Pressure Indicator

PG500 Communication Quick Instruction Manual

 IMR02F03-E3

Thank you for purchasing this RKC product. In order to achieve maximum performance and ensure proper operation of your new instrument, carefully read all the instructions in this manual. Please place the manual in a convenient location for easy reference.
This manual describes the connection method with host computer, communication parameters and communication data of the PG500.

For detailed host communication such as protocol description, refer to the **PG500 Communication Instruction Manual (IMR02F04-E□)**.
The manual can be downloaded from the official RKC website:
http://www.rkcinst.com/english/manual_load.htm.

1. CONNECTION TO HOST COMPUTER

WARNING

To prevent electric shock or instrument failure, turn off the power before connecting or disconnecting the instrument and peripheral equipment.

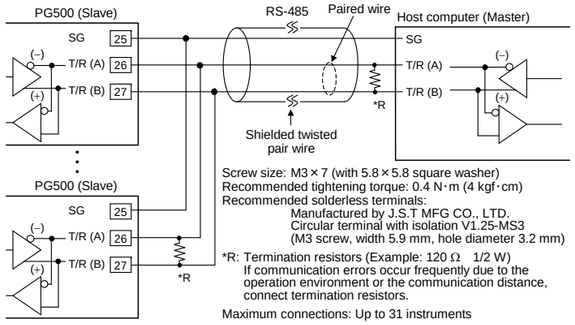
The cable and termination resistor (s) must be provided by the customer.

1.1 RS-485

■ **Communication terminal number and signal details**

Terminal No.	Signal name	Symbol
25	Signal ground	SG
26	Send/Receive data	T/R (A)
27	Send/Receive data	T/R (B)

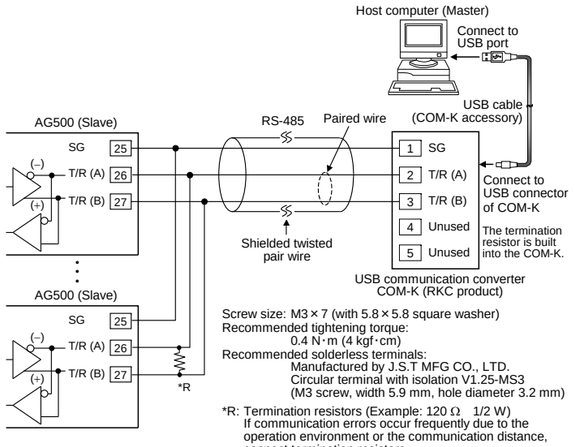
■ **When the interface of host computer (Master) is RS-485**



Screw size: M3 × 7 (with 5.8 × 5.8 square washer)
Recommended tightening torque: 0.4 N·m (4 kgf·cm)
Recommended solderless terminals:
Manufactured by J.S.T MFG CO., LTD.
Circular terminal with isolation V1.25-MS3
(M3 screw, width 5.9 mm, hole diameter 3.2 mm)
*R: Termination resistors (Example: 120 Ω 1/2 W)
If communication errors occur frequently due to the operation environment or the communication distance, connect termination resistors.
Maximum connections: Up to 31 instruments

■ **When the host computer (Master) has a USB connector**

Connect the USB communication converter between the host computer and the PG500.



Screw size: M3 × 7 (with 5.8 × 5.8 square washer)
Recommended tightening torque: 0.4 N·m (4 kgf·cm)
Recommended solderless terminals:
Manufactured by J.S.T MFG CO., LTD.
Circular terminal with isolation V1.25-MS3
(M3 screw, width 5.9 mm, hole diameter 3.2 mm)
*R: Termination resistors (Example: 120 Ω 1/2 W)
If communication errors occur frequently due to the operation environment or the communication distance, connect termination resistors.
Maximum connections: Up to 31 instruments

For the COM-K, refer to the **COM-K Instruction Manual (IMR01Z01-E□)**.

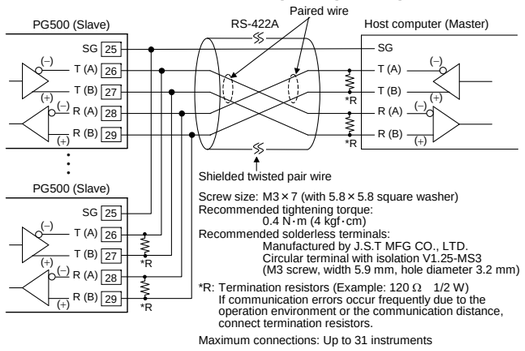
1.2 RS-422A

■ **Communication terminal number and signal details**

Terminal No.	Signal name	Symbol
25	Signal ground	SG
26	Send data	T (A)
27	Send data	T (B)

Terminal No.	Signal name	Symbol
28	Receive data	R (A)
29	Receive data	R (B)

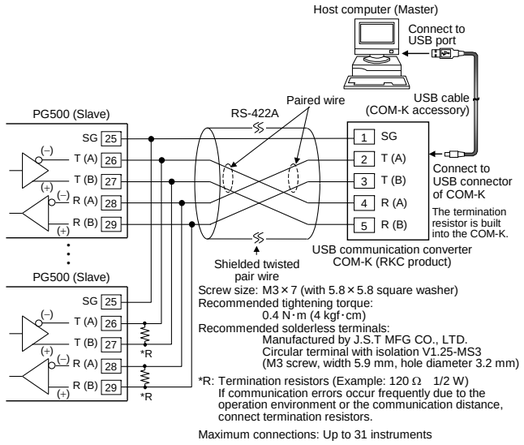
■ **When the interface of host computer (Master) is RS-422A**



Screw size: M3 × 7 (with 5.8 × 5.8 square washer)
Recommended tightening torque: 0.4 N·m (4 kgf·cm)
Recommended solderless terminals:
Manufactured by J.S.T MFG CO., LTD.
Circular terminal with isolation V1.25-MS3
(M3 screw, width 5.9 mm, hole diameter 3.2 mm)
*R: Termination resistors (Example: 120 Ω 1/2 W)
If communication errors occur frequently due to the operation environment or the communication distance, connect termination resistors.
Maximum connections: Up to 31 instruments

■ **When the host computer (Master) has a USB connector**

Connect the USB communication converter between the host computer and the PG500.



Screw size: M3 × 7 (with 5.8 × 5.8 square washer)
Recommended tightening torque: 0.4 N·m (4 kgf·cm)
Recommended solderless terminals:
Manufactured by J.S.T MFG CO., LTD.
Circular terminal with isolation V1.25-MS3
(M3 screw, width 5.9 mm, hole diameter 3.2 mm)
*R: Termination resistors (Example: 120 Ω 1/2 W)
If communication errors occur frequently due to the operation environment or the communication distance, connect termination resistors.
Maximum connections: Up to 31 instruments

For the COM-K, refer to the **COM-K Instruction Manual (IMR01Z01-E□)**.

2. SETTING

To establish communication parameters between host computer and PG500, it is necessary to set the following parameters.

When all communication parameter settings have been completed, turn the power off and then on to make the new set values take effect.

This section describes the parameters to need setting for communication. For the mode/parameters transfer and data setting, refer to the **PG500 Operation Manual (IMR02F02-E□)**.

■ **Description of each parameters**

● **Engineering mode F60**

Symbol	Name	Data range	Description	Factory set value
CMP (CMP)	Communication protocol	0: RKC communication 1: Modbus	Use to select a protocol of communication function.	0

● **Setup setting mode**

Symbol	Name	Data range	Description	Factory set value
Add (Add)	Device address (Slave address)	0 to 99 Maximum connections: Up to 31 instruments	Do not use the same device address for more than one instrument in multi-drop connection. Each instrument must have a unique address in multi-drop connection. In Modbus communication, communication is not possible when the address is 0.	0
bPS (bPS)	Communication speed	1.2: 1200 bps 2.4: 2400 bps 4.8: 4800 bps 9.6: 9600 bps 19.2: 19200 bps 38.4: 38400 bps	Set the same communication speed for both the PG500 (slave) and the host computer (master).	9.6
bIT (bIT)	Data bit configuration	Refer to **Data bit configuration table**	Set the same data bit configuration for both the PG500 (slave) and the host computer (master).	8n1
InT (InT)	Interval time	0 to 250 ms	The interval time for the PG500 should be set to provide a time for host computer to finish sending all data including stop bit and to switch the line to receive status for the host.	10

Data bit configuration table

Set value	Data bit	Parity bit	Stop bit
8n1	8	Without	1
8n2	8	Without	2
8E1	8	Even	1
8E2	8	Even	2
8o1	8	Odd	1
8o2	8	Odd	2

Set value	Data bit	Parity bit	Stop bit
7n1 *	7	Without	1
7n2 *	7	Without	2
7E1 *	7	Even	1
7E2 *	7	Even	2
7o1 *	7	Odd	1
7o2 *	7	Odd	2

* When the Modbus communication protocol selected, this setting becomes invalid.

Interval time:
The interval time for the PG500 should be set to provide a time for host computer to finish sending all data including stop bit and to switch the line to receive status for the host. If the interval time between the two is too short, the PG500 may send data before the host computer is ready to receive it. In this case, communication transmission cannot be conducted correctly.

3. COMMUNICATION REQUIREMENTS

■ **Processing times during data send/receive**

When the host computer is using either the polling or selecting procedure for communication, the following processing times are required for PG500 to send data:
- Response wait time after PG500 sends BCC in polling procedure
- Response wait time after PG500 sends ACK or NAK in selecting procedure

Response send time is time when interval time is set at 0 ms.

RKC communication (Polling procedure)

Procedure details	Time
Response send time after PG500 receives ENQ	3 ms max.
Response send time after PG500 receives ACK	3 ms max.
Response send time after PG500 receives NAK	3 ms max.
Response send time after PG500 sends BCC	1 ms max.

RKC communication (Selecting procedure)

Procedure details	Time
Response send time after PG500 receives BCC	34 ms max.
Response wait time after PG500 sends ACK	1 ms max.
Response wait time after PG500 sends NAK	1 ms max.

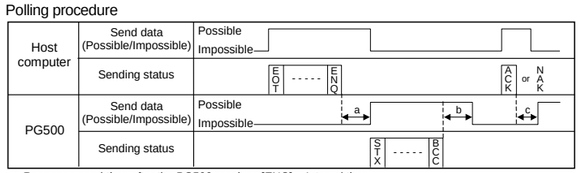
Modbus

Procedure details	Time
Read holding registers [03H] Response send time after the slave receives the query message (When 125 registers are collectively read)	360 ms max.
Preset single register [06H] Response send time after the slave receives the query message	25 ms max.
Diagnostics (loopback test) [08H] Response send time after the slave receives the query message	15 ms max.
Preset multiple registers [10H] Response send time after the slave receives the query message (When 123 registers are collectively write)	360 ms max.

■ **RS-485 (2-wire system) send/receive timing (RKC communication)**

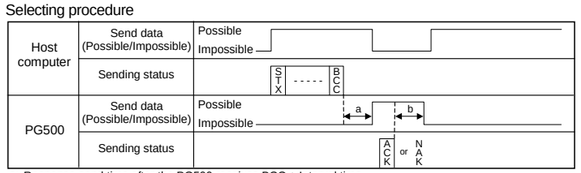
RS-485 communication is conducted through two wires, therefore the transmission and reception of data requires precise timing.

Polling procedure



a: Response send time after the PG500 receives [ENQ] + Interval time
b: Response send time after the PG500 sends BCC
c: Response send time after the PG500 receives [ACK] + Interval time or
Response send time after the PG500 receives [NAK] + Interval time

Selecting procedure



a: Response send time after the PG500 receives BCC + Interval time
b: Response wait time after the PG500 sends ACK or Response wait time after the controller sends NAK

To switch the host computer from transmission to reception, send data must be on line.

The following processing times are required for the PG500 to process data.
- In Polling procedure, Response wait time after the PG500 sends BCC
- In Selecting procedure, Response wait time after the PG500 sends ACK or NAK

■ **RS-422A/RS-485 fail-safe**

A transmission error may occur with the transmission line disconnected, shorted or set to the high-impedance state. In order to prevent the above error, it is recommended that the fail-safe function be provided on the receiver side of the host computer. The fail-safe function can prevent a framing error from its occurrence by making the receiver output stable to the MARK (1) when the transmission line is in the high-impedance state.

■ **Modbus data processing precautions**

- The numeric range of data used in Modbus protocol is 0000H to FFFFH. Only the set value within the setting range is effective.
  FFFFH represents –1.
- Data with decimal point is treated as data without decimal point on the Modbus protocol.
- If data (holding register) exceeding the accessible address range is accessed, an error response message is returned.
- Read data of unused item is a default value.
- Any attempt to write to an unused item is not processed as an error. Data can not be written into an unused item.
- If data range or address error occurs during data writing (Write Action), it is not processed as an error. Normal data is written in data register but data with error is not written; therefore, it is recommended to confirm data of changed items after the data setting.
- An attribute of the item for functions which are not in the indicator is RO (read only). If read action to this item is performed, the read data will be "0." If write action to this item is performed, no error message is indicated and no data is written.
- Commands should be sent at time intervals of 30 bits after the master receives the response message.
- Error code

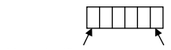
Problem	Possible cause	Solution
Error code 1	Function cod error (Specifying nonexistent function code)	Confirm the function code
Error code 2	When the mismatched address is specified	Confirm the address of holding register
Error code 3	When the specified number of data items in the query message exceeds the maximum number of data items available	Confirm the setting data
Error code 4	Self-diagnostic error	Turn off the power to the instrument. If the same error occurs when the power is turned back on, please contact RKC sales office or the agent.

4. COMMUNICATION DATA LIST

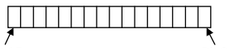
The communication data map shows data which can be used for communication between the host computer and PG500.

Explanation of data map items
- Modbus register address
  HEX: Hexadecimal DEC: Decimal
- Attribute (A method of how communication data items are read or written when viewed from the host computer is described)
  RO: Only reading data is possible (Host computer ← PG500)
  R/W: Reading and writing data is possible (Host computer ↔ PG500)
- Data

RKC communication
ASCII code data of 6 digits



Modbus
16-bit data



Name	RKC Identifier	Modbus register address HEX	Modbus register address DEC	Attribute	Data range	Factory set value
Model code	ID	—	—	RO	Model character code (32-digit)	—
ROM version monitor	VR	—	—	RO	Version of ROM built-in the instrument (9-digit)	—
Measured value (PV)	M1	00E0	224	RO	Pressure display low to Pressure display high	—
Burnout state monitor	B1	00E1	225	RO	0: OFF 1: ON	—
Alarm 1 state monitor	AA	00E2	226	RO	0: OFF 1: ON	—
Alarm 2 state monitor	AB	00E3	227	RO		—
Alarm 3 state monitor	AC	00E4	228	RO		—
Alarm 4 state monitor	AD	00E5	229	RO		—
Unused	—	00E6	230	—	—	—
Unused	—	00E7	231	—	—	—
Peak hold monitor	HP	00E8	232	RO	Pressure display low to Pressure display high	—
Bottom hold monitor	HQ	00E9	233	RO	At input break: Display range limit	—

Name	RKC Identifier	Modbus register address HEX	Modbus register address DEC	Attribute	Data range	Factory set value
Error code	ER	00EA	234	RO	RKC communication 1: Adjustment data error 2: Back-up error 4: A/D conversion error 16: Auto zero/auto calibration error 128: Watchdog timer error 256: Program error (stack) 2048: Program error (busy)	—
					Modbus (Bit data) Bit 0: Adjustment data error Bit 1: Back-up error Bit 2: A/D conversion error Bit 3: Unused Bit 4: Auto zero/auto calibration error Bit 5, Bit 6: Unused Bit 7: Watchdog timer error Bit 8: Program error (stack) Bit 9: Unused Bit 10: Unused Bit 11: Program error (busy) Bit 12 to Bit 15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 2455]	—
Digital input (DI) state monitor	L1	00EB	235	RO	RKC communication Least significant digit: The state of auto zero (DI1) 2nd digit: The state of hold reset (DI2) 3rd digit: The state of Interlock release (DI3) 4th digit to Most significant digit: Unused Data 0: Contact open 1: Contact closed	—
					Modbus (Bit data) Bit 0: The state of auto zero (DI1) Bit 1: The state of hold reset (DI2) Bit 2: The state of Interlock release (DI3) Bit 3 to Bit 15: Unused Data 0: Contact open 1: Contact closed [Decimal number: 0 to 7]	—
Alarm output state monitor	Q1	00EC	236	RO	RKC communication Least significant digit to 4th digit: The state of Alarm 1 output to Alarm 4 output 5th digit to Most significant digit: Unused Data 0: OFF 1: ON	—
					Modbus (Bit data) Bit 0 to Bit 3: The state of Alarm 1 output to Alarm 4 output Bit 4 to Bit 15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 15]	—
Integrated operating time monitor	UT	00ED	237	RO	0 to 19999 hours	—
Unused	—	00EE	238	—	—	—
Unused	—	00EF	239	—	—	—
Auto zero	AZ	00F0	240	R/W	0: Normal state 1: Auto zero execution When "1" is written, auto zero starts. When done, the value reverts to "0." 3: Error When "0" is written, returns to a normal state.	0
Auto calibration [1]	FS	00F1	241	R/W	0: Normal state 1: Auto calibration execution When "1" is written, auto calibration starts. When done, the value reverts to "0." 3: Error When "0" is written, returns to a normal state.	0
Hold reset	HR	00F2	242	R/W	0: Hold reset execution 1: Hold state When "0" is written, the hold reset is performed. When done, the value reverts to "1."	1
Interlock release [2]	IR	00F3	243	R/W	0: Interlock release execution 1: Interlock state When "0" is written, the interlock is released. When done, the value reverts to "1."	1
Alarm 1 set value [3]	A1	00F4	244	R/W	Pressure display low to Pressure display high Varies with the setting of the Input decimal point position. Signals are output from the alarm outputs (ALM1 to ALM4) if exceeding the alarm set value.	50
Alarm 2 set value [3]	A2	00F5	245	R/W		0
Alarm 3 set value [3]	A3	00F6	246	R/W		50
Alarm 4 set value [3]	A4	00F7	247	R/W		50
Unused	—	00F8	248	—	—	—
Unused	—	00F9	249	—	—	—

[1] This item is valid when using resistance for sensitivity adjustment built-in pressure sensor.
[2] This item is invalid when the alarm 1 to 4 Interlock are set to "0: Unused."
[3] This item is invalid when the alarm type is set to "0: None."

Name	RKC Identifier	Modbus register address HEX	Modbus register address DEC	Attribute	Data range	Factory set value
Input type	XI	00FA	250	R/W	0 to 4 Refer to **Input type and factory set value table**.	Based on model code.
Gain setting	GA	00FB	251	R/W	0.500 to 4.000 mV/V or 0.5000 to 1.9999 mV/V * Varies with the setting of the Gain setting decimal point position.	Refer to **Input type and factory set value table**
Display unit	PU	00FC	252	R/W	0: Kgf/cm^2 2: bar 1: MPa 3: psi	1
Input decimal point position	XU	00FD	253	R/W	0: No decimal place 1: One decimal place 2: Two decimal places 3: Three decimal places	0
Pressure display high	XV	00FE	254	R/W	Pressure display low to 19999 Varies with the setting of the Input decimal point position.	50
Pressure display low	XW	00FF	255	R/W	0 to Pressure display high Varies with the setting of the Input decimal point position.	0
Linearizing type	LI	0100	256	R/W	0 to 20 *	0
PV bias	PB	0101	257	R/W	–Input span to +Input span Varies with the setting of the Input decimal point position.	0
PV digital filter	F1	0102	258	R/W	0.0 to 100.0 seconds (0.0: Unused)	0
PV ratio	PR	0103	259	R/W	0.500 to 1.500 *	1.000
Unused	—	0104	260	—	—	—
Set lock level	LK	0105	261	R/W	RKC communication Least significant digit: Items other than alarm set value. 2nd digit: Alarm set value 3rd digit to Most significant digit: Unused Data 0: Unlock 1: Lock	0
					Modbus (Bit data) Bit 0: Items other than alarm set value. Bit 1: Alarm set value Bit 2 to Bit 15: Unused Data 0: Unlock 1: Lock [Decimal number: 0 to 3]	0
Display timer	TL	0106	262	R/W	0.1 to 10.0 seconds	0.1
PV display condition	DU	0107	263	R/W	RKC communication 0 to 63 (Decimal) Set the bit data (Refer to Modbus) after converting it to decimal.	0
					Modbus (Bit data) Bit 0: Minus display of PV value Bit 1: Input error Bit 2: Alarm 1 occurs Bit 3: Alarm 2 occurs Bit 4: Alarm 3 occurs Bit 5: Alarm 4 occurs Bit 6 to Bit 15: Unused Data Bit 0 0: Minus display 1: Non-minus display Bit 1 to Bit 5 0: Non-flashing display 1: Flashing display [Decimal number: 0 to 63]	0

* The setting value varies depending on using pressure sensor.

Data name	When using our CZ-100P or CZ-200P	When using resistance for sensitivity adjustment built-in pressure sensor
Gain setting	Refer to ● **Gain setting and linearizing type** of **PG500 Operation Manual (IMR02F02-E□)**.	Set the appropriate gain setting value.
Linearizing type		Use a factory set value of "0."
PV ratio	[Explosionproof specification type] Set the desired correction factor of our safety barrier RZB-001 to the PV ratio (Pr). Thus, an indicated error caused by the use of the safety barrier is corrected. The correction factor is described in the nameplate attached to the safety barrier (RZB-001).	The result obtained by auto calibration is reflected to the PV ratio (Pr). Manual full scale adjustment can be performed by changing this PV ratio value.
	[Non-explosionproof specification type] Use a factory set value of "1.000."	

Input type and factory set value table

Set value	Input type	Factory set value of gain setting (mV/V)
0	Our CZ-100P/CZ-200P (Standard)	1.500
1	Our CZ-100P/CZ-200P (Explosionproof)	1.500
2	Our CZ-100P/CZ-200P (Standard) [Loose nut: 0.0 to 0.5 MPa, Fixed nut: 0 to 5 MPa]	0.650
3	Our CZ-100P/CZ-200P (Explosionproof) [Loose nut: 0.0 to 0.5 MPa, Fixed nut: 0 to 5 MPa]	0.650
4	3.33 mV/V output type (Pressure sensor made by other companies)	3.330

Name	RKC Identifier	Modbus register address HEX	Modbus register address DEC	Attribute	Data range	Factory set value
Input error determination point (high)	AV	0108	264	R/W	Pressure display low – (5 % of input span) to Pressure display high + (5 % of input span) Varies with the setting of the Input decimal point position.	53
Input error determination point (low)	AW	0109	265	R/W		–2
Burnout direction	IB	010A	266	R/W	0: Upscale 1: Downscale Setting of a barn out direction select switch is necessary to select a barn out direction. For the switch setting, refer to the **PG500 Installation Manual (IMR02F01-E□)**.	0
Gain setting decimal point position	GS	010B	267	R/W	3: Three decimal places 4: Four decimal places	3
Unused	—	010C	268	—	—	—
Shunt resistance output value [1]	OR	010D	269	R/W	40.0 to 100.0 %	80.0
Transmission output scale high	HV	010E	270	R/W	Transmission output scale low to Pressure display high Varies with the setting of the Input decimal point position.	50
Transmission output scale low	HW	010F	271	R/W	Pressure display low to Transmission output scale high Varies with the setting of the Input decimal point position.	0
Transmission output timer	TO	0110	272	R/W	0.1 to 10.0 seconds	0.1
Alarm 1 type	XA	0111	273	R/W	0: None 1: Process high 2: Process low	Based on model code [2]
Alarm 1 hold action	WA	0112	274	R/W	0: OFF 1: Hold action ON	Based on model code [2]
Alarm 1 interlock	QA	0113	275	R/W	0: Unused (OFF) 1: Used	0
Alarm 1 energized/ de-energized	NA	0114	276	R/W	0: Energized 1: De-energized	0
Alarm 1 differential gap	HA	0115	277	R/W	0 to Input span Varies with the setting of the Input decimal point position.	2
Alarm 1 delay timer	TD	0116	278	R/W	0.0 to 600.0 seconds	0.0
Alarm 1 action at input error	OA	0117	279	R/W	0: Normal alarm action 1: Forced alarm ON when temperature measured value exceeds the input error determination point (high or low limit).	0
Alarm 2 type	XB	0118	280	R/W	Same as Alarm 1 type	
Alarm 2 hold action	WB	0119	281	R/W	Same as Alarm 1 hold action	
Alarm 2 interlock	QB	011A	282	R/W	Same as Alarm 1 interlock	
Alarm 2 energized/ de-energized	NB	011B	283	R/W	Same as Alarm 1 energized/ de-energized	
Alarm 2 differential gap	HB	011C	284	R/W	Same as Alarm 1 differential gap	
Alarm 2 delay timer	TG	011D	285	R/W	Same as Alarm 1 delay timer	
Alarm 2 action at input error	OB	011E	286	R/W	Same as Alarm 1 action at input error	
Alarm 3 type	XC	011F	287	R/W	Same as Alarm 1 type	
Alarm 3 hold action	WC	0120	288	R/W	Same as Alarm 1 hold action	
Alarm 3 interlock	QC	0121	289	R/W	Same as Alarm 1 interlock	
Alarm 3 energized/ de-energized	NC	0122	290	R/W	Same as Alarm 1 energized/ de-energized	
Alarm 3 differential gap	HC	0123	291	R/W	Same as Alarm 1 differential gap	
Alarm 3 delay timer	TH	0124	292	R/W	Same as Alarm 1 delay timer	
Alarm 3 action at input error	OC	0125	293	R/W	Same as Alarm 1 action at input error	
Alarm 4 type	XD	0126	294	R/W	Same as Alarm 1 type	
Alarm 4 hold action	WD	0127	295	R/W	Same as Alarm 1 hold action	
Alarm 4 interlock	QD	0128	296	R/W	Same as Alarm 1 interlock	
Alarm 4 energized/ de-energized	ND	0129	297	R/W	Same as Alarm 1 energized/ de-energized	
Alarm 4 differential gap	HD	012A	298	R/W	Same as Alarm 1 differential gap	
Alarm 4 delay timer	TI	012B	299	R/W	Same as Alarm 1 delay timer	
Alarm 4 action at input error	OD	012C	300	R/W	Same as Alarm 1 action at input error	
Unused	—	012D ⋮ 013A	301 ⋮ 314	—	—	—

[1] This item is valid when using resistance for sensitivity adjustment built-in pressure sensor.
[2] When not specifying: Alarm 1: Process high (without hold action) Alarm 3: No alarm
Alarm 2: Process low (without hold action) Alarm 4: No alarm

5. HOW TO USE MODBUS DATA MAPPING

In this communication, it is possible to continuously read/write data by freely specifying 16 sets of data.
Register address to specify mapping data: **1000H to 100FH**
Register address to actually read/write data: **1500H to 150FH**
Register address of data which can be mapped: Refer to **4. COMMUNICATION DATA LIST**.

Example: When mapping Measured value (PV), Alarm 1 state monitor, Alarm 2 state monitor and Alarm output state monitor to the register addresses from 1500H to 1503H

For data mapping Factory set value: (–1: No mapping) Name	Register address HEX	Register address DEC
Setting 1 (For 1500H)	1000	4096
Setting 2 (For 1501H)	1001	4097
Setting 3 (For 1502H)	1002	4098
Setting 4 (For 1503H)	1003	4099
⋮	⋮	⋮
Setting 16 (For 150FH)	100F	4111

Mapping data Name	Register address HEX	Register address DEC
Measured value (PV)	00E0	224
Alarm 1 state monitor	00E2	226
Alarm 2 state monitor	00E3	227
Alarm output state monitor	00EC	236

Write to 1000H to 1003H.

1. The register address, "00E0H" of the "Measured value (PV)" to be mapped is written to register address setting 1 (1000H).
2. The register address, "00E2H" of the "Alarm 1 state monitor" to be mapped is written to register address setting 2 (1001H).
3. The register address, "00E3H" of the "Alarm 2 state monitor" to be mapped is written to register address setting 3 (1002H).
4. The register address, "00ECH" of the "Alarm output state monitor" to be mapped is written to register address setting 4 (1003H).
5. The assignment of the register addresses from 1500H to 1503H from/to which data is actually read/written becomes as follows.

Register address HEX	Register address DEC	Name
1500	5376	Measured value (PV)
1501	5377	Alarm 1 state monitor
1502	5378	Alarm 2 state monitor
1503	5379	Alarm output state monitor

High-speed communication is performed by reading or writing data in the consecutive register addresses from 1500H to 1503H.

6. COMMUNICATION SPECIFICATIONS

Interface: Based on RS-422A or RS-485, EIA standard
Synchronous method: Start-stop synchronous type
Communication speed: 1200 bps, 2400 bps, 4800 bps, 9600 bps, 19200 bps, 38400 bps
Data bit configuration:
Start bit: 1
Data bit: RKC communication: 7 or 8
Modbus: 8
Parity bit: Without, Odd or Even
Stop bit: 1 or 2
Connection method: RS-422A: 4-wire system, half-duplex multi-drop connection
RS-485: 2-wire system, half-duplex multi-drop connection
Protocol:
- RKC communication (ANSI X3.28-1976 subcategories 2.5 and A4)
  Error control: Vertical parity (With parity bit selected)
  Horizontal parity (BCC check)
  Communication code: ASCII 7-bit code
  Xon/Xoff control: None
- Modbus
  Signal transmission mode: Remote Terminal Unit (RTU) mode
  Function code: 03H (Read holding registers)
  06H (Preset single register)
  08H (Diagnostics: loopback test)
  10H (Preset multiple registers)
  Error check method: CRC-16

Maximum connections: Up to 31 instruments
Termination resistor: Externally connected (Example: 120 Ω 1/2 W)
Data mapping function: Up to 16 items (Only Modbus)
Interval time: 0 to 250 ms
Signal logic: RS-422A, RS-485

Signal voltage	Logic
V (A) – V (B) ≥ 2 V	0 (SPACE)
V (A) – V (B) ≤ –2 V	1 (MARK)

Voltage between V (A) and V (B) is the voltage of (A) terminal for the (B) terminal.

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