-2 zero calibration concentration		
000B _H	40012	Word	Ch3 range-2 span calibration concentration		
000C _H	40013	Word	Ch4 range-1 zero calibration concentration		
000D _H	40014	Word	Ch4 range-1 span calibration concentration		
000E _H	40015	Word	Ch4 range-2 zero calibration concentration		
000F _H	40016	Word	Ch4 range-2 span calibration concentration		
0010 _H	40017	Word	Ch5 range-1 zero calibration concentration		
0011 _H	40018	Word	Ch5 range-1 span calibration concentration		
0012 _H	40019	Word	Ch5 range-2 zero calibration concentration		
0013 _H	40020	Word	Ch5 range-2 span calibration concentration		
0014 _H	40021	Word	Ch1 auto calibration switch	0, 1 (0: Do not calibrate in auto calibration 1: Calibrate in auto calibration)	Auto calibration component
0015 _H	40022	Word	Ch2 auto calibration switch		
0016 _H	40023	Word	Ch3 auto calibration switch		
0017 _H	40024	Word	Ch4 auto calibration switch		
0018 _H	40025	Word	Ch5 auto calibration switch		

Relative address	Register No.	Data type	Memory contents	Read-out/write-in data	Remarks or corresponding parameter
0019 _H	40026	Word	Ch1 zero calibration switch	0,1 (0: Selectable zero calibration, 1: Zero calibration at once)	About zero calibration
001A _H	40027	Word	Ch2 zero calibration switch		
001B _H	40028	Word	Ch3 zero calibration switch		
001C _H	40029	Word	Ch4 zero calibration switch		
001D _H	40030	Word	Ch5 zero calibration switch		
001E _H	40031	Word	Ch1 calibration range switch	0,1 (0: Calibrate indicated range only, 1: Calibrate both ranges at same time)	About calibration range
001F _H	40032	Word	Ch2 calibration range switch		
0020 _H	40033	Word	Ch3 calibration range switch		
0021 _H	40034	Word	Ch4 calibration range switch		
0022 _H	40035	Word	Ch5 calibration range switch		
0023 _H	40036	Word	Ch1 range-1 high alarm setting	0 to 9999 Decimal point position depends on range	Alarm setting (option)
0024 _H	40037	Word	Ch1 range-1 low alarm setting		
0025 _H	40038	Word	Ch1 range-2 high alarm setting		
0026 _H	40039	Word	Ch1 range-2 low alarm setting		
0027 _H	40040	Word	Ch2 range-1 high alarm setting		
0028 _H	40041	Word	Ch2 range-1 low alarm setting		
0029 _H	40042	Word	Ch2 range-2 high alarm setting		
002A _H	40043	Word	Ch2 range-2 low alarm setting		
002B _H	40044	Word	Ch3 range-1 high alarm setting		
002C _H	40045	Word	Ch3 range-1 low alarm setting		
002D _H	40046	Word	Ch3 range-2 high alarm setting		
002E _H	40047	Word	Ch3 range-2 low alarm setting		
002F _H	40048	Word	Ch4 range-1 high alarm setting		
0030 _H	40049	Word	Ch4 range-1 low alarm setting		
0031 _H	40050	Word	Ch4 range-2 high alarm setting		
0032 _H	40051	Word	Ch4 range-2 low alarm setting		
0033 _H	40052	Word	Ch5 range-1 high alarm setting		
0034 _H	40053	Word	Ch5 range-1 low alarm setting		
0035 _H	40054	Word	Ch5 range-2 high alarm setting		
0036 _H	40055	Word	Ch5 range-2 low alarm setting		

Relative address	Register No.	Data type	Memory contents	Read-out/write-in data	Remarks or corresponding parameter
0037 _H	40056	Word	Ch1 alarm mode	0,1,2,3,4 (0: High limit alarm, 1: Low limit alarm, 2: High or low limit) 3: High-high limit alarm, 4: Low-low limit alarm	Alarm setting
0038 _H	40057	Word	Ch2 alarm mode		
0039 _H	40058	Word	Ch3 alarm mode		
003A _H	40059	Word	Ch4 alarm mode		
003B _H	40060	Word	Ch5 alarm mode		
003C _H	40061	Word	Ch1 alarm switch	0,1 (0: Alarm OFF 1: Alarm ON)	
003D _H	40062	Word	Ch2 alarm switch		
003E _H	40063	Word	Ch3 alarm switch		
003F _H	40064	Word	Ch4 alarm switch		
0040 _H	40065	Word	Ch5 alarm switch		
0041 _H	40066	Word	Alarm hysteresis	0000 _H to 0014 _H (0 to 20%FS)	
0042 _H	40067	Word	Auto calibration start time(day)	00 _H to 06 _H (Sun. to Sat.)	Setting of auto calibration (option)
0043 _H	40068	Word	Auto calibration start time(hour)	00 _H to 23 _H (BCD code)	
0044 _H	40069	Word	Auto calibration start time(min)	00 _H to 59 _H (BCD code)	
0045 _H	40070	Word	Auto calibration cycle		
0046 _H	40071	Word	Auto calibration cycle unit	0,1 (0: h, 1: days)	
0047 _H	40072	Word	Auto calibration switch	0,1 (0: OFF, 1: ON)	
0048 _H	40073		Not used		
0049 _H	40074	Word	Key lock switch	0,1 (0: OFF, 1: ON)	Key lock
004A _H	40075		Not used		
004B _H	40076	Word	Ch1 response time	0000 _H to 003C _H (0 to 60 sec)	Response time The response time of O ₂ measurement defines register No 40084, regardless of measurement Ch
004C _H	40077	Word	Not used		
004D _H	40078	Word	Ch2 response time		
004E _H	40079	Word	Not used		
004F _H	40080	Word	Ch3 response time		
0050 _H	40081	Word	Not used		
0051 _H	40082	Word	Ch4 response time		
0052 _H	40083	Word	Not used		
0053 _H	40084	Word	O ₂ meter response time		

Relative address	Register No.	Data type	Memory contents	Read-out/write-in data	Remarks or corresponding parameter
0054 _H	40085	Word	1st order moving average period	0000 _H to 003B _H (0 to 59 min or 1 to 4 h)	Average period (option)
0055 _H	40086	Word	2nd order moving average period		
0056 _H	40087	Word	3rd order moving average period		
0057 _H	40088	Word	4th order moving average period		
0058 _H	40089	Word	1st order moving average period unit	0,1 (0: h, 1: min)	
0059 _H	40090	Word	2nd order moving average period unit		
005A _H	40091	Word	3rd order moving average period unit		
005B _H	40092	Word	4th order moving average period unit		
005C _H	40093	Word	Hold switch	0,1 (0: OFF, 1: ON)	Output hold
005D _H	40094	Word	Oxygen conversion reference value	00 _H to 13 _H (0% to 19%)	Oxygen conversion reference value
005E _H	40095	Word	Peak alarm switch	0,1 (0: OFF, 1: ON)	Setting of peak alarm
005F _H	40096	Word	Peak alarm concentration	0064 _H to 03E8 _H (100 to 1000 ppm)	
0060 _H	40097	Word	Peak alarm count	0001 _H to 0063 _H (1 to 99 times)	
0061 _H	40098	Word	Peak alarm hysteresis	0000 _H to 0014 _H (0 to 20%FS)	
0062 _H	40099	Word	Auto zero calibration start (day)	00 _H to 06 _H (Sun. to Sat.)	Setting of auto zero calibration (option)
0063 _H	40100	Word	Auto zero calibration start (hour)	00 _H to 23 _H (BCD code)	
0064 _H	40101	Word	Auto zero calibration start (min)	00 _H to 59 _H (BCD code)	
0065 _H	40102	Word	Auto zero calibration cycle		
0066 _H	40103	Word	Auto zero calibration cycle unit	0,1 (0: h, 1: days)	
0067 _H	40104	Word	Auto zero calibration switch	0,1 (0: OFF, 1: ON)	
0068 _H	40105	Word	Auto zero calibration gas flow time	003C _H to 0384 _H (60 to 900 sec)	Range changeover (disabled if remote range ON)
0069 _H	40106	Word	Ch1 range change setting	0,1 (0: range-1, 1: range-2)	
006A _H	40107	Word	Ch2 range change setting		
006B _H	40108	Word	Ch3 range change setting		
006C _H	40109	Word	Ch4 range change setting		
006D _H	40110	Word	Ch5 range change setting		

Relative address	Register No.	Data type	Memory contents	Read-out/write-in data	Remarks or corresponding parameter
006E _H	40111	Word	Ch1 range change method	0,1,2 (0: manual, 1: remote, 2:auto)	
006F _H	40112	Word	Ch2 range change method		
0070 _H	40113	Word	Ch3 range change method		
0071 _H	40114	Word	Ch4 range change method		
0072 _H	40115	Word	Ch5 range change method		
0073 _H	40116	Word	Ch1 auto calibration range	0,1 (0: range-1, 1: range-2)	
0074 _H	40117	Word	Ch2 auto calibration range		
0075 _H	40118	Word	Ch3 auto calibration range		
0076 _H	40119	Word	Ch4 auto calibration range		
0077 _H	40120	Word	Ch5 auto calibration range		
0078 _H	40121	Word	Alarm 1 target channel	0,1,2,3,4,5,6	
0079 _H	40122	Word	Alarm 2 target channel		
007A _H	40123	Word	Alarm 3 target channel		
007B _H	40124	Word	Alarm 4 target channel		
007C _H	40125	Word	Alarm 5 target channel		
007D _H	40126	Word	Alarm 6 target channel		
007E _H	40127	Word	alarm-6 range-1 high alarm setting	0 to 9999 Decimal point position depends on range	Alarm-6 setting (option)
007F _H	40128	Word	alarm-6 range-1 low alarm setting		
0080 _H	40129	Word	alarm-6 range-2 high alarm setting		
0081 _H	40130	Word	alarm-6 range-2 low alarm setting		
0082 _H	40131	Word	alarm-6 alarm mode	same as alarm Ch1 to 5	
0083 _H	40132	Word	alarm-6 alarm switch	same as alarm Ch1 to 5	
0084 _H	40133	Word	auto calibration gas flow time 1	003C _H to 0384 _H (60 to 900 sec)	
0085 _H	40134	Word	auto calibration gas flow time 2		
0086 _H	40135	Word	auto calibration gas flow time 3		
0087 _H	40136	Word	auto calibration gas flow time 4		
0088 _H	40137	Word	auto calibration gas flow time 5		
0089 _H	40138	Word	auto calibration gas flow time 6		
008A _H	40139	Word	auto calibration gas flow time 7		
008B _H	40140	Word	Hold change	(0: Last value, 1: Setting)	
008C _H	40141	Word	Ch1 hold set value	0 to 100 (%FS)	
008D _H	40142	Word	Ch2 hold set value		
008E _H	40143	Word	Ch3 hold set value		
008F _H	40144	Word	Ch4 hold set value		
0090 _H	40145	Word	Ch5 hold set value		

Relative address	Register No.	Data type	Memory contents	Read-out/write-in data	Remarks or corresponding parameter
0091 _H	40146	Word	Blowback start (day)	00 _H to 06 _H (Sun. to Sat.)	Blowback setting (Option)
0092 _H	40147	Word	Blowback start (hour)	00 _H to 23 _H (BCD code)	
0093 _H	40148	Word	Blowback start (min)	00 _H to 59 _H (BCD code)	
0094 _H	40149	Word	Blowback cycle	1 to 99 (h), 1 to 7 (days)	
0095 _H	40150	Word	Blowback cycle unit	0,1 (0:h, 1:days)	
0096 _H	40151	Word	Blowback time	0001 _H to 0384 _H (1 to 900 sec)	
0097 _H	40152	Word	Blowback switch	0,1 (0:OFF, 1:ON)	
0098 _H	40153	Word	Gas displacement time after blowback	003C _H to 384 _H (60 to 900 sec)	Measurement point change setting (Option)
0099 _H	40154	Word	Measurement point change cycle	1 to 60 (min), 1 to 99 (h)	
009A _H	40155	Word	Measurement point change cycle unit	0,1 (0: h, 1: min)	
009B _H	40156	Word	Measurement point change displacement time	003C _H to 384 _H (60 to 900 sec)	
009C _H	40157	Word	Measurement point change setting	0,1,2 (0: Line, 1: Line 2, 2: Change)	for IR202-C
009D _H	40158	Word	O ₂ concentration limit at the time of oxygen correction	01 _H to 14 _H (1 to 20%)	
009E _H	40159	Word	Reference Gas Switching Time	1 to 1E _H (1 to 30 sec)	
009F _H	40160	Word	Reference Gas Measuring Time	1 to 3C _H (1 to 60 sec)	
00A0 _H	40161	Word	Average period Ch1	0 to 9 _H (0 to 9 cycle)	
00A1 _H	40162	Word	Average period Ch2	0 to 9 _H (0 to 9 cycle)	
00A2 _H	40163	Word	Average period Ch3	0 to 9 _H (0 to 9 cycle)	
00A3 _H	40164	Word	Average period Ch4	0 to 9 _H (0 to 9 cycle)	
00A4 _H	40165	Word	Interference compensation coefficient Ch1 range1		
00A5 _H	40166	Word	Interference compensation coefficient Ch1 range2		
00A6 _H	40167	Word	Interference compensation coefficient Ch2 range1		
00A7 _H	40168	Word	Interference compensation coefficient Ch2 range2		
00A8 _H	40169	Word	Interference compensation coefficient Ch3 range1		
00A9 _H	40170	Word	Interference compensation coefficient Ch3 range2		
00AA _H	40171	Word	Interference compensation coefficient Ch4 range1		
00AB _H	40172	Word	Interference compensation coefficient Ch4 range2		

**Word data [write-in] : Function code [06_H]
Operation command**

Relative address	Register No.	Data type	Memory contents	Read-out/write-in data	Remarks or corresponding parameter
07D0 _H	42001	Word	Keying command	01 _H :MODE, 02 _H : Side, 04 _H : Up, 08 _H : Down, 10 _H : ESC, 20 _H : ENT, 40 _H : ZERO, 80 _H :SPAN	Sending a value simulates
07D1 _H	42002	Word	Display change	1: Return to measurement mode display	Force to return to measurement mode
07D2 _H	42003	Word	Auto calibration	1; Execute auto calibration	Auto calibration is executed only once.
07D3 _H	42004	Word	Auto zero calibration	1; Execute auto zero calibration	Auto zero calibration is executed only once.
07D4 _H	42005	Word	Blowback	1; Execute blowback	Blowback is executed only once. (Option)

**Word data [read-out only] : Function code [04_H]
Measurement value and status**

Relative address	Register No.	Data type	Memory contents	Read-out/write-in data	Remarks or corresponding parameter
0000 _H	30001	Word		Concentration: -9999 to 9999 (value corresponding to indication without decimal point) Decimal point position: 0,1,2,3 (0; concentration/1 1; concentration/10 2; concentration/100 3; concentration/1000) Measurement unit: 0, 1, 2, 3 (0; vol% 1; ppm 2; mg/m ³ 3; g/m ³) Transmit values under current measurement conditions	
0001 _H	30002	Word	Ch1 decimal point position		
0002 _H	30003	Word	Ch1 measurement unit		
0003 _H	30004	Word	Ch2 concentration		
0004 _H	30005	Word	Ch2 decimal point position		
0005 _H	30006	Word	Ch2 measurement unit		
0006 _H	30007	Word	Ch3 concentration		
0007 _H	30008	Word	Ch3 decimal point position		
0008 _H	30009	Word	Ch3 measurement unit		
0009 _H	30010	Word	Ch4 concentration		
000A _H	30011	Word	Ch4 decimal point position		
000B _H	30012	Word	Ch4 measurement unit		
000C _H	30013	Word	Ch5 concentration		
000D _H	30014	Word	Ch5 decimal point position		
000E _H	30015	Word	Ch5 measurement unit		
000F _H	30016	Word	Ch6 concentration		
0010 _H	30017	Word	Ch6 decimal point position		
0011 _H	30018	Word	Ch6 measurement unit		
0012 _H	30019	Word	Ch7 concentration		
0013 _H	30020	Word	Ch7 decimal point position		
0014 _H	30021	Word	Ch7 measurement unit		
0015 _H	30022	Word	Ch8 concentration		
0016 _H	30023	Word	Ch8 decimal point position		
0017 _H	30024	Word	Ch8 measurement unit		
0018 _H	30025	Word	Ch9 concentration		
0019 _H	30026	Word	Ch9 decimal point position		
001A _H	30027	Word	Ch9 measurement unit		
001B _H	30028	Word	Ch10 concentration		
001C _H	30029	Word	Ch10 decimal point position		
001D _H	30030	Word	Ch10 measurement unit		
001E _H	30031	Word	Ch11 concentration		
001F _H	30032	Word	Ch11 decimal point position		
0020 _H	30033	Word	Ch11 measurement unit		
0021 _H	30034	Word	Ch12 concentration		
0022 _H	30035	Word	Ch12 decimal point position		
0023 _H	30036	Word	Ch12 measurement unit		
0024 _H	30037	Word	Peak count	0 to 100 times/hour	
0025 _H	30038	Word	Ch1 current range	0, 1 (0; range-1, 1; range-2)	
0026 _H	30039	Word	Ch2 current range		
0027 _H	30040	Word	Ch3 current range		
0028 _H	30041	Word	Ch4 current range		
0029 _H	30042	Word	Ch5 current range		

Relative address	Register No.	Data type	Memory contents	Read-out/write-in data	Remarks or corresponding parameter
002A _H	30043	Word	Ch1 high/low limit alarm	0, 1, 2, 3, 4 (0: No alarm, 1: High limit alarm, 2: Low limit alarm 3: High-high limit alarm, 4: Low-low limit alarm)	Whether or how alarm is currently produced.
002B _H	30044	Word	Ch2 high/low limit alarm		
002C _H	30045	Word	Ch3 high/low limit alarm		
002D _H	30046	Word	Ch4 high/low limit alarm		
002E _H	30047	Word	Ch5 high/low limit alarm		
002F _H	30048	Word	Peak count alarm 0	0,1 (0: No, 1: Yes)	
0030 _H	30049	Word	Auto (Auto zero) c	0,1 (0: No, 1: Yes)	
0031 _H	30050	Word	Ch1 zero calibration in progress	0,1 (0: No, 1: Yes)	
0032 _H	30051	Word	Ch2 zero calibration in progress		
0033 _H	30052	Word	Ch3 zero calibration in progress		
0034 _H	30053	Word	Ch4 zero calibration in progress		
0035 _H	30054	Word	Ch5 zero calibration in progress		
0036 _H	30055	Word	Ch1 span calibration in progress		
0037 _H	30056	Word	Ch2 span calibration in progress		
0038 _H	30057	Word	Ch3 span calibration in progress		
0039 _H	30058	Word	Ch4 span calibration in progress		
003A _H	30059	Word	Ch5 span calibration in progress		
003B _H	30060	Word	Instrument error	0,1 (0: No, 1: Yes)	Whether error is produced
003C _H	30061	Word	Calibration error	0,1 (0: No, 1: Yes)	Whether error is produced
003D _H	30062	Word	Latest error No. -	-1 to 9 (Error No.-1) * (a)	Error log contents
003E _H	30063	Word	Latest error DAY	1 to 31 (date)	
003F _H	30064	Word	Latest error HOUR	0 to 23 (hours)	
0040 _H	30065	Word	Latest error MIN 0	0 to 59(min)	
0041 _H	30066	Word	Latest error TARGET	0 to 4	
0042 _H	30067	Word	The previous error No.	-1 to 9 (Error No.-1)	
0043 _H	30068	Word	The previous error DAY	1 to 31 (date)	
0044 _H	30069	Word	The previous error HOUR	0 to 23 (hours)	
0045 _H	30070	Word	The previous error MIN	0 to 59(min)	
0046 _H	30071	Word	The previous error TARGET	0 to 4	
⋮	⋮		⋮		
007E _H	30127	Word	Oldest error No.	-1 to 9 (Error No.-1)	
007F _H	30128	Word	Oldest error DAY	1 to 31 (date)	
0080 _H	30129	Word	Oldest error HOUR	0 to 23 (hours)	
0081 _H	30130	Word	Oldest error MIN	0 to 59(min)	
0082 _H	30131	Word	Oldest error TARGET	0 to 4	

Relative address	Register No.	Data type	Memory contents	Read-out/write-in data	Remarks or corresponding parameter
0083 _H	30132	Word	Error 1	0,1 (0: No, 1: Yes)	Whether error is currently produced
0084 _H	30133	Word	Error 2		
0085 _H	30134	Word	Error 3		
0086 _H	30135	Word	Error 10		
0089 _H	30138	Word	Ch1 Error 6	0,1 (0: No, 1: Yes)	
008A _H	30139	Word	Ch1 Error 7		
008B _H	30140	Word	Ch1 Error 8		
008C _H	30141	Word	Ch1 Error 9		
⋮	⋮		⋮		
0099 _H	30154	Word	Ch4 Error 4	0,1 (0: No, 1: Yes)	
009A _H	30155	Word	Ch4 Error 5		
009B _H	30156	Word	Ch4 Error 6		
009C _H	30157	Word	Ch4 Error 7		
009D _H	30158	Word	Ch4 Error 8		
009E _H	30159	Word	Ch4 Error 9		
009F _H	30160	Word	Ch5 Error 4 ,	0,1 (0: No, 1: Yes)	
00A0 _H	30161	Word	Ch5 Error 5		
00A1 _H	30162	Word	Ch5 Error 6		
00A2 _H	30163	Word	Ch5 Error 7		
00A3 _H	30164	Word	Ch5 Error 8		
00A4 _H	30165	Word	Ch5 Error 9		
00A5 _H	30166	Word	Ch1 auto zero calibration in progress	0,1 (0: No, 1: Yes)	
00A6 _H	30167	Word	Ch1 auto span calibration in progress		
00A7 _H	30168	Word	Ch1 hold in progress	0,1 (0: No, 1: Yes)	
⋮	⋮		⋮		
00AE _H	30175	Word	Ch4 auto zero calibration in progress	0,1 (0: No, 1: Yes)	
00AF _H	30176	Word	Ch4 auto span calibration in progress		
00B0 _H	30177	Word	Ch4 hold in progress	0,1 (0: No, 1: Yes)	
00B1 _H	30178	Word	Ch5 auto zero calibration in progress	0,1 (0: No, 1: Yes)	
00B2 _H	30179	Word	Ch5 auto span calibration in progress		
00B3 _H	30180	Word	Ch5 hold in progress	0,1 (0: No, 1: Yes)	
00B4 _H	30181	Word	Display information (1)	* (b)	
00B5 _H	30182	Word	Display information (2)		
00B6 _H	30183	Word	Display information (3)		
00B7 _H	30184		(Do not use)		
00B8 _H	30185		(Do not use)		
00B9 _H	30186		(Do not use)		
00BA _H	30187		(Do not use)		
00BB _H	30188		(Do not use)		
00BC _H	30189	Word	Manual calibration channel	Cursor Ch-1 * (c)	
00BD _H	30190		(Do not use)		

Relative address	Register No.	Data type	Memory contents	Read-out/write-in data	Remarks or corresponding parameter
00BE _H	30191	Word	High/Low limit alarm (6)		
00BF _H	30192		(Do not use)		
00C0 _H	30193		(Do not use)		
00C1 _H	30194		(Do not use)		

NOTE

- 1: Set "0" for accessing to the area not used within address map.
- 2: For contents of *(a) to *(c), refer to "5.3 Supplement to address map".

Word data [read-out only] : Function code [04_H]
Fixed setting

Relative address	Register No.	Data type	Memory contents	Read-out/write-in data	Remarks or corresponding parameter	
0425 _H	31062	Word	Ch1 range numbers 1, 2	1, 2 (1: 1 range, 2: 2 ranges)		
0426 _H	31063	Word	Ch2 range numbers			
0427 _H	31064	Word	Ch3 range numbers			
0428 _H	31065	Word	Ch4 range numbers			
0429 _H	31066	Word	Ch5 range numbers			
042A _H	31067	Word	Ch1 range-1 unit	0,1,2,3 (0;vol% 1; ppm 2; mg/m ³ 3; g/m ³)		
042B _H	31068	Word	Ch1 range-2 unit			
042C _H	31069	Word	Ch2 range-1 unit			
042D _H	31070	Word	Ch2 range-2 unit			
042E _H	31071	Word	Ch3 range-1 unit			
042F _H	31072	Word	Ch3 range-2unit			
0430 _H	31073	Word	Ch4 range-1 unit			
0431 _H	31074	Word	Ch4 range-2 unit			
0432 _H	31075	Word	Ch5 range-1 unit			
0433 _H	31076	Word	Ch5 range-2 unit			
0434 _H	31077	Word	Ch1 range-1 value	1 to 9999		The actual range value is calculated with the decimal point position taken into consideration. Actual range value = Read range value / X (X is 1 when 0 is selected, 10 when 1 is selected, and 100 when 2 is selected, and 1000 when 3 is selected for decimal point position.)
0435 _H	31078	Word	Ch1 range-2 value			
0436 _H	31079	Word	Ch2 range-1 value			
0437 _H	31080	Word	Ch2 range-2 value			
0438 _H	31081	Word	Ch3 range-1 value			
0439 _H	31082	Word	Ch3 range-2 value			
043A _H	31083	Word	Ch4 range-1 value			
043B _H	31084	Word	Ch4 range-2 value			
043C _H	31085	Word	Ch5 range-1 value			
043D _H	31086	Word	Ch5 range-2 value			
043E _H	31087	Word	Ch1 range-1 decimal point position	0,1,2,3 (0: Nothing below decimal point, 1: 1 digit below decimal point, 2: 2 digits below decimal point, 3: 3 digits below decimal point)		
043F _H	31088	Word	Ch1 range-2 decimal point position			
0440 _H	31089	Word	Ch2 range-1 decimal point position			
0441 _H	31090	Word	Ch2 range-2 decimal point position			
0442 _H	31091	Word	Ch3 range-1 decimal point position			
0443 _H	31092	Word	Ch3 range-2 decimal point position			
0444 _H	31093	Word	Ch4 range-1 decimal point position			
0445 _H	31094	Word	Ch4 range-2 decimal point position			
0446 _H	31095	Word	Ch5 range-1 decimal point position			
0447 _H	31096	Word	Ch5 range-2 decimal point position			
0448 _H	31097	Word	Type: 1st digit	Z		
0449 _H	31098	Word	Type: 2nd digit	P		

Relative address	Register No.	Data type	Memory contents	Read-out/write-in data	Remarks or corresponding parameter
044A _H	31099	Word	Type: 3rd digit	A, B, G	
044B _H	31100	Word	Type: 4th digit	0 to 9, A to Z	
044C _H	31101	Word	Type: 5th digit	0 to 9, A to Z	
044D _H	31102	Word	Type: 6th digit	0 to 9, A to Z	
044E _H	31103	Word	Type: 7th digit	0 to 9, A to Z	
044F _H	31104	Word	Type: 8th digit	1	
0450 _H	31105	Word	Type: 9th digit	0 to 9, A to Z	
0451 _H	31106	Word	Type: 10th digit	0 to 9, A to Z	
0452 _H	31107	Word	Type: 11th digit	0 to 9, A to Z	
0453 _H	31108	Word	Type: 12th digit	0 to 9, A to Z	
0454 _H	31109	Word	Type: 13th digit	0 to 9, A to Z	
0455 _H	31110	Word	Type: 14th digit	0 to 9, A to Z	
0456 _H	31111	Word	Type: 15th digit	0 to 9, A to Z	
0457 _H	31112	Word	Type: 16th digit	0 to 9, A to Z	
0458 _H	31113	Word	Type: 17th digit	0 to 9, A to Z	
0459 _H	31114	Word	Type: 18th digit	0 to 9, A to Z	
045A _H	31115	Word	Type: 19th digit	0 to 9, A to Z	
045B _H	31116	Word	Type: 20th digit	0 to 9, A to Z	
045C _H	31117	Word	Type: 21st digit	0 to 9, A to Z	
045D _H	31118	Word	Type: 22nd digit	0 to 9, A to Z	
045E _H	31119	Word	Type: 23rd digit	0 to 9, A to Z	
045F _H	31120	Word	Type: 24th digit	0 to 9, A to Z	
0460 _H	31121	Word	Type: 25th digit	0 to 9, A to Z	
0461 _H	31122	Word	Type: 26th digit	0 to 9, A to Z (blank)	
0462 _H	31123	Word	Board: 1st digit	0 to 9, A to Z	
0463 _H	31124	Word	Board: 2nd digit	0 to 9, A to Z	
0464 _H	31125	Word	Board: 3rd digit	0 to 9, A to Z	
0465 _H	31126	Word	Board: 4th digit	0 to 9, A to Z	
0466 _H	31127	Word	Board: 5th digit	0 to 9, A to Z	
0467 _H	31128	Word	Board: 6th digit	0 to 9, A to Z	
0468 _H	31129	Word	Board: 7th digit	0 to 9, A to Z	
0469 _H	31130	Word	Board: 8th digit	0 to 9, A to Z (blank)	
047A _H	31147	Word	Type: 27th digit	0 to 9, A to Z (blank)	
047B _H	31148	Word	Type: 28th digit	0 to 9, A to Z (blank)	
047C _H	31149	Word	Type: 29th digit	0 to 9, A to Z (blank)	

NOTE

- 1: Set "0" for accessing to the area not used within address map.
- 2: The relative addresses "047A_H to 047C_H" correspond to program Version 2.24 and later (Check the version on the display screen when the power is turned ON).

Word data [read-out only] : Function code [04_H]
User data

Relative address	Register No.	Data type	Memory contents	Read-out/write-in data	Remarks or corresponding parameter
01000 _H	34097	Word	Latest calibration log Ch#	-1 to 5 0:Z1, 1:S1, 2:Z2, 3:S2 0-100000 (Count value) -999.9 to +999.9 deviation value (%FS) 1-12 (Calibration month) 1-31 (Calibration day) 0-23 (Calibration hour) 0-59 (Calibration minute)	Sent in order of latest logs first Ch1 region 40 sets FF(-1) if there is no value
01001 _H	34098	Word	Latest calibration log range&Z, S		
01002 _H	34099	Long Word	Latest calibration log Count value at calibration		
01003 _H	34100	Word	Latest calibration log Count deviation		
01004 _H	34101	Word	Latest calibration log MONTH		
01005 _H	34102	Word	Latest calibration log DAY		
01006 _H	34103	Word	Latest calibration log HOUR		
01007 _H	34104	Word	Latest calibration log MIN		
01008 _H	34105	Word	Previous calibration log Ch#	-1 to 5 0:Z1, 1:S1, 2:Z2, 3:S2 0-100000 (Count value) -999.9 to +999.9 deviation value (%FS) 1-12 (Calibration month) 1-31 (Calibration day) 0-23 (Calibration hour) 0-59 (Calibration minute)	
01009 _H	34106	Word	Previous calibration log range&Z, S		
0100A _H	34107	Long Word	Previous calibration log Count value at calibration		
0100B _H	34108	Word	Previous calibration log Count deviation		
0100C _H	34109	Word	Previous calibration log MONTH		
0100D _H	34110	Word	Previous calibration log DAY		
0100E _H	34111	Word	Previous calibration log HOUR		
0100F _H	34112	Word	Previous calibration log MIN		
⋮	⋮		⋮		
0115F _H	34448	Word	Oldest calibration log Ch#	-1 to 5 0:Z1, 1:S1, 2:Z2, 3:S2 0-100000 (Count value) -999.9 to +999.9 deviation value (%FS) 1-12 (Calibration month) 1-31 (Calibration day) 0-23 (Calibration hour) 0-59 (Calibration minute)	
01160 _H	34449	Word	Oldest calibration log range&Z, S		
01161 _H	34450	Long Word	Oldest calibration log Count value at calibration		
01162 _H	34451	Word	Oldest calibration log Count deviation		
01163 _H	34452	Word	Oldest calibration log MONTH		
01164 _H	34453	Word	Oldest calibration log DAY		
01165 _H	34454	Word	Oldest calibration log HOUR		
01166 _H	34455	Word	Oldest calibration log MIN		
01167 _H	34456	Word			

Relative address	Register No.	Data type	Memory contents	Read-out/write-in data	Remarks or corresponding parameter
01168 _H	34457	Word	Latest calibration log Ch#	-1 to 5 0:Z1, 1:S1, 2:Z2, 3:S2 0-100000 (Count value) -999.9 to+999.9 deviation value (%FS) 1-12 (Calibration month) 1-31 (Calibration day) 0-23 (Calibration hour) 0-59 (Calibration minute)	Sent in order of latest logs first Ch2 region 40 sets FF(-1) if there is no value
01169 _H	34458	Word	Latest calibration log range&Z, S		
0116A _H	34459	Long Word	Latest calibration log		
0116B _H	34460		Count value at calibration		
0116C _H	34461	Word	Latest calibration log Count deviation		
0116D _H	34462	Word	Latest calibration log MONTH		
0116E _H	34463	Word	Latest calibration log DAY		
0116F _H	34464	Word	Latest calibration log HOUR		
01170 _H	34465	Word	Latest calibration log MIN	-1 to 5 0:Z1, 1:S1, 2:Z2, 3:S2 0-100000 (Count value) -999.9 to+999.9 deviation value (%FS) 1-12 (Calibration month) 1-31 (Calibration day) 0-23 (Calibration hour) 0-59 (Calibration minute)	
01171 _H	34466	Word	Previous calibration log Ch#		
01172 _H	34467	Word	Previous calibration log range&Z, S		
01173 _H	34468	Long Word	Previous calibration log		
01174 _H	34469		Count value at calibration		
01175 _H	34470	Word	Previous calibration log Count deviation		
01176 _H	34471	Word	Previous calibration log MONTH		
01177 _H	34472	Word	Previous calibration log DAY		
01178 _H	34473	Word	Previous calibration log HOUR		
01179 _H	34474	Word	Previous calibration log MIN		
⋮	⋮		⋮		
012C7 _H	34808	Word	Oldest calibration log Ch#	-1 to 5 0:Z1, 1:S1, 2:Z2, 3:S2 0-100000 (Count value) -999.9 to+999.9 deviation value (%FS) 1-12 (Calibration month) 1-31 (Calibration day) 0-23 (Calibration hour) 0-59 (Calibration minute)	
012C8 _H	34809	Word	Oldest calibration log range&Z, S		
012C9 _H	34810	Long Word	Oldest calibration log		
012CA _H	34811		Count value at calibration		
012CB _H	34812	Word	Oldest calibration log Count deviation		
012CC _H	34813	Word	Oldest calibration log MONTH		
012CD _H	34814	Word	Oldest calibration log DAY		
012CE _H	34815	Word	Oldest calibration log HOUR		
012CF _H	34816	Word	Oldest calibration log MIN		

Relative address	Register No.	Data type	Memory contents	Read-out/write-in data	Remarks or corresponding parameter
012D0 _H	34817	Word	Latest calibration log Ch#	-1 to 5 0:Z1, 1:S1, 2:Z2, 3:S2 0-100000 (Count value) -999.9 to +999.9 deviation value (%FS) 1-12 (Calibration month) 1-31 (Calibration day) 0-23 (Calibration hour) 0-59 (Calibration minute)	Sent in order of latest logs first Ch3 region 40 sets FF(-1) if there is no value
012D1 _H	34818	Word	Latest calibration log range&Z, S		
012D2 _H	34819	Long Word	Latest calibration log Count value at calibration		
012D3 _H	34820	Word	Latest calibration log Count deviation		
012D4 _H	34821	Word	Latest calibration log MONTH		
012D5 _H	34822	Word	Latest calibration log DAY		
012D6 _H	34823	Word	Latest calibration log HOUR		
012D7 _H	34824	Word	Latest calibration log MIN		
012D8 _H	34825	Word	Previous calibration log Ch#	-1 to 5 0:Z1, 1:S1, 2:Z2, 3:S2 0-100000 (Count value) -999.9 to +999.9 deviation value (%FS) 1-12 (Calibration month) 1-31 (Calibration day) 0-23 (Calibration hour) 0-59 (Calibration minute)	
012D9 _H	34826	Word	Previous calibration log range&Z, S		
012DA _H	34827	Long Word	Previous calibration log Count value at calibration		
012DB _H	34828	Word	Previous calibration log Count deviation		
012DC _H	34829	Word	Previous calibration log MONTH		
012DD _H	34830	Word	Previous calibration log DAY		
012DE _H	34831	Word	Previous calibration log HOUR		
012DF _H	34832	Word	Previous calibration log MIN		
012E0 _H	34833	Word			
012E1 _H	34834	Word			
⋮	⋮		⋮		
0142F _H	35168	Word	Oldest calibration log Ch#	-1 to 5 0:Z1, 1:S1, 2:Z2, 3:S2 0-100000 (Count value) -999.9 to +999.9 deviation value (%FS) 1-12 (Calibration month) 1-31 (Calibration day) 0-23 (Calibration hour) 0-59 (Calibration minute)	
01430 _H	35169	Word	Oldest calibration log range&Z, S		
01431 _H	35170	Long Word	Oldest calibration log Count value at calibration		
01432 _H	35171	Word	Oldest calibration log Count deviation		
01433 _H	35172	Word	Oldest calibration log MONTH		
01434 _H	35173	Word	Oldest calibration log DAY		
01435 _H	35174	Word	Oldest calibration log HOUR		
01436 _H	35175	Word	Oldest calibration log MIN		
01437 _H	35176	Word			

Relative address	Register No.	Data type	Memory contents	Read-out/write-in data	Remarks or corresponding parameter
01438 _H	35177	Word	Latest calibration log Ch#	-1 to 5 0:Z1, 1:S1, 2:Z2, 3:S2 0-100000 (Count value) -999.9 to +999.9 deviation value (%FS) 1-12 (Calibration month) 1-31 (Calibration day) 0-23 (Calibration hour) 0-59 (Calibration minute)	Sent in order of latest logs first Ch4 region 40 sets FF(-1) if there is no value
01439 _H	35178	Word	Latest calibration log range&Z, S		
0143A _H	35179	Long Word	Latest calibration log Count value at calibration		
0143B _H	35180	Word	Latest calibration log Count deviation		
0143C _H	35181	Word	Latest calibration log MONTH		
0143D _H	35182	Word	Latest calibration log DAY		
0143E _H	35183	Word	Latest calibration log HOUR		
0143F _H	35184	Word	Latest calibration log MIN		
01440 _H	35185	Word	Previous calibration log Ch#	-1 to 5 0:Z1, 1:S1, 2:Z2, 3:S2 0-100000 (Count value) -999.9 to +999.9 deviation value (%FS) 1-12 (Calibration month) 1-31 (Calibration day) 0-23 (Calibration hour) 0-59 (Calibration minute)	
01441 _H	35186	Word	Previous calibration log range&Z, S		
01442 _H	35187	Long Word	Previous calibration log Count value at calibration		
01443 _H	35188	Word	Previous calibration log Count deviation		
01444 _H	35189	Word	Previous calibration log MONTH		
01445 _H	35190	Word	Previous calibration log DAY		
01446 _H	35191	Word	Previous calibration log HOUR		
01447 _H	35192	Word	Previous calibration log MIN		
01448 _H	35193	Word			
01449 _H	35194	Word			
⋮	⋮		⋮		
01597 _H	35528	Word	Oldest calibration log Ch#	-1 to 5 0:Z1, 1:S1, 2:Z2, 3:S2 0-100000 (Count value) -999.9 to +999.9 deviation value (%FS) 1-12 (Calibration month) 1-31 (Calibration day) 0-23 (Calibration hour) 0-59 (Calibration minute)	
01598 _H	35529	Word	Oldest calibration log range&Z, S		
01599 _H	35530	Long Word	Oldest calibration log Count value at calibration		
0159A _H	35531	Word	Oldest calibration log Count deviation		
0159B _H	35532	Word	Oldest calibration log MONTH		
0159C _H	35533	Word	Oldest calibration log DAY		
0159D _H	35534	Word	Oldest calibration log HOUR		
0159E _H	35535	Word	Oldest calibration log MIN		
0159F _H	35536	Word			

Relative address	Register No.	Data type	Memory contents	Read-out/write-in data	Remarks or corresponding parameter
015A0 _H	35537	Word	Latest calibration log Ch#	-1 to 5 0:Z1, 1:S1, 2:Z2, 3:S2 0-100000 (Count value) -999.9 to +999.9 deviation value (%FS) 1-12 (Calibration month) 1-31 (Calibration day) 0-23 (Calibration hour) 0-59 (Calibration minute)	Sent in order of latest logs first Ch5 region 40 sets FF(-1) if there is no value
015A1 _H	35538	Word	Latest calibration log range&Z, S		
015A2 _H	35539	Long Word	Latest calibration log Count value at calibration		
015A3 _H	35540				
015A4 _H	35541	Word	Latest calibration log Count deviation		
015A5 _H	35542	Word	Latest calibration log MONTH		
015A6 _H	35543	Word	Latest calibration log DAY		
015A7 _H	35544	Word	Latest calibration log HOUR		
015A8 _H	35545	Word	Latest calibration log MIN		
015A9 _H	35546	Word	Previous calibration log Ch#	-1 to 5 0:Z1, 1:S1, 2:Z2, 3:S2 0-100000 (Count value) -999.9 to +999.9 deviation value (%FS) 1-12 (Calibration month) 1-31 (Calibration day) 0-23 (Calibration hour) 0-59 (Calibration minute)	
015AA _H	35547	Word	Previous calibration log range&Z, S		
015AB _H	35548	Long Word	Previous calibration log Count value at calibration		
015AC _H	35549				
015AD _H	35550	Word	Previous calibration log Count deviation		
015AE _H	35551	Word	Previous calibration log MONTH		
015AF _H	35552	Word	Previous calibration log DAY		
015B0 _H	35553	Word	Previous calibration log HOUR		
015B1 _H	35554	Word	Previous calibration log MIN		
⋮	⋮		⋮		
016FF _H	35888	Word	Oldest calibration log Ch#	-1 to 5 0:Z1, 1:S1, 2:Z2, 3:S2 0-100000 (Count value) -999.9 to +999.9 deviation value (%FS) 1-12 (Calibration month) 1-31 (Calibration day) 0-23 (Calibration hour) 0-59 (Calibration minute)	
01700 _H	35889	Word	Oldest calibration log range&Z, S		
01701 _H	35890	Long Word	Oldest calibration log Count value at calibration		
01702 _H	35891				
01703 _H	35892	Word	Oldest calibration log Count deviation		
01704 _H	35893	Word	Oldest calibration log MONTH		
01705 _H	35894	Word	Oldest calibration log DAY		
01706 _H	35895	Word	Oldest calibration log HOUR		
01707 _H	35896	Word	Oldest calibration log MIN		

NOTE

- 1: The relative addresses "01000_H to 01707_H" correspond to program Version 2.24 and later (Check the version on the display screen when the power is turned ON).

5.3 Supplement to address map

* (1) Register No. 30062 to 30131 (error log)

You can read up to 14 errors in order of most recent to older ones. The following information is available.

Error No.:	No. of produced error. Stored value is error number minus 1.
Error DAY:	Date
Error HOUR:	Indicates at what o'clock error occurred.
Error MIN:	Indicates at what minutes error occurred.
Error TARGET:	No. of Ch where error occurred. Ch No. minus 1 is stored. 0 at error No. 3 or 10.

* (2) Register numbers 30181, 30182, 30183 (Display information (1), (2), (3))

Display information shows a current status of the instrument.

- The next values on the display information (1) represent the following setting status.

0:	Measurement mode (manual calibration display included)
1:	Menu mode
2:	Changeover of range
3:	Calibration setting
4:	Alarm setting
5:	Automatic calibration setting
6:	Peak alarm setting
7:	Parameter setting
8:	Maintenance mode
9:	Factory mode
10:	Auto zero calibration setting
- The next values on display information (2) represent the following status at manual calibration.

0:	Measurement mode
4:	Channel selection at manual zero calibration
5:	Zero calibration wait at manual zero calibration
6:	Zero calibration in progress at manual zero calibration
7:	Channel selection at manual span calibration
8:	Span calibration wait at manual span calibration
9:	Span calibration in progress at manual span calibration
10:	Error contents indication
- Contents of values of display information (3)
Correspond to value of Ch (channel) from which the measurement mode is displayed.
Top channel number minus 1 is stored.

* (3) Register number 30189 (manual calibration channel)

Data for knowing a channel (component) which the cursor is positioned at to carry out a calibration at when a manual calibration is under way.

Channel number to carry out a calibration at minus 1 is stored.

6. TROUBLE SHOOTING

If the communication is unavailable, check the following items.

- Whether all devices related to communication are turned on.
- Whether connections are correct.
- Whether the number of connected instruments and connection distance are as specified
- Whether communication conditions coincide between the master station (host computer) and slave stations (instrument)

Transmission speed : 38400bps

Data length : 8 bits

Stop bit : 1 bit

Parity : None

Whether send/receive signal timing conforms to Section 5.6 in this manual.

- Whether the station No. designated as send destination by the master station coincides with the station No. of the connected instrument.
- Whether more than one instrument connected on the same transmission line shares the same station No.
- Whether the station No. of instruments is set at other than 0.

If it's 0, the communication function does not work.

Revision Information

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