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This document describes MODBUS communication by IR800G, IR810G, IR810S Infrared Gas Analyzer.

Before communicating using the MODBUS protocol, refer to the User's Manual of the IR800G, IR810G Infrared Gas Analyzer (IM 11G06A01-02EN) or IR810S Explosion-protected model Infrared Gas Analyzer (IM 11G06D01-02EN) for the details.

For the latest User's Manual, download it from our website or scan the QR code.

Search by product model name (IR800G, IR810G, or IR810S).

<https://www.yokogawa.com/library/>



1. General

IR800G, IR810G, IR810S configures or obtains process data by using MODBUS/RTU protocol on physical application: RS-485.

MODBUS RTU is supported but not ASCII.

1.1 MODBUS setup

Depending on your environment, select RS-485 (Modbus RTU) as a wired digital connection for the IR800G, IR810G, IR810S. Be sure to use shielded cables to prevent malfunctions caused by external noise and to prevent radiated noise.

● RS-485 (RS)

IR800G, IR810G, IR810S communicates via RS-485 MODBUS.

The following list shows the required setting by HMI to establish communication between a master device and IR800G, IR810G, IR810S via RS-485 MODBUS.

Converter register: 1 to 247 (initial value 1)

Transmission speed: 9600[bps], 38400[bps], 115200[bps]

Parity : Even, Odd, None

When Parity is Even or Odd, Stop bit is 1bit, when None, Stop bit is 2 bit.

1.2 MODBUS master

● Data memory

YOKOGAWA GX series with RS-485 MODBUS are recommended for process data saving. MODBUS communication enables to store larger amount of process data than IR800G, IR810G, IR810S mA output.

1.3 Function code/Exception code

MODBUS Function code used for IR800G, IR810G, IR810S

Function	Function Code (hex)
Read Coils	0x01
Write Single Coil	0x05
Write Multiple Coils	0x0F
Read Input Register	0x04
Read Holding Registers	0x03
Write Single Register	0x06
Write Multiple Register	0x10
Read Device Identification	0x2B

Exception responses

Exception Code	Name	Meaning
0x01	Illegal Function	The Function Code received in the query is not an allowable action for the server or slave.
0x02	Illegal Data Register	The data register received in the query is not an allowable register for the server or slave.
0x03	Illegal Data Values	The value contained in the query data field is not an allowable value for the server or slave.

If an attempt is made to write a value outside the setting range of a parameter in MODBUS communication, the setting is not reflected. In this case, the exception code 0x03 is returned to indicate setting failure. If you want to write multiple values, none of the settings will be reflected if even one parameter is out of range.

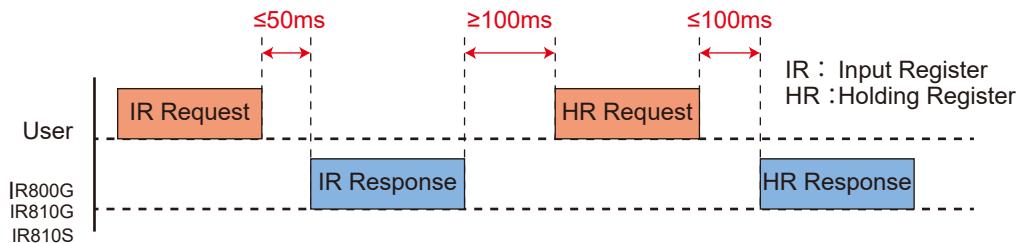
1.4 MODBUS communication

The following must be cared when master devices are used.

● MODBUS response timing

IR (Input Register) response to IR Read request within 50 ms after IR800G, IR810G, IR810S receives the message. To the other request, IR800G, IR810G, IR810S replies within 100 ms after it receives the request.

Another request must be sent at least 100 ms after the last response was received from IR800G, IR810G, IR810S.



● Input Register renewal cycle

Process value sent in Input Register is renewed every 200 ms. It is better to Read the process value every 200 ms.

● How to change the setting

Change the Coil/Holding register.

NOTE

You cannot change settings while screens locked by HMI password, such as setting are being shifted, or Calibration, Blow back are being conducted/measured. If you try to write setting parameters in this status, an error response (Error code 03) is replied.

1.5 MODBUS password

Entering password on “MODBUS password” protects parameter setting and prohibits data input except for “cancel MODBUS password” and “gain access authority.”

MODBUS password protects parameter setting and prohibits data input except for “cancel MODBUS password”.

On the password-setting screen, enter a password you created to “cancel MODBUS password” then you can cancel the password.

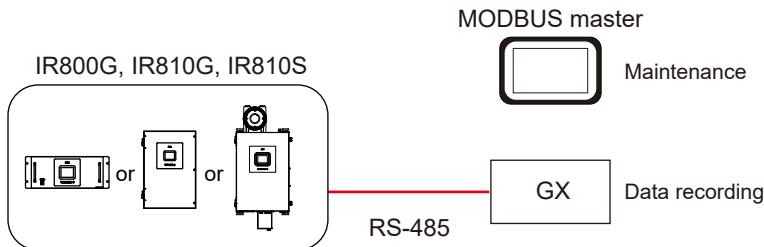
NOTE

- On the password-setting screen, when a data input is being allowed but no message to input data comes from MODBUS master for 10 minutes, data input is automatically prohibited again.
- Those three parameters in MODBUS password register shall be accessed with correct Quantity corresponding to the register.
- Be sure to access Write Multiple Register (Function Code 0x10) to input data.

1.6 Connection

● RS-485

IR800G, IR810G, IR810S communicates with one MODBUS master via RS-485 MODBUS. RS-485 is connected constantly and provides communication for reading process value.



NOTE

- Although connections other than these mentioned above are available, they might disable obtaining process value, if Read and setting change are implemented in a single session/communication.
 - Option code shall be specified to use GX. Refer to a user's manual of GX for details.
-

2. MODBUS map

Data type for IR800G, IR810G, IR810S MODBUS map

Data type	Definition
float	floating point (4byte) IEEE754 NaN: 0x7FFFFFFF
int16	16 bit signed integer
uint16	16 bit unsigned integer
uint32	32 bit unsigned integer
ASCII	character set (using one byte per character), multiple registration possible
bit fields	data assigning information on bit

Access (load/import) to multiple registration such as float, uint32, ASCII etc. must be implemented at once.

2.1 Decimal point position, measurement unit, float value

As transmitted data, no decimal point or unit is displayed for calibration concentration value setting, alarm upper/lower limits, concentration measurement value, and range value data.

As transmitted data, no decimal point or unit is displayed for calibration concentration value setting, alarm upper/lower limits, concentration measurement value, and range value data.

- (a) Calibration concentration setting (register 40001 to 40020)
- Alarm setting (register 40036 to 40055)
- Range setting (31077 to 31086)

The decimal point position corresponding to each Ch (channel) range can be found by reading the decimal point position data (register 31087 to 31096).

The unit of measure can be found by reading the unit data (register 31067 to 31076).

The data at the decimal point position takes the values 0, 1, 2, and 3.

The actual value is obtained as follows.

- 0: Calibration concentration set value data ÷ 1
- 1: Calibration concentration set value data ÷ 10
- 2: Calibration concentration set value data ÷ 100
- 3: Calibration concentration set value data ÷ 1000

The unit data takes values of 0, 1, 2, and 3. The actual value is obtained as follows.

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

(Example)

Ch1 Range 1 span calibration concentration set value (register 40002) = 2000

Ch1 Range 1 decimal point position (register 31087) = 1

If Ch1 range 1 unit (register 31067) = 1, the value is 200.0 ppm

For write-in, the formula is reversed. If you want to set 200.0 ppm, enter "2000" in the calibration concentration setting value.

CAUTION

- Decimal point position and units cannot be changed in MODBUS.
- Set the unit for span gas concentration setting in “ppm” even if the unit for Ch (component) is displayed in “mg/m³” or “g/m³” in the calibration concentration setting value.

(b) Measured concentration values (register 30001 to 30036)

The decimal point position corresponding to each concentration value and the unit of measurement is stored in the register following the concentration value.

The measured concentration values are stored in the registers according to the range that corresponds to the status of the current range (register 30038 to 30042), as they are not divided by range.

The meaning of the decimal point position data and unit of measurement data values is the same as in “(a) Calibration concentration set values (registers 40001 to 40020)”.

(Example)

- Ch3 measured concentration value (register 30007) = 1270
- Ch3 decimal point position (register 30008) = 2
- Ch3 Unit of measurement (register 30009) = 0

The above set/measured values to which no decimal point position is annotated can be handled as float values in a different register.

Item	Integer register number	Float value register number
Calibration concentration setting value	40001 to 40020	410001 to 410010
Alarm setting value	40036 to 40055	410031 to 410078
Measured concentration value	30001 to 30036	310001 to 310024

2.2 When measurement data is over-range

Even if the measured data is over-range and the screen display shows ++++++, the readout data of the measured concentration value will transmit the concentration value at that time.

2.3 Modbus Address

2.3.1 Coil

Address (HEX)	Registers	Item name	value/description
0x0000	01	Reserved	all 0 Do not change.
0x001E	31	WRITE_STATUS	Read only Shows access authorization. ON: disables change of setting via Modbus. Off: enables change of setting via Modbus.
0x001F	32	PASSWORD_STATUS	Read only Shows MODBUS password locked. On: Password locked Off: Unlocked
0x0032	51	CAL_AUTO_START	Starts auto calibration
0x0033	52	CAL_ZERO_START	Starts zero calibration
0x0034	53	CAL_BLOWBACK_START	Starts blow back
0x0035	54	VLD_AUTO_START	Starts validation (option)
0x0036	55	PEAK_ALARM_RESET	Resets peak alarm count value
0x0042	67	AD_TOUCH_SCREEN_FLAG	HMI of the converter switches from Adjust panel to Touch panel.

2.3.2 Input Register (IR)

■ Ch concentration (integer)

Address (HEX)	Registers	Item name	type	value/description
0x0000	30001	Ch1concentration	UINT16	Value without a decimal point (-9999to9999)
0x0001	30002	Ch1decimal point position		decimal point position 0: concentration value/1 1: concentration value/10 2: concentration value/100 3: concentration value/1000
0x0002	30003	Ch1measurement unit		Measurement unit 0: vol% 1: ppm 2: mg/m ³ 3: g/m ³
0x0003	30004	Ch2concentration		Same as Ch1 concentration
0x0004	30005	Ch2decimal point position		Same as Ch1 decimal point position
0x0005	30006	Ch2measurement unit		Same as Ch1 measurement unit
0x0006	30007	Ch3concentration		Same as Ch1 concentration
0x0007	30008	Ch3decimal point position		Same as Ch1 decimal point position
0x0008	30009	Ch3measurement unit		Same as Ch1 measurement unit
0x0009	30010	Ch4concentration		Same as Ch1concentration
0x000A	30011	Ch4decimal point position		Same as Ch1 decimal point position
0x000B	30012	Ch4measurement unit		Same as Ch1 measurement unit
0x000C	30013	Ch5concentration		Same as Ch1 concentration
0x000D	30014	Ch5decimal point position		Same as Ch1 decimal point position
0x000E	30015	Ch5measurement unit		Same as Ch1 measurement unit
0x000F	30016	Ch6concentration		Same as Ch1 concentration
0x0010	30017	Ch6decimal point position		Same as Ch1 decimal point position
0x0011	30018	Ch6measurement unit		Same as Ch1 measurement unit
0x0012	30019	Ch7concentration		Same as Ch1 concentration
0x0013	30020	Ch7decimal point position		Same as Ch1 decimal point position
0x0014	30021	Ch7measurement unit		Same as Ch1 measurement unit
0x0015	30022	Ch8concentration		Same as Ch1 concentration
0x0016	30023	Ch8decimal point position		Same as Ch1 decimal point position
0x0017	30024	Ch8measurement unit		Same as Ch1 measurement unit
0x0018	30025	Ch9concentration		Same as Ch1 concentration
0x0019	30026	Ch9decimal point position		Same as Ch1 decimal point position
0x001A	30027	Ch9measurement unit		Same as Ch1 measurement unit
0x001B	30028	Ch10concentration		Same as Ch1 concentration
0x001C	30029	Ch10decimal point position		Same as Ch1 decimal point position
0x001D	30030	Ch10measurement unit		Same as Ch1 measurement unit
0x001E	30031	Ch11concentration		Same as Ch1 concentration
0x001F	30032	Ch11decimal point position		Same as Ch1 decimal point position
0x0020	30033	Ch11measurement unit		Same as Ch1 measurement unit
0x0021	30034	Ch12concentration		Same as Ch1 concentration
0x0022	30035	Ch12decimal point position		Same as Ch1 decimal point position
0x0023	30036	Ch12measurement unit		Same as Ch1 measurement unit

■ Peak count

Address (HEX)	Registers	Item name	type	value/description
0x0024	30037	Peak count	UINT16	0 to 100times/hour

■ Current range

Address (HEX)	Registers	Item	type	value/description
0x0025	30038	Ch1 current range	UINT16	Current range 0: range 1 1: range 2
0x0026	30039	Ch2 current range		
0x0027	30040	Ch3 current range		
0x0028	30041	Ch4 current range		
0x0029	30042	Ch5 current range		

■ High/Low alarm

Address (HEX)	Registers	Item	type	value/description
0x002A	30043	Ch1 H/L alarm	UINT16	Current alarm status 0: no alarm 1: High alarm 2: Low alarm 3: HH alarm 4: LL alarm
0x002B	30044	Ch2 H/L alarm		
0x002C	30045	Ch3 H/L alarm		
0x002D	30046	Ch4 H/L alarm		
0x002E	30047	Ch5 H/L alarm		

■ Peak counts alarm

Address (HEX)	Registers	Item	type	value/description
0x002F	30048	Peak counts alarm	UINT16	Current alarm status 0: no alarm 1: alarming

■ Auto calibration status

Address (HEX)	Registers	Item	type	value/description
0x0030	30049	Auto (zero) calibration	UINT16	Status 0: no calibration 1: calibration in progress

■ Zero/Span status

Address (HEX)	Registers	Item	type	value/description
0x0031	30050	Ch1 zero calibration	UINT16	Status 0: no calibration 1: calibration in progress
0x0032	30051	Ch2 zero calibration		
0x0033	30052	Ch3 zero calibration		
0x0034	30053	Ch4 zero calibration		
0x0035	30054	Ch5 zero calibration		
0x0036	30055	Ch1 span calibration		Status 0: no calibration 1: calibration in progress
0x0037	30056	Ch2 span calibration		
0x0038	30057	Ch3 span calibration		
0x0039	30058	Ch4 span calibration		
0x003A	30059	Ch5 span calibration		

■ Converter unit failure

Address (HEX)	Registers	Item	type	value/description
0x003B	30060	Converter unit failure	UINT16	Status 0: no failure 1: Failed See 3.1 Alarm list for details.

■ Calibration failure

Address (HEX)	Registers	Item	type	value/description
0x003C	30061	Calibration error	UINT16	Status 0: no failure 1: failed See 3.1 Alarm list for details.

■ Error log

Address (HEX)	Registers	Item	type	value/description
0x003D	30062	Last error No.	UINT16	Error log -1 to 9 See 2.4 address map description.
0x003E	30063	Last error DAY		Error log 1 to 31
0x003F	30064	Last error HOUR		Error log 0 to 23
0x0040	30065	Last error MIN		Error log 0 to 59
0x0041	30066	Last error TARGET		Error log 0 to 4 See 2.4 address map description.
0x0042	30067	Second to last error No.		Same as the last error No.
0x0043	30068	Second to last error DAY		Same as the last error DAY
0x0044	30069	Second to last error HOUR		Same as the last error HOUR
0x0045	30070	Second to last error MIN		Same as the last error MIN
0x0046	30071	Second to last error TARGET		Same as the last error TARGET
0x0047	30072	3rd to last error No.		Same as the last error No.
0x0048	30073	3rd to last error DAY		Same as the last error DAY
0x0049	30074	3rd to last error HOUR		Same as the last error HOUR
0x004A	30075	3rd to last error MIN		Same as the last error MIN
0x004B	30076	3rd to last error TARGET		Same as the last error TARGET
0x004C	30077	4th to last error No.		Same as the last error No.
0x004D	30078	4th to last error DAY		Same as the last error DAY
0x004E	30079	4th to last error HOUR		Same as the last error HOUR
0x004F	30080	4th to last error MIN		Same as the last error MIN
0x0050	30081	4th to last error TARGET		Same as the last error TARGET
0x0051	30082	5th to last error No.		Same as the last error No.
0x0052	30083	5th to last error DAY		Same as the last error DAY
0x0053	30084	5th to last error HOUR		Same as the last error HOUR
0x0054	30085	5th to last error MIN		Same as the last error MIN
0x0055	30086	5th to last error TARGET		Same as the last error TARGET
0x0056	30087	6th to last error No.		Same as the last error No.
0x0057	30088	6th to last error DAY		Same as the last error DAY
0x0058	30089	6th to last error HOUR		Same as the last error HOUR
0x0059	30090	6th to last error MIN		Same as the last error MIN
0x005A	30091	6th to last error TARGET		Same as the last error TARGET
0x005B	30092	7th to last error No.		Same as the last error No.
0x005C	30093	7th to last error DAY		Same as the last error DAY
0x005D	30094	7th to last error HOUR		Same as the last error HOUR
0x005E	30095	7th to last error MIN		Same as the last error MIN
0x005F	30096	7th to last error TARGET		Same as the last error TARGET
0x0060	30097	8th to last error No.		Same as the last error No.
0x0061	30098	8th to last error DAY		Same as the last error DAY
0x0062	30099	8th to last error HOUR		Same as the last error HOUR
0x0063	30100	8th to last error MIN		Same as the last error MIN
0x0064	30101	8th to last error TARGET		Same as the last error TARGET
0x0065	30102	9th to last error No.		Same as the last error No.
0x0066	30103	9th to last error DAY		Same as the last error DAY

Address (HEX)	Registers	Item	type	value/description
0x0067	30104	9th to last error HOUR	UINT16	Same as the last error HOUR
0x0068	30105	9th to last error MIN		Same as the last error MIN
0x0069	30106	9th to last error TARGET		Same as the last error TARGET
0x006A	30107	10th to last error No.		Same as the last error No.
0x006B	30108	10th to last error DAY		Same as the last error DAY
0x006C	30109	10th to last error HOUR		Same as the last error HOUR
0x006D	30110	10th to last error MIN		Same as the last error MIN
0x006E	30111	10th to last error TARGET		Same as the last error TARGET
0x006F	30112	11th to last error No.		Same as the last error No.
0x0070	30113	11th to last error DAY		Same as the last error DAY
0x0071	30114	11th to last error HOUR		Same as the last error HOUR
0x0072	30115	11th to last error MIN		Same as the last error MIN
0x0073	30116	11th to last error TARGET		Same as the last error TARGET
0x0074	30117	12th to last errorNo.		Same as the last error No.
0x0075	30118	12th to last errorDAY		Same as the last error DAY
0x0076	30119	12th to last errorHOUR		Same as the last error HOUR
0x0077	30120	12th to last errorMIN	Same as the last error MIN	
0x0078	30121	12th to last errorTARGET	Same as the last error TARGET	
0x0079	30122	13th to last error No.	Same as the last error No.	
0x007A	30123	13th to last error DAY	Same as the last error DAY	
0x007B	30124	13th to last error HOUR	Same as the last error HOUR	
0x007C	30125	13th to last error MIN	Same as the last error MIN	
0x007D	30126	13th to last error TARGET	Same as the last error TARGET	
0x007E	30127	14th to last error No.	Same as the last error No.	
0x007F	30128	14th to last error DAY	Same as the last error DAY	
0x0080	30129	14th to last error HOUR	Same as the last error HOUR	
0x0081	30130	14th to last error MIN	Same as the last error MIN	
0x0082	30131	14th to last error TARGET	Same as the last error TARGET	

■ Current error status

Address (HEX)	Registers	Item	type	value/description
0x0083	30132	Error1		
0x0084	30133	Error2		
0x0085	30134	Error3		
0x0086	30135	Error10		
0x0087	30136	Ch1 Error4		
0x0088	30137	Ch1 Error5		
0x0089	30138	Ch1 Error6		
0x008A	30139	Ch1 Error7		
0x008B	30140	Ch1 Error8		
0x008C	30141	Ch1 Error9		
0x008D	30142	Ch2 Error4		
0x008E	30143	Ch2 Error5		
0x008F	30144	Ch2 Error6		
0x0090	30145	Ch2 Error7		
0x0091	30146	Ch2 Error8		
0x0092	30147	Ch2 Error9		
0x0093	30148	Ch3 Error4		
0x0094	30149	Ch3 Error5		
0x0095	30150	Ch3 Error6		
0x0096	30151	Ch3 Error7		
0x0097	30152	Ch3 Error8		
0x0098	30153	Ch3 Error9		
0x0099	30154	Ch4 Error4		
0x009A	30155	Ch4 Error5		
0x009B	30156	Ch4 Error6		
0x009C	30157	Ch4 Error7		
0x009D	30158	Ch4 Error8		
0x009E	30159	Ch4 Error9		
0x009F	30160	Ch5 Error4		
0x00A0	30161	Ch5 Error5		
0x00A1	30162	Ch5 Error6		
0x00A2	30163	Ch5 Error7		
0x00A3	30164	Ch5 Error8		
0x00A4	30165	Ch5 Error9		

■ Calibration/Hold current status

Address (HEX)	Registers	Item	type	value/description
0x00A5	30166	Ch1 Auto zero calibration	UINT16	Current status 0: no calibration 1: calibration in progress
0x00A6	30167	Ch1 Auto span calibration		
0x00A7	30168	Ch1 Hold		
0x00A8	30169	Ch2 Auto zero calibration		
0x00A9	30170	Ch2 Auto span calibration		
0x00AA	30171	Ch2 Hold		
0x00AB	30172	Ch3 Auto zero calibration		
0x00AC	30173	Ch3 Auto span calibration		
0x00AD	30174	Ch3 Hold		
0x00AE	30175	Ch4 Auto zero calibration		
0x00AF	30176	Ch4 Auto span calibration		
0x00B0	30177	Ch4 Hold		
0x00B1	30178	Ch4 Auto zero calibration		
0x00B2	30179	Ch4 Auto span calibration		
0x00B3	30180	Ch4 Hold		
0x00B4 to 0x00BD	30181 to 30190	(Do not use)		

■ High/Low alarm 6

Address (HEX)	Registers	Item	type	value/description
0x00BE	30191	Ch6 high/low limit alarm	UINT16	Alarm status 0: no alarm 1: High alarm 2: Low alarm 3: HH alarm 4: LL alarm
0x00BF to 0x00C1	30192 to 30194	(Do not use)		

■ Fixed setting value

Address (HEX)	Registers	Item	type	value/description
0x0425	31062	Ch1 range numbers	UINT16	1:1 Range meter 2:2 Range meter
0x0426	31063	Ch2 range numbers		
0x0427	31064	Ch3 range numbers		
0x0428	31065	Ch4 range numbers		
0x0429	31066	Ch5 range numbers		
0x042A	31067	Ch1 range-1 unit		
0x042B	31068	Ch1 range-2 unit		
0x042C	31069	Ch2 range-1 unit		
0x042D	31070	Ch2 range-2 unit		
0x042E	31071	Ch3 range-1 unit		
0x042F	31072	Ch3 range-2 unit		
0x0430	31073	Ch4 range-1 unit		
0x0431	31074	Ch4 range-2 unit		
0x0432	31075	Ch5 range-1 unit		
0x0433	31076	Ch5 range-2 unit		
0x0434	31077	Ch1 range-1 value		1to9999 The actual range value is obtained by taking into account the following decimal point positions Actual range value = read range value/X X: Decimal point position When 0, 1 When 1, 10 When 2, 100 When 3, 1000
0x0435	31078	Ch1 range-2 value		
0x0436	31079	Ch2 range-1 value		
0x0437	31080	Ch2 range-2 value		
0x0438	31081	Ch3 range-1 value		
0x0439	31082	Ch3 range-2 value		
0x043A	31083	Ch4 range-1 value		
0x043B	31084	Ch4 range-2 value		
0x043C	31085	Ch5 range-1 value		
0x043D	31086	Ch5 range-2 value		
0x043E	31087	Ch1 range-1 decimal point position		0: no decimal places 1: One decimal place 2: Two decimal places 3: 3 decimal places
0x043F	31088	Ch1 range-2 decimal point position		
0x0440	31089	Ch2 range-1 decimal point position		
0x0441	31090	Ch2 range-2 decimal point position		
0x0442	31091	Ch3 range-1 decimal point position		
0x0443	31092	Ch3 range-2 decimal point position		
0x0444	31093	Ch4 range-1 decimal point position		
0x0445	31094	Ch4 range-2 decimal point position		
0x0446	31095	Ch5 range-1 decimal point position		
0x0447	31096	Ch5 range-2 decimal point position		
0x0448 to 0x0469	31097 to 31130	(Do not use)		

■ Alarm status

Address (HEX)	Registers	Item	type	value/description
0x07D0	32001	Alarm status : Device Failure	UINT32	For details on bit assignments, see "3. Alarm"
0x07D1	32002			
0x07D2	32003	Alarm status : Ch1 to Ch8 Hi/Lo Alarm		
0x07D3	32004			
0x07D4	32005	Alarm status : Ch9 to Ch12 Hi/Lo Alarm, Peak Alarm, Ch1=Ch5Validation Alarm		
0x07D5	32006			
0x07D6	32007	Alarm status : Calibration Alarm		
0x07D7	32008			
0x07D8	32009	Alarm status : Maintenance Status		
0x07D9	32010			

■ Ch concentration (float)

Address (HEX)	Registers	Item	type	value/description
0x0BB8	33001	Ch1concentration (float)	float	—
0x0BB9	33002	Ch2concentration (float)		—
0x0BBA	33003	Ch3concentration (float)		—
0x0BBB	33004	Ch4concentration (float)		—
0x0BBC	33005	Ch5concentration (float)		—
0x0BBD	33006	Ch6concentration (float)		—
0x0BBE	33007	Ch7concentration (float)		—
0x0BBF	33008	Ch8concentration (float)		—
0x0BC0	33009	Ch9concentration (float)		—
0x0BC1	33010	Ch10concentration (float)		—
0x0BC2	33011	Ch11concentration (float)		—
0x0BC3	33012	Ch12concentration (float)		—
0x0BC4	33013	(Do not use)		
0x0BC5	33014			
0x0BC6	33015			
0x0BC7	33016			
0x0BC8	33017			
0x0BC9	33018			
0x0BCA	33019			
0x0BCB	33020			
0x0BCC	33021			
0x0BCD	33022			
0x0BCE	33023			
0x0BCF	33024			
0x0BD0 to 0x0BDF	33025 to 33040			

■ mA Output, mA Input, Contact Output, Contact Input

Address (HEX)	Registers	Item	type	value/description
0x0BE0	33041	AO_mA1	float	Output value of current output mA1 to mA12 Display range: 3.6 to 22mA
0x0BE1	33042			
0x0BE2	33043	AO_mA2		
0x0BE3	33044			
0x0BE4	33045	AO_mA3		
0x0BE5	33046			
0x0BE6	33047	AO_mA4		
0x0BE7	33048			
0x0BE8	33049	AO_mA5		
0x0BE9	33050			
0x0BEA	33051	AO_mA6		
0x0BEB	33052			
0x0BEC	33053	AO_mA7		
0x0BED	33054			
0x0BEE	33055	AO_mA8		
0x0BEF	33056			
0x0BF0	33057	AO_mA9		
0x0BF1	33058			
0x0BF2	33059	AO_mA10		
0x0BF3	33060			
0x0BF4	33061	AO_mA11		
0x0BF5	33062			
0x0BF6	33063	AO_mA12		
0x0BF7	33064			
0x0BF8 to 0x0C07	33065 to 33080	(Do not use)		
0x0C08	33081	AI_CURRENT	float	Analog input information (physical quantity of external oxygen concentration value)
0x0C09	33082			
0x0C0A to 0x0C12	33083 to 33091	(Do not use)		
0x0C13 to 0x0C1B	33092 to 33100	(Do not use)		
0x0C1C	33101	CONTACT_OUTPUT_STATUS	uint32 (bit fields)	When the bit is set, the state is closed. bit0:State of contact output 1 bit1:State of contact output 2 ~~~~~ bit21:State of contact output 22 bit22:State of contact output 23
0x0C1D	33102			
0x0C1E	33103	CONTACT_INPUT_STATUS	uint32 (bit fields)	When the bit is set, the state is closed. bit0:State of contact input 1 bit1:State of contact input 2 ~~~~~ bit8:State of contact input 9 bit9:State of contact input 10
0x0C1F	33104			

2.3.3 Holding Register (HR)

■ Zero/Span calibration concentration (Integer)

Address (HEX)	Registers	Item	type	value/description
0x0000	40001	(Do not use)		
0x0001	40002	Ch1 range-1 span calibration concentration		Calibration concentration*410001 to 410010 are available for float type setting 0 to 99999
0x0002	40003	(Do not use)		The decimal point position depends on the decimal point position in each range.
0x0003	40004	Ch1 range-2span calibration concentration		
0x0004	40005	(Do not use)		
0x0005	40006	Ch2 range-1 span calibration concentration		When a concentration value is set for the target range of each channel, the calibration range (40116 to 40120) will also change to the set range in conjunction with the range. If you want to calibrate at a different range from the last calibration range where the concentration value was set, set the calibration range (40116 to 40120). When this register is READ when the power is turned on, the calibration concentration value setting is reflected in the corresponding address of the range where the calibration range (40116 to 40120) was set.
0x0006	40007	(Do not use)		
0x0007	40008	Ch2 range-2span calibration concentration		
0x0008	40009	(Do not use)		
0x0009	40010	Ch3 range-1 span calibration concentration		
0x000A	40011	(Do not use)		
0x000B	40012	Ch3 range-2span calibration concentration		
0x000C	40013	(Do not use)		
0x000D	40014	Ch4 range-1 span calibration concentration		
0x000E	40015	(Do not use)		
0x000F	40016	Ch4 range-2span calibration concentration		
0x0010	40017	(Do not use)		
0x0011	40018	Ch5 range-1 span calibration concentration		
0x0012	40019	(Do not use)		
0x0013	40020	Ch5 range-2span calibration concentration		

■ Ch auto calibration switch

Address (HEX)	Registers	Item	type	value/description
0x0014	40021	Ch1 auto calibration switch		
0x0015	40022	Ch2 auto calibration switch		
0x0016	40023	Ch3 auto calibration switch		
0x0017	40024	Ch4 auto calibration switch		
0x0018	40025	Ch5 auto calibration switch		

■ Ch zero calibration

Address (HEX)	Registers	Item	type	value/description
0x0019	40026	Ch1 zero calibration switch	UINT16	Zero calibration parameter
0x001A	40027	Ch2 zero calibration switch	UINT16	0: Individual 1: Simultaneous
0x001B	40028	Ch3 zero calibration switch	UINT16	
0x001C	40029	Ch4 zero calibration switch	UINT16	
0x001D	40030	Ch5 zero calibration switch	UINT16	
0x001E to 0x0022	40031 to 40035	(Do not use)	UINT16	

■ Alarm setting (Integer)

Address (HEX)	Registers	Item	type	value/description	
0x0023	40036	Ch1 range-1 high alarm setting	UINT16	Alarm setting value *410031 to 410070 can be used for the float type setting. 0 to 9999 Decimal point position is based on the decimal point position in each range.	
0x0024	40037	Ch1 range-1 low alarm setting			
0x0025	40038	Ch1 range-2 high alarm setting			
0x0026	40039	Ch1 range-2 low alarm setting			
0x0027	40040	Ch2 range-1 high alarm setting			
0x0028	40041	Ch2 range-1 low alarm setting			
0x0029	40042	Ch2 range-2 high alarm setting			
0x002A	40043	Ch2 range-2 low alarm setting			
0x002B	40044	Ch3 range-1 high alarm setting			
0x002C	40045	Ch3 range-1 low alarm setting			
0x002D	40046	Ch3 range-2 high alarm setting			
0x002E	40047	Ch3 range-2 low alarm setting			
0x002F	40048	Ch4 range-1 high alarm setting			
0x0030	40049	Ch4 range-1 low alarm setting			
0x0031	40050	Ch4 range-2 high alarm setting			
0x0032	40051	Ch4 range-2 low alarm setting			
0x0033	40052	Ch5 range-1 high alarm setting	Alarm mode 0:H-Limit (High limit) 1:L-Limit (Low limit) 2:H-Limit or L-Limit(High or low limit) 3:HH-Limit(HH limit) 4:LL-Limit(LL limit)		
0x0034	40053	Ch5 range-1 low alarm setting			
0x0035	40054	Ch5 range-2 high alarm setting			
0x0036	40055	Ch5 range-2 low alarm setting			
0x0037	40056	Ch1 alarm mode			
0x0038	40057	Ch2 alarm mode	Alarm switch 0: alarm OFF 1: alarm ON		
0x0039	40058	Ch3 alarm mode			
0x003A	40059	Ch4 alarm mode			
0x003B	40060	Ch5 alarm mode			
0x003C	40061	Ch1 alarm switch			
0x003D	40062	Ch2 alarm switch	Alarm hysteresis (%FS) 0 to 20		
0x003E	40063	Ch3 alarm switch			
0x003F	40064	Ch4 alarm switch			
0x0040	40065	Ch5 alarm switch			
0x0041	40066	Alarm hysteresis			

■ Auto calibration setting

Address (HEX)	Registers	Item	type	value/description
0x0042	40067	Auto calibration start time(day)	UINT16	Time setting (day of the week) 0 to 6 (Sunday to Saturday)
0x0043	40068	Auto calibration start time(hour)		Time setting (hour) 0 to 23
0x0044	40069	Auto calibration start time(min)		Time setting (minute) 0to59
0x0045	40070	Auto calibration cycle		Cycle *Setting range varies depending on the cycle unit. Cycle Unit = hour: 1 to 99 Cycle unit = day: 1 to 40
0x0046	40071	Auto calibration cycle unit		Unit 0:hour 1:day
0x0047	40072	Auto calibration switch		Auto calibration switch 0:OFF 1:ON
0x0048 to 0x004A	40073 to 40075	(Do not use)		

■ Response time

Address (HEX)	Registers	Item	type	value/description
0x004B	40076	Response time Ch1	UINT16	Response time (second) 0 to 60
0x004C	40077	(Do not use)		
0x004D	40078	Response time Ch2		
0x004E	40079	(Do not use)		
0x004F	40080	Response time Ch3		
0x0050	40081	(Do not use)		
0x0051	40082	Response time Ch4		
0x0052	40083	(Do not use)		
0x0053	40084	Oxygen meter response time		

■ Average period

Address (HEX)	Registers	Item	type	value/description
0x0054	40085	Ch1 moving average period	UINT16	Average period *Setting range varies depending on the average time unit. Average period unit= minute: 1 to 59 Average period unit= hour: 1 to 4
0x0055	40086	Ch2 moving average period		
0x0056	40087	Ch3 moving average period		
0x0057	40088	Ch4 moving average period		
0x0058	40089	Ch1 moving average period unit		
0x0059	40090	Ch2 moving average period unit		
0x005A	40091	Ch3 moving average period unit		
0x005B	40092	Ch4 moving average period unit		

■ Remote hold

Address (HEX)	Registers	Item	type	value/description
0x005C	40093	Hold switch	UINT16	Hold switch 0:OFF 1:ON

■ O₂ conversion reference value

Address (HEX)	Registers	Item	type	value/description
0x005D	40094	Oxygen conversion reference value	UINT16	O ₂ conversion reference value (%FS) 0 to 19
0x005E	40095	(Do not use)		
0x005F	40096	(Do not use)		

■ Peak alarm (option)

Address (HEX)	Registers	Item	type	value/description
0x0060	40097	Peak alarm count	UINT16	Peak alarm count (times) 1 to 99
0x0061	40098	Peak alarm hysteresis		Peak alarm hysteresis (%FS) 0 to 20

■ Auto zero calibration setting

Address (HEX)	Registers	Item	type	value/description
0x0062	40099	Auto zero calibration start (day)	UINT16	Time setting (day of the week) 0 to 6(Sunday to Saturday)
0x0063	40100	Auto zero calibration start (hour)		Time setting (hour) 0 to 23
0x0064	40101	Auto zero calibration start (min)		Time setting (minute) 0 to 59
0x0065	40102	Auto zero calibration cycle		Cycle* Setting range varies depending on the cycle unit. Cycle unit = hour: 1 to 99 Cycle unit = day 1 to 40
0x0066	40103	Auto zero calibration cycle unit		Unit 0:hour 1:day
0x0067	40104	Auto zero calibration switch		Auto zero calibration switch 0:OFF 1:ON
0x0068	40105	Auto zero calibration gas flow time		Auto zero calibration gas flow time (second) 60 to 900

■ Ch range change setting

Address (HEX)	Registers	Item	type	value/description
0x0069	40106	Ch1 range change setting	UINT16	Range change setting *Disabled when the range switching done by remote. 0: range1 1: range2
0x006A	40107	Ch2 range change setting		
0x006B	40108	Ch3 range change setting		
0x006C	40109	Ch4 range change setting		
0x006D	40110	Ch5 range change setting		
0x006E	40111	Ch1 Range setting		Range change setting 0: manual 1: remote 2: automatic
0x006F	40112	Ch2 Range setting		
0x0070	40113	Ch3 Range setting		
0x0071	40114	Ch4 Range setting		
0x0072	40115	Ch5 Range setting		

■ Calibration range

Address (HEX)	Registers	Item	type	value/description
0x0073	40116	Ch1 auto calibration Range setting	UINT16	Calibration range When an address is set for each range of span calibration concentration from 40002 to 40020, it is changed to the range that has been changed. 0: range1 1: range2
0x0074	40117	Ch2 auto calibration Range setting		
0x0075	40118	Ch3 auto calibration Range setting		
0x0076	40119	Ch4 auto calibration Range setting		
0x0077	40120	Ch5 auto calibration Range setting		

■ Alarm target channel

Address (HEX)	Registers	Item	type	value/description
0x0078	40121	Alarm1 Target Ch	UINT16	Alarm target Ch 0 to 11 (Ch1 to Ch12)
0x0079	40122	Alarm2 Target Ch		
0x007A	40123	Alarm3 Target Ch		
0x007B	40124	Alarm4 Target Ch		
0x007C	40125	Alarm5 Target Ch		
0x007D	40126	Alarm6 Target Ch		

■ Ch6 alarm

Address (HEX)	Registers	Item	type	value/description
0x007E	40127	Ch6 range-1 high alarm setting	UINT16	Alarm setting 410071 to 410078 can be used for float type setting. 0 to 9999 Decimal point position depends on decimal point position in each range
0x007F	40128	Ch6 range-1 low alarm setting		
0x0080	40129	Ch6 range-2 high alarm setting		
0x0081	40130	Ch6 range-2 low alarm setting		
0x0082	40131	Ch6 alarm mode		
0x0083	40132	Ch6 alarm switch		

■ Auto calibration gas flow time

Address (HEX)	Registers	Item	type	value/description
0x0084	40133	Auto calibration Flow time Zero Gas	UINT16	Zero calibration gas flow time (second) 60 to 900
0x0085	40134	Ch1 Auto calibration Flow time Span Gas		Span calibration gas flow time (second) 5 to 900
0x0086	40135	Ch2 Auto calibration Flow time Span Gas		
0x0087	40136	Ch3 Auto calibration Flow time Span Gas		
0x0088	40137	Ch4 Auto calibration Flow time Span Gas		
0x0089	40138	Ch5 Auto calibration Flow time Span Gas		
0x008A	40139	Gas replacement time after auto calibration		Replacement time (second) 60 to 900

■ Hold setting

Address (HEX)	Registers	Item	type	value/description
0x008B	40140	Hold Type	UINT16	Hole type 0: last value 1: set value
0x008C	40141	Ch1 Hold setting value		Hold setting value (%FS) 0 to 100
0x008D	40142	Ch2 Hold setting value		
0x008E	40143	Ch3 Hold setting value		
0x008F	40144	Ch4 Hold setting value		
0x0090	40145	Ch5 Hold setting value		

■ Blowback setting

Address (HEX)	Registers	Item	type	value/description
0x0091	40146	Blowback start (day)	UINT16	Time setting (day of the week) 0 to 6(Sunday to Saturday)
0x0092	40147	Blowback start (hour)		Time setting (hour) 0 to 23
0x0093	40148	Blowback start (min)		Time setting (minute) 0 to 59
0x0094	40149	Blowback cycle		Cycle *The setting range varies depending on the cycle unit. Cycle unit = hour: 1 to 99 Cycle unit = day : 1 to 40
0x0095	40150	Blowback cycle unit		Unit 0: hour 1: day
0x0096	40151	Blowback switch		Blowback time (sec) If a back time (in seconds) of less than 10 seconds is specified, it will be rounded off to the nearest whole second. 1 to 900
0x0097	40152	Blowback switch		Blowback switch 0:OFF 1:ON
0x0098	40153	Blowback gas replacement time		Replacement time (sec) 60 to 900

■ Operation command

Address (HEX)	Registers	Item	type	value/description
0x07D2	42003	Auto calibration start	UINT16	1: Automatic calibration execution
0x07D3	42004	Auto zero calibration start		1: Automatic zero calibration execution
0x07D4	42005	Blowback start		1: Blowback execution

■ Span calibration concentration (float)

Address (HEX)	Registers	Item	type	value/description
0x2710	410001	Ch1 span calibration concentration(float)	float	40002 to 40020 span calibration concentration (integer type) float setting 0 to (upper range value of Ch x1.05)
0x2711	410002	Ch2 span calibration concentration (float)		
0x2712	410003	Ch3 span calibration concentration (float)		
0x2713	410004	Ch4 span calibration concentration (float)		
0x2714	410005	Ch5 span calibration concentration (float)		
0x2715	410006			
0x2716	410007			
0x2717	410008			
0x2718	410009			
0x2719	410010			

■ Gas channel

Address (HEX)	Registers	Item	type	value/description
0x271A	410011	Gas Channel (Auto calibration)	UINT16	flow channel setting 0:NDIR 1:Entire system
0x271B	410012	Gas Channel (Auto zero calibration)		
0x271C	410013	Gas Channel (Validation)		

■ Other setting

Address (HEX)	Registers	Item	type	value/description
0x2724	410021	Sample gas compensation	float	—
0x2725	410022			

■ Alarm setting (float)

Address (HEX)	Registers	Item	type	value/description
0x272E	410031	Ch1 range-1 high alarm setting(float)	float	Float setting of alarm upper and lower limits (integer type) for 40036 to 40055 and 40127 to 40130 0 to (100%FS concentration value)
0x272F	410032	Ch1 range-1 low alarm setting(float)		
0x2730	410033	Ch1 range-2 high alarm setting(float)		
0x2731	410034	Ch1 range-2 low alarm setting(float)		
0x2732	410035	Ch2 range-1 high alarm setting(float)		
0x2733	410036	Ch2 range-1 low alarm setting(float)		
0x2734	410037	Ch2 range-2 high alarm setting(float)		
0x2735	410038	Ch2 range-2 low alarm setting(float)		
0x2736	410039	Ch3 range-1 high alarm setting(float)		
0x2737	410040	Ch3 range-1 low alarm setting(float)		
0x2738	410041	Ch3 range-2 high alarm setting(float)		
0x2739	410042	Ch3 range-2 low alarm setting(float)		
0x273A	410043	Ch4 range-1 high alarm setting(float)		
0x273B	410044	Ch4 range-1 low alarm setting(float)		
0x273C	410045	Ch4 range-2 high alarm setting(float)		
0x273D	410046	Ch4 range-2 low alarm setting(float)		
0x273E	410047	Ch5 range-1 high alarm setting(float)		
0x273F	410048	Ch5 range-1 low alarm setting(float)		
0x2740	410049	Ch5 range-2 high alarm setting(float)		
0x2741	410050	Ch5 range-2 low alarm setting(float)		
0x2742	410051	Ch6 range-1 high alarm setting(float)		
0x2743	410052	Ch6 range-1 low alarm setting(float)		
0x2744	410053	Ch6 range-2 high alarm setting(float)		
0x2745	410054	Ch6 range-2 low alarm setting(float)		
0x2746	410055	Ch7 range-1 high alarm setting(float)		
0x2747	410056	Ch7 range-1 low alarm setting(float)		
0x2748	410057	Ch7 range-2 high alarm setting(float)		
0x2749	410058	Ch7 range-2 low alarm setting(float)		
0x274A	410059	Ch8 range-1 high alarm setting(float)		
0x274B	410060	Ch8 range-1 low alarm setting(float)		
0x274C	410061	Ch8 range-2 high alarm setting(float)		
0x274D	410062	Ch8 range-2 low alarm setting(float)		
0x274E	410063	Ch9 range-1 high alarm setting(float)		
0x274F	410064	Ch9 range-1 low alarm setting(float)		
0x2750	410065	Ch9 range-2 high alarm setting(float)		
0x2751	410066	Ch9 range-2 low alarm setting(float)		
0x2752	410067	Ch10 range-1 high alarm setting(float)		
0x2753	410068	Ch10 range-1 low alarm setting(float)		
0x2754	410069	Ch10 range-2 high alarm setting(float)		
0x2755	410070	Ch10 range-2 low alarm setting(float)		
0x2756	410071	Ch11 range-1 high alarm setting(float)		
0x2757	410072	Ch11 range-1 low alarm setting(float)		
0x2758	410073	Ch11 range-2 high alarm setting(float)		
0x2759	410074	Ch11 range-2 low alarm setting(float)		
0x275A	410075	Ch12 range-1 high alarm setting(float)		
0x275B	410076	Ch12 range-1 low alarm setting(float)		
0x275C	410077	Ch12 range-2 high alarm setting(float)		
0x275D	410078	Ch12 range-2 low alarm setting(float)		

■ Loop check AO value

Address (HEX)	Registers	Item	type	value/description
0x2774	410101	Test validity AO1toAO12	uint16 (bit fields)	Loop check enable Settable in Bit units. bit0:AO1 bit1:AO2 to~~ bit10:AO11 bit11:AO12
0x2775	410102	AO1 Test output	float	Test output (mA) 2.4 to 21.6
0x2776	410103	AO2 Test output		
0x2777	410104	AO3 Test output		
0x2778	410105	AO4 Test output		
0x2779	410106	AO5 Test output		
0x277A	410107	AO6 Test output		
0x277B	410108	AO7 Test output		
0x277C	410109	AO8 Test output		
0x277D	410110	AO9 Test output		
0x277E	410111	AO10 Test output		
0x277F	410112	AO11 Test output		
0x2780	410113	AO12 Test output		
0x2781	410114			
0x2782	410115			
0x2783	410116			
0x2784	410117			
0x2785	410118			
0x2786	410119			
0x2787	410120			
0x2788	410121			
0x2789	410122			
0x278A	410123			
0x278B	410124			
0x278C	410125			

■ Loop check DO value

Address (HEX)	Registers	Item	type	value/description
0x2792	410131	Test validity DO1 to DO23	uint32 (bit fields)	Loop check enabled. Settable in Bit units bit0:DO1 bit1:DO2 ~~~ bit21:DO22 bit22:DO23
0x2793	410132			
0x2794	410133	Test output DO1 to DO23	uint32 (bit fields)	Loop check output Settable in Bit units bit0:DO1 bit1:DO2 ~~~ bit21:DO22 bit22:DO23
0x2795	410134			

■ MODBUS password

Address (HEX)	Registers	Item	type	value/description
0x27A6	410151	Modbus password unlock	ASCII	" " (all spaces)
0x27A7	410152			
0x27A8	410153			
0x27A9	410154			
0x27AA	410155			
0x27AB	410156			
0x27AC	410157			
0x27AD	410158			
0x27AE	410159	Modbus password lock	ASCII	"*****" (12 '*'s)
0x27AF	410160			
0x27B0	410161			
0x27B1	410162			
0x27B2	410163			
0x27B3	410164			
0x27B4	410165			
0x27B5	410166			
0x27B6	410167	Modbus password enable	UINT16	0: Password invalid 1: password enabled

■ MODBUS setting

Address (HEX)	Registers	Item	type	value/description
0x27BA	410171	Modbus address	UINT16	Converter address 1 to 247
0x27BB	410172	Modbus Baud rate		Baud rate 0:9600bps 1:38400bps 2:115200bps
0x27BC	410173	Modbus Parity		Parity 0:even number 1: odd number 2: none

■ Date and Time setting

Address (HEX)	Registers	Item	type	value/description
0x27BD	410174	Data & Time setting	UINT32	Elapsed time since 2000/1/1 0:00 (second)
0x27BE	410175			

■ AO setting

Address (HEX)	Registers	Item	type	value/description
0x27D8	410201	AO1 Target Ch	UINT16	0:Ch1 to 11:Ch12
0x27D9	410202	AO2 Target Ch		
0x27DA	410203	AO3 Target Ch		
0x27DB	410204	AO4 Target Ch		
0x27DC	410205	AO5 Target Ch		
0x27DD	410206	AO6 Target Ch		
0x27DE	410207	AO7 Target Ch		
0x27DF	410208	AO8 Target Ch		
0x27E0	410209	AO9 Target Ch		
0x27E1	410210	AO10 Target Ch		
0x27E2	410211	AO11 Target Ch		
0x27E3	410212	AO12 Target Ch		

■ Hold setting when an error occurs

Address (HEX)	Registers	Item	type	value/description
0x27E4	410213	Hold type(Error)	UINT16	Hole type 0: last value 1: set value
0x27E5	410214	Hold setting value(Error)	float	Hold setting value (mA) 2.4 to 21.6
0x27E6	410215			

■ Output limit setting

Address (HEX)	Registers	Item	type	value/description
0x27E7	410216	Lower limit value	float	Output lower limit (mA) 2.4 to 21.6
0x27E8	410217			
0x27E9	410218	Upper limit value	float	Output upper limit (mA) 2.4 to 21.6
0x27EA	410219			

■ DO setting

Address (HEX)	Registers	Item	type	value/description
0x27EC	410221	DO5 type	uint32 (bit fields)	Selection of contact output. Multiple functions can be selected. bit0: Instrument error bit1: Calibration error bit2: Auto calibration status bit3: Auto validation status bit4: Zero calibration bit5: Ch1 span calibration bit6: Ch2 span calibration bit7: Ch3 span calibration bit8: Ch4 span calibration bit9: Ch5 span calibration bit10: Ch1 range identification bit11: Ch2 range identification bit12: Ch3 range identification bit13: Ch4 range identification bit14: Ch5 range identification bit15: Blow back bit16: Alarm1 bit17: Alarm2 bit18: Alarm3 bit19: Alarm4 bit20: Alarm5 bit21: Alarm6 bit22: Peak counts alarm bit23: Sample gas selecting bit24: Maintenance status bit25: Power status bit26: System calibration bit27: System validation
0x27ED	410222	DO6 type		
0x27EE	410223	DO7 type		
0x27EF	410224	DO8 type		
0x27F0	410225	DO9 type		
0x27F1	410226	DO10 type		
0x27F2	410227	DO11 type		
0x27F3	410228	DO12 type		
0x27F4	410229	DO13 type		
0x27F5	410230	DO14 type		
0x27F6	410231	DO15 type		
0x27F7	410232	DO16 type		
0x27F8	410233	DO17 type		
0x27F9	410234	DO18 type		
0x27FA	410235	DO19 type		
0x27FB	410236	DO20 type		
0x27FC	410237	DO21 type		
0x27FD	410238	DO22 type		
0x27FE	410239	DO23 type		
0x27FF	410240			
0x2800	410241			
0x2801	410242			
0x2802	410243			
0x2803	410244			
0x2804	410245			
0x2805	410246			
0x2806	410247			
0x2807	410248			
0x2808	410249			
0x2809	410250			
0x280A	410251			
0x280B	410252			
0x280C	410253			
0x280D	410254			
0x280E	410255			
0x280F	410256			
0x2810	410257			
0x2811	410258			

■ DI setting

Address (HEX)	Registers	Item	type	value/description
0x2814	410261	DI1 type	uint16 (bit fields)	Selection of contact output. Multiple functions can be selected. bit0:None bit1:Remote hold bit2:Average value reset bit3:Auto cal. remote start bit4:Auto zero cal. remote start bit5:Auto val. remote start bit6:Ch1 remote range switch bit7:Ch2 remote range switch bit8:Ch3 remote range switch bit9:Ch4 remote range switch bit10:Ch5 remote range switch bit11:Blow back bit12:ACK from external oxygen analyzer ZR802. Connection to DO in calibration bit13:Calibration factor error notification for the external oxygen analyzer ZR802. Connection to DO of the calibration factor error. Analyzer error
0x2815	410262	DI2 type		
0x2816	410263	DI3 type		
0x2817	410264	DI4 type		
0x2818	410265	DI5 type		
0x2819	410266	DI6 type		
0x281A	410267	DI7 type		
0x281B	410268	DI8 type		
0x281C	410269	DI9 type		
0x281D	410270	DI10 type		

■ Validation setting (option)

Address (HEX)	Registers	Item	type	value/description	
0x281E	410271	Auto Validation start(day)	UINT16	Time setting (day of the week) 0 to 6 (Sunday to Saturday)	
0x281F	410272	Auto Validation start(hour)		Time setting (hour) 0 to 23	
0x2820	410273	Auto Validation start(min)		Time setting (minute) 0 to 59	
0x2821	410274	Auto Validation cycle		cycle *The setting range varies depending on the cycle unit. Cycle unit = hour: 1 to 99 Cycle unit = day: 1 to 40	
0x2822	410275	Auto Validation cycle unit	Unit 0: hour 1:day		
0x2823	410276	Auto Validation switch		Validation switch 0:OFF 1:ON	
0x2824	410277	Validation Flow time Zero Gas		Zero calibration gas flow time (minute) 60 to 900	
0x2825	410278	Ch1 Validation Flow time Span Gas		Span calibration gas flow time (second) 5 to 900	
0x2826	410279	Ch2 Validation Flow time Span Gas			
0x2827	410280	Ch3 Validation Flow time Span Gas			
0x2828	410281	Ch4 Validation Flow time Span Gas			
0x2829	410282	Ch5 Validation Flow time Span Gas			
0x282A	410283	Gas replacement time after validation		Replacement time (second) 60 to 900	
0x282B	410284	Ch1 Validation switch		Auto Validation Enable/Disable	
0x282C	410285	Ch2 Validation switch		0:Enable 1:Disable	
0x282D	410286	Ch3 Validation switch			
0x282E	410287	Ch4 Validation switch			
0x282F	410288	Ch5 Validation switch			
0x2830	410289	Ch1 Validation alarm setting	float	Validation alarm range (%FS)* Judgment is made by ± 0 to 20	
0x2831	410290				
0x2832	410291	Ch2 Validation alarm setting			
0x2833	410292				
0x2834	410293	Ch3 Validation alarm setting			
0x2835	410294				
0x2836	410295	Ch4 Validation alarm setting			
0x2837	410296				
0x2838	410297	Ch5 Validation alarm setting			
0x2839	410298				

2.3.4 Identification

Object id	Object name	Type	Value/description
0x00	vendor_name	ASCII	YOKOGAWA
0x01	product_code		IR800G, IR810G, IR810S
0x02	major_minor_version		create from software revision (e.g. 1,01.01)
Object id	Object name	Type	Value/description
0x03	vendor_url		—
0x04	product_name		—
0x05	model_name		—
0x06	user_app_name		—
Object id	Object name	Type	Value/description
0x84	MS_CODE	ASCII[64]	Model Code
0x85	SOFTWARE_REVISION	ASCII[12]	Software revision
0x86	INPUT_REG_FIFO_UPDATE_CYCLE	UINT32	500[ms]
0x87	INPUT_REG_RES_TIME		50[ms]
0x88	HOLD_REG_RES_TIME		100 [ms], Timeout time except Input Register
0x89	NEXT_REQ_WAIT_TIME		100 [ms], waiting time between completion of receiving a response and sending the next request
0x90	MODBUS_ADDR	UINT16	MODBUS address information
0x91	SERIAL_PROFILE_RS-485	ASCII[32]	Display example: 9600 even 1 stop

2.4 Additional Explanation of Address Map

* Register numbers 30062 - 30131 (error log)

The error log allows you to read up to 14 errors that have occurred in the past, starting with the most recent. The details of the errors are as follows

- | | |
|--------------|---|
| Error No: | The number of error that occurred. |
| | The stored value is the error number minus one. |
| | See "3. Alarm List" for error numbers. |
| Error DATE: | The date the error occurred. |
| Error HOUR | The time (hour) the error occurred. |
| Error MIN | The time (minute) the error occurred. |
| Error TARGET | Ch number where the error occurred |
| | The stored value is the Ch number minus 1. |
| | 0 for Error No. 3 and 10 |

3. Alarm

Refer to “7.1 Alarm” in the User’s Manual (IM 11G06A01-02EN or IM 11G06D01-02EN).

Alarm	Bit	Alarm name	Input Register Address
DEVICE_FAILURE	31	Converter unit failure	error 1(30132):1
	30	Output wiring error	error 10(30135):1
	29	Date/Time setting alarm	—
	15	Optical unit error	error 2(30133):1
	14	O2 unit error	error 3(30134):1
High Low alarm Ch1 to 8	31	Ch1 LL alarm	Upper and lower limit alarms for the target Ch set for each alarm Alarm 1 High Low limit alarm (30043) Alarm 2 High Low limit alarm (30044) Alarm 3 High Low limit alarm (30045) Alarm 4 High Low limit alarm (30046) Alarm 5 High Low limit alarm (30047) Alarm 6 High Low limit alarm (30191) 0: no alarm 1: High alarm 2: Low alarm 3: HH alarm 4: LL alarm
	30	Ch1 HH alarm	
	29	Ch1 L alarm	
	28	Ch1 H alarm	
	27	Ch2 LL alarm	
	26	Ch2 HH alarm	
	25	Ch2 L alarm	
	24	Ch2 H alarm	
	23	Ch3 LL alarm	
	22	Ch3 HH alarm	
	21	Ch3 L alarm	
	20	Ch3 H alarm	
	19	Ch4 LL alarm	
	18	Ch4 HH alarm	
	17	Ch4 L alarm	
	16	Ch4 H alarm	
High Low alarm Ch1 to 8	15	Ch5 LL alarm	
	14	Ch5 HH alarm	
	13	Ch5 L alarm	
	12	Ch5 H alarm	
	11	Ch6 LL alarm	
	10	Ch6 HH alarm	
	9	Ch6 L alarm	
	8	Ch6 H alarm	
	7	Ch7 LL alarm	
	6	Ch7 HH alarm	

Alarm	Bit	Alarm name	Input Register Address
High Low alarm Ch9 to 12	31	Ch9 LL alarm	Upper and lower limit alarms for the target Ch set for each alarm Alarm 1 High Low limit alarm (30043) Alarm 2 High Low limit alarm (30044) Alarm 3 High Low limit alarm (30045) Alarm 4 High Low limit alarm (30046) Alarm 5 High Low limit alarm (30047) Alarm 6 High Low limit alarm (30191) 0: no alarm 1: High alarm 2: Low alarm 3: HH alarm 4: LL alarm
	30	Ch9 HH alarm	
	29	Ch9 L alarm	
	28	Ch9 H alarm	
	27	Ch10 LL alarm	
	26	Ch10 HH alarm	
	25	Ch10 L alarm	
	24	Ch10 H alarm	
	23	Ch11 LL alarm	
	22	Ch11 HH alarm	
	21	Ch11 L alarm	
	20	Ch11 H alarm	
	19	Ch12 LL alarm	
	18	Ch12 HH alarm	
	17	Ch12 L alarm	
	16	Ch12 H alarm	
Peak alarm validation alarm Ch1 to Ch5	15	Peak counts alarm	Peak count alarm (30048) value:1
	14	Ch1 Zero validation alarm	—
	13	Ch1 Span validation alarm	—
	12	Ch2 Zero validation alarm	—
	11	Ch2 Span validation alarm	—
	10	Ch3 Zero validation alarm	—
	9	Ch3 Span validation alarm	—
	8	Ch4 Zero validation alarm	—
	7	Ch4 Span validation alarm	—
	6	Ch5 Zero validation alarm	—
	5	Ch5 Span validation alarm	—
Calibration error	31	Ch1 Zero calibration alarm	Error 4(30136) :1
	30	Ch1 Span calibration alarm	Error 6(30138) :1
	29	Ch1 Auto calibration alarm	Error 9(30141) :1
	28	Ch2 Zero calibration alarm	Error 4(30142) :1
	27	Ch2 Span calibration alarm	Error 6(30144) :1
	26	Ch2 Auto calibration alarm	Error 9(30147) :1
	25	Ch3 Zero calibration alarm	Error 4(30148) :1
	24	Ch3 Span calibration alarm	Error 6(30150) :1
	23	Ch3 Auto calibration alarm	Error 9(30153) :1
	22	Ch4 Zero calibration alarm	Error 4(30154) :1
	21	Ch4 Span calibration alarm	Error 6(30156) :1
	20	Ch4 Auto calibration alarm	Error 9(30159) :1
	19	Ch5 Zero calibration alarm	Error 4(30160) :1
	18	Ch5 Span calibration alarm	Error 6(30162) :1
	17	Ch5 Auto calibration alarm	Error 9(30165) :1
	16	Ch1 Cal. stability alarm	Error 8(30140) :1
	15	Ch2 Cal. stability alarm	Error 8(30146) :1
	14	Ch3 Cal. stability alarm	Error 8(30152) :1

Alarm	Bit	Alarm name	Input Register Address
Calibration error	13	Ch4 Cal. stability alarm	Error 8(30158) : 1
	12	Ch5 Cal. stability alarm	Error 8(30164) : 1
	11	Ch1 Zero cal. caution	—
	10	Ch1 Span cal. caution	—
	9	Ch2 Zero cal. caution	—
	8	Ch2 Span cal. caution	—
	7	Ch3 Zero cal. caution	—
	6	Ch3 Span cal. caution	—
	5	Ch4 Zero cal. caution	—
	4	Ch4 Span cal. caution	—
maintenance status	31	Ch1 Zero calibration / validation	Ch1 zero calibration (30050) : 1 During automatic calibration, Ch1 During automatic zero calibration (30166) Value: 1
	30	Ch1 Span calibration / validation	Ch1 span calibration in progress (30055) Value: 1 during automatic calibration, Ch1 automatic span calibration in progress (30167) Value: 1
	29	Ch1 Hold status	Ch1 on hold (30168) Value: 1
	28	Ch1 Range status	Ch1 Current range (30038) Value: (0: Range 1, 1: Range 2)
	27	Ch2 Zero calibration / validation	Ch2 zero calibration in progress (30051) Value: 1 during automatic calibration, Ch2 automatic zero calibration in progress (30169) Value: 1
	26	Ch2 Span calibration / validation	Ch2 span calibration in progress (30056) Value: 1 during automatic calibration, Ch2 automatic span calibration in progress (30170) Value: 1
	25	Ch2 Hold status	Ch2 on hold (30171) Value: 1
	24	Ch2 Range status	Ch2 Current range (30039) Value: (0: Range 1, 1: Range 2)
	23	Ch3 Zero calibration / validation	Ch3 Zero calibration in progress (30052) Value: 1 During automatic calibration, Ch3 Automatic Zero Calibration in progress (30172) Value: 1
	22	Ch3 Span calibration / validation	Ch3 span calibration in progress (30057) Value: 1 Ch3 Auto span calibration in progress (30057) Value: 1 During (30173) Value: 1
	21	Ch3 Hold status	Ch3 on hold (30174) Value: 1
	20	Ch3 Range status	Ch3 Current range (30040) Value: (0: Range 1, 1: Range 2)
	19	Ch4 Zero calibration / validation	Ch4 Zero calibration in progress (30053) Value: 1 During automatic calibration, Ch3 Automatic zero calibration in progress (30175) Value: 1

Alarm	Bit	Alarm name	Input Register Address
maintenance status	18	Ch4 Span calibration / validation	Ch4 span calibration in progress (30058) Value: 1 During automatic calibration, Ch3 Automatic span calibration During (30176) Value: 1
	17	Ch4 Hold status	Ch4 on hold (30177) Value: 1
	16	Ch4 Range status	Ch4 Current range (30041) Value: (0: Range 1, 1: Range 2)
	15	Ch5 Zero calibration / validation	Ch5 Zero calibration in progress (30054) Value: 1 During automatic calibration, Ch3 Automatic zero calibration in progress (30178) Value: 1
	14	Ch5 Span calibration / validation	Ch5 span calibration in progress (30059) Value: 1 During automatic calibration, Ch3 Automatic span calibration is in progress (30179) Value: 1 During (30179) Value: 1
	13	Ch5 Hold status	Ch5 on hold (30180) Value: 1
	12	Ch5 Range status	Ch5 Current range (30042) Value: (0: Range 1, 1: Range 2)
	11	Auto calibration mode	Automatic (auto zero) calibration in progress (30049)
	10	Maintenance mode	—
	9	Average value Reset	—
	8	Remote Hold mode	—
	7	Blowback mode	—
	6	Loop check	—
	5	Replace time mode	—
	4	Power On	—
	3	Validation mode	—

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