PROFIBUS Communication Converter

COM-JG [For FB100/FB400/FB900] Communication Data List

IMR01Y18-E4

This manual describes the communication data of the COM-JG. For the installation, the detail handling procedures and various function settings, please read if necessary the following separate manuals.

- COM-JG [For FB100/FB400/FB900] Installation Manual (IMR01Y03-E□): Enclosed with COM-JG
- COM-JG [For FB100/FB400/FB900] Quick Instruction Manual (IMR01Y13-E□): Enclosed with COM-JG
- COM-JG [For FB100/FB400/FB900] Instruction Manual (IMR01Y08-E□): Separate (Download free or purchase hard copy)

These manuals can be downloaded from our website:
URL: http://www.rkcinst.com/english/manual_load.htm

1. COMMUNICATION DATA

Describes data to use by PROFIBUS communication.

■ Data access types

- Static data read/write
- Dynamic data read/write
- Error state register
- Write permission register

■ Communication data length

Up to 170 bytes including both read and write data.

- Static data request
  The maximum number of communication items which can be specified:
  40 items (Read items+Write items)
  The communication items which can be specified:
  Data of the **2. COMMUNICATION DATA MAP**
- Dynamic data request
  The communication items which can be requested:
  Data of the **2. COMMUNICATION DATA MAP**

The number of communication items becomes as follows depending on the number of connecting controllers.

Number of static data × Number of connection controller × 2 + Number of dynamic data × 6 + 4 ≤ 170

Number of connection controllers	Number of static data
1 controller	Up to 40 items including both read and write items.
16 controllers	Up to 5 items including both read and write items.
31 controllers	Up to 2 items including both read and write items.

■ Static data request

- Static data is that which is always read/written from/to the PROFIBUS master such as the PLC. The data item is selected by the configuration tool such as the PLC.
- As the Modbus register address is directly specified, data items of all the controllers connected to the COM-JG can be selected.
- When static data is requested, 1-word (2-bytes) data is used for both read and write.

■ Dynamic data request

- Dynamic data is that which is freely read/written from/to the PROFIBUS master such as the PLC. The data item is freely selected by the sequence program.
- As the Modbus register address is directly specified, data items of all the controllers connected to the COM-JG can be selected.
- When dynamic data is requested, 3-word (6-bytes) data is used for both read and write.

- Send register to the COM-JG

Register configuration:

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5
Attribute	Device address	Communication item address		Communication item data	

Byte position	Content
0	Attribute: Bit 7 Bit 6 Bit 5 Bit 4 Bit 3 Bit 2 Bit 1 Bit 0 Bit 5: Unused Bit 6: 0: Send data is valid, 1: Send data is invalid Bit 7: 0: Data read, 1: Data write
1	Device address: Specify an accessing device address of controller. Data range: 0 to 99 ("0" at Modbus is invalid)
2, 3	Communication item address: The communication item address of controller, to/from which data is written/read is specified.
4, 5	Communication item data: Write data of a communication item. For data read, data is ignored.

- Receive register from the COM-JG

Register configuration:

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5
Attribute	Device address	Communication item address		Communication item data	

Byte position	Content
0	Attribute: Bit 7 Bit 6 Bit 5 Bit 4 Bit 3 Bit 2 Bit 1 Bit 0 Bit 4: Unused Bit 5: 0: Controller data updated, 1: Controller data non-update Bit 6: 0: Send data is valid, 1: Send data is invalid Bit 7: 0: Data read, 1: Data write
1	Device address: The specified controller device address is returned.
2, 3	Communication item address: The communication item address of controller, to/from which data is written/read is returned. However, if any communication item address out of the data range or of unused item is specified, "FFFFH" is returned.
4, 5	Communication item data: The current value of relevant communication item is stored. When the data is written, there is a delay in rewriting the data in this register as the COM-JG updates the register after rereading the data on the controller.

■ Error state register

Bit configuration:

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0

Bit position	Content
0	Instrument error: 0: No instrument error 1: Instrument error In case of the following either, become an error. • None of the controllers is connected. • COM-JG is hardware abnormally.
1	Time-out error: 0: No time-out error 1: Time-out error Successive communication time-out occurring twice in the same controller after PROFIBUS is initialized causes a time-out error. Communication continues even during the time-out error and recovers with no time-out error when the communication returns to normal. Time-out time: 3 seconds
2	Controller communication valid/invalid: 0: Controller communication is valid 1: Controller communication is invalid Interlocked with dip switch No. 7 at the side of the controller.
3	Controller communication initialization: 0: Completed initialization of controller communication 1: During initialization of controller communication Indicates the controller communication initialized state when the power is turned on and at this state invalidates the data on each communication item.
4 to 7	Unused

■ Write permission register

Register to control data write permission/not permission.

00h: Not permission

0Fh: Permission

The operation of writing a hexadecimal value of "0FH" to the write permission register is necessary for both static and dynamic data requests.

2. COMMUNICATION DATA MAP

The communication data map shows data which can be used for communication between the PLC and COM-JG.

- Modbus register address
  HEX: Hexadecimal DEC: Decimal
- Attribute
  RO: Only reading data is possible.
  R/W: Reading and writing data is possible.
- Data

16-bit data

Bit 15 ····· Bit 0

■ Communication data

No.	Name	Modbus register address HEX	Modbus register address DEC	Attribute	Data range	Factory set value
1	Measured value (PV)	0000	0	RO	Input scale low to Input scale high	—
2	Current transformer 1 (CT1) input value monitor	0001	1	RO	CTL-6-P-N: 0.0 to 30.0A	—
3	Current transformer 2 (CT2) input value monitor	0002	2	RO	CTL-12-S56-10L-N: 0.0 to 100.0 A	—
4	Set value (SV) monitor	0003	3	RO	Setting limiter low to Setting limiter high	—
5	Remote setting (RS) input value monitor	0004	4	RO	Setting limiter low to Setting limiter high	—
6	Burnout state monitor	0005	5	RO	0: OFF 1: ON	—
7	Burnout state monitor of feedback resistance input	0006	6	RO	0: OFF 1: ON	—
8	Event 1 state monitor	0007	7	RO	0: OFF 1: ON	—
9	Event 2 state monitor	0008	8	RO		—
10	Event 3 state monitor	0009	9	RO		
11	Event 4 state monitor	000A	10	RO		—
12	Heater break alarm 1 (HBA1) state monitor	000B	11	RO	0: OFF 1: ON	—
13	Heater break alarm 2 (HBA2) state monitor	000C	12	RO		—
14	Manipulated output value (MV1) monitor [heat-side]	000D	13	RO	PID control or Heat/Cool PID control: −5.0 to +105.0 % Position proportioning control with feedback resistance (FBR) input: 0.0 to 100.0 %	—
15	Manipulated output value (MV2) monitor [cool-side]	000E	14	RO	−5.0 to +105.0 %	—
16	Error code	000F	15	RO	Bit data Bit 0: Adjustment data error Bit 1: Back-up error Bit 2: A/D conversion error Bit 3 to Bit 4: Unused Bit 5: Custom data error Bit 6: Unused Bit 7: Watchdog timer error Bit 8: Stack overflow Bit 9 to Bit 10: Unused Bit 11: Program error (busy) Bit 12 to Bit 15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 4095]	—
17	Digital input (DI) state monitor	0010	16	RO	Bit data Bit 0: DI1 Bit 1: DI2 Bit 2: DI3 Bit 3: DI4 Bit 4: DI5 Bit 5: DI6 [1] Bit 6: DI7 [1] Bit 7 to Bit 15: Unused Data 0: Contact open 1: Contact closed [Decimal number: 0 to 127]	—

[1] Unused on the FB100.

No.	Name	Modbus register address HEX	Modbus register address DEC	Attri-bute	Data range	Factory set value
18	Output state monitor	0011	17	RO	Bit data Bit 0: OUT1 Bit 1: OUT2 Bit 2: DO1 Bit 3: DO2 Bit 4: DO3 [1] Bit 5: DO4 [1] Bit 6 to Bit 15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 63]	—
19	Operation mode state monitor	0012	18	RO	Bit data Bit 0: Control STOP Bit 1: Control RUN Bit 2: Manual mode [2] Bit 3: Remote mode [2] Bit 4 to Bit 15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 15]	—
20	Memory area soak time monitor	0013	19	RO	0 to 11999 seconds or 0 to 5999 minutes Data range of Area soak time can be selected on the Soak time unit.	—
21	Integrated operating time monitor	0014	20	RO	0 to 19999 hours	—
22	Holding peak value ambient temperature monitor	0015	21	RO	−10.0 to +100.0 °C	—
23	Power feed forward input value monitor [1]	0016	22	RO	0.0 to 160.0 % Display in the percentage of the load voltage (rated value).	—
24	Backup memory state monitor	0017	23	RO	0: The content of the backup memory does not coincide with that of the RAM. 1: The content of the backup memory coincides with that of the RAM.	—
25	ROM version monitor	—	—	RO	Display the version of ROM.	—
26 • • • 33	Unused	0018 • • • 001F	24 • • • 31	—	—	—
34	PID/AT transfer	0020	32	R/W	0: PID control 1: Autotuning (AT) * * Automatically reverts to 0 after Autotuning ends.	0
35	Auto/Manual transfer	0021	33	R/W	0: Auto mode 1: Manual mode	0
36	Remote/Local transfer	0022	34	R/W	0: Local mode 1: Remote mode	0
37	RUN/STOP transfer	0023	35	R/W	0: RUN mode (Control start) 1: STOP mode (Control stop)	0
38	Memory area transfer	0024	36	R/W	1 to 8	1
39	Interlock release	0025	37	R/W	0: Interlock release (Execution/State) 1: Interlock "1" is for monitoring the interlocked state. Under this condition, do not write "1."	0
40	Event 1 set value (EV1)	0026	38	R/W	Deviation: −Input span to +Input span Process and set value: Input scale low to Input scale high Manipulated output value (MV1 or MV2): −5.0 to +105.0 %	50
41	Event 2 set value (EV2)	0027	39	R/W		50
42	Event 3 set value (EV3)	0028	40	R/W		50
43	Event 4 set value (EV4)	0029	41	R/W		50
44	Control loop break alarm (LBA) time	002A	42	R/W	0 to 7200 seconds (0: Unused)	480
45	LBA deadband	002B	43	R/W	0 to Input span	0
46	Set value (SV)	002C	44	R/W	Setting limiter low to Setting limiter high	TC/RTD inputs: 0 V/I inputs: 0.0
47	Proportional band [heat-side]	002D	45	R/W	TC/RTD inputs: 0 (0.0, 0.00) to Input span (Unit: °C [°F]) Voltage (V)/Current (I) inputs: 0.0 to 1000.0 % of input span (0, 0.0, 0.00: ON/OFF action)	TC/RTD inputs: 30 V/I inputs: 30.0

[1] Unused on the FB100.

[2] During operation in Manual mode, the Manual mode of the Operation mode state monitor is set to the "1: ON" state and the Remote mode of the same monitor is set to the "0: OFF" state even if the parameter, Remote/Local transfer is set to "1: Remote mode."

No.	Name	Modbus register address HEX	Modbus register address DEC	Attri-bute	Data range	Factory set value
48	Integral time [heat-side]	002E	46	R/W	PID control or Heat/Cool PID control: 0 to 3600 seconds or 0.0 to 1999.9 seconds [1] (0, 0.0: PD action) [2] Position proportioning control: 1 to 3600 seconds or 0.1 to 1999.9 seconds [1]	240
49	Derivative time [heat-side]	002F	47	R/W	0 to 3600 seconds or 0.0 to 1999.9 seconds [1] (0, 0.0: PI action)	60
50	Control response parameter	0030	48	R/W	0: Slow 1: Medium 2: Fast [When the P or PD action is selected, this setting becomes invalid.]	Note 1
51	Proportional band [cool-side]	0031	49	R/W	TC/RTD inputs: 1 (0.1, 0.01) to Input span [3] (Unit: °C [°F]) Voltage (V)/Current (I) inputs: 0.1 to 1000.0 % of input span	TC/RTD inputs: 30 V/I inputs: 30.0
52	Integral time [cool-side]	0032	50	R/W	0 to 3600 seconds or 0.0 to 1999.9 seconds [1] (0, 0.0: PD action) [2]	240
53	Derivative time [cool-side]	0033	51	R/W	0 to 3600 seconds or 0.0 to 1999.9 seconds [1] (0, 0.0: PI action)	60
54	Overlap/Deadband	0034	52	R/W	TC/RTD inputs: −Input span to +Input span (Unit:°C [°F]) Voltage (V)/Current (I) inputs: −100.0 to +100.0 % of input span Minus (−) setting results in Overlap. However, the overlapping range is within the proportional range.	0
55	Manual reset	0035	53	R/W	−100.0 to +100.0 %	0.0
56	Setting change rate limiter (up)	0036	54	R/W	0 to Input span/Unit time * (0: Unused)	0
57	Setting change rate limiter (down)	0037	55	R/W	* Unit time: 60 seconds (factory set value)	0
58	Area soak time	0038	56	R/W	0 to 11999 seconds or 0 to 5999 minutes Data range of Area soak time can be selected on the Soak time unit.	0
59	Link area number	0039	57	R/W	0 to 8 (0: No link)	0
60	Heater break alarm 1 (HBA1) set value	003A	58	R/W	CTL-6-P-N: 0.0 to 30.0 A (0.0: Not used) CTL-12-S56-10L-N: 0.0 to 100.0 A (0.0: Not used)	0.0
61	Heater break determination point 1	003B	59	R/W	0.0 to 100.0 % of HBA1 set value (0.0: Heater break determination is invalid)	30.0
62	Heater melting determination point 1	003C	60	R/W	0.0 to 100.0 % of HBA1 set value (0.0: Heater melting determination is invalid)	30.0
63	Heater break alarm 2 (HBA2) set value	003D	61	R/W	CTL-6-P-N: 0.0 to 30.0 A (0.0: Not used) CTL-12-S56-10L-N: 0.0 to 100.0 A (0.0: Not used)	0.0
64	Heater break determination point 2	003E	62	R/W	0.0 to 100.0 % of HBA2 set value (0.0: Heater break determination is invalid)	30.0
65	Heater melting determination point 2	003F	63	R/W	0.0 to 100.0 % of HBA2 set value (0.0: Heater melting determination is invalid)	30.0
66	PV bias	0040	64	R/W	−Input span to +Input span	0
67	PV digital filter	0041	65	R/W	0.0 to 100.0 seconds (0.0: Unused)	0.0
68	PV ratio	0042	66	R/W	0.500 to 1.500	1.000
69	PV low input cut-off	0043	67	R/W	0.00 to 25.00 % of input span	0.00
70	RS bias	0044	68	R/W	−Input span to +Input span	0
71	RS digital filter	0045	69	R/W	0.0 to 100.0 seconds (0.0: Unused)	0.0
72	RS ratio	0046	70	R/W	0.001 to 9.999	1.000

[1] Varies with the setting of the Integral/Derivative time decimal point position selection.

[2] When the heat-side or cool-side Integral time is set to zero for Heat/Cool PID control, PD action will take place for both heat-side and cool-side.

[3] Varies with the setting of the Decimal point position selection.

Note 1: PID control, Position proportioning control: 0 Heat/Cool PID control: 2

No.	Name	Modbus register address HEX	Modbus register address DEC	Attri-bute	Data range	Factory set value
73	Proportional cycle time [heat-side]	0047	71	R/W	0.1 to 100.0 seconds M: Relay contact output V: Voltage pulse output T: Triac output D: Open collector output	M output: 20.0 V, T, D output: 2.0
74	Proportional cycle time [cool-side]	0048	72	R/W		M output: 20.0 V, T, D output: 2.0
75	Manual manipulated output value	0049	73	R/W	PID control: Output limiter low [MV1] to Output limiter high [MV1] Heat/Cool PID control: −Output limiter high [MV2] to +Output limiter high [MV1] (−105.0 to +105.0 %) Position proportioning control with feedback resistance (FBR) input: Output limiter low [MV1] to Output limiter high [MV1]	0.0
76	Set lock level	004A	74	R/W	Bit data Bit 0: Lock only setting items other than SV and event set value (EV1 to EV4). Bit 1: Lock only event set value (EV1 to EV4) Bit 2: Lock only set value (SV) Bit 3 to Bit 15: Unused Data 0: Unlock 1: Lock [Decimal number: 0 to 7]	0
77 • • • 204	Engineering mode For the data, refer to the **COM-JG [For FB100/FB400/FB900] Instruction Manual (IMR01Y08-E□).**					
205	Startup tuning (ST)	00CB	203	R/W	0: ST unused 1: Execute once * 2: Execute always * When the Startup tuning is finished, the setting will automatically returns to "0: ST unused."	0
206 • • • 210	Engineering mode For the data, refer to the **COM-JG [For FB100/FB400/FB900] Instruction Manual (IMR01Y08-E□).**					
211	Automatic temperature rise learning	00D1	209	R/W	0: Unused 1: Learning * * When the Automatic temperature rise learning is finished, the setting will automatically returns to "0: Unused."	1
212 • • • 225	Engineering mode For the data, refer to the **COM-JG [For FB100/FB400/FB900] Instruction Manual (IMR01Y08-E□).**					

■ Memory area data

The register addresses, 0500H to 0514H are used for checking and changing each set value belonging to the Memory area.

No.	Name	Modbus register address HEX	Modbus register address DEC	Attri-bute	Data range	Factory set value
1	Setting memory area number	0500	1280	R/W	1 to 8	1
2	Event 1 set value (EV1)	0501	1281	R/W	Deviation: −Input span to +Input span Process and set value: Input scale low to Input scale high Manipulated output value (MV1 or MV2): −5.0 to +105.0 %	50
3	Event 2 set value (EV2)	0502	1282	R/W		50
4	Event 3 set value (EV3)	0503	1283	R/W		50
5	Event 4 set value (EV4)	0504	1284	R/W		50
6	Control loop break alarm (LBA) time	0505	1285	R/W	0 to 7200 seconds (0: Unused)	480
7	LBA deadband	0506	1286	R/W	0 to Input span	0
8	Set value (SV)	0507	1287	R/W	Setting limiter low to Setting limiter high	TC/RTD inputs: 0 V/I inputs: 0.0

No.	Name	Modbus register address HEX	Modbus register address DEC	Attri-bute	Data range	Factory set value
9	Proportional band [heat-side]	0508	1288	R/W	TC/RTD inputs: 0 (0.0, 0.00) to Input span (Unit: °C [°F]) Voltage (V)/Current (I) inputs: 0.0 to 1000.0 % of input span (0, 0.0, 0.00: ON/OFF action)	TC/RTD inputs: 30 V/I inputs: 30.0
10	Integral time [heat-side]	0509	1289	R/W	PID control or Heat/Cool PID control: 0 to 3600 seconds or 0.0 to 1999.9 seconds [1] (0, 0.0: PD action) [2] Position proportioning control: 1 to 3600 seconds or 0.1 to 1999.9 seconds [1]	240
11	Derivative time [heat-side]	050A	1290	R/W	0 to 3600 seconds or 0.0 to 1999.9 seconds [1] (0, 0.0: PI action)	60
12	Control response parameter	050B	1291	R/W	0: Slow 1: Medium 2: Fast [When the P or PD action is selected, this setting becomes invalid.]	Note 1
13	Proportional band [cool-side]	050C	1292	R/W	TC/RTD inputs: 1 (0.1, 0.01) to Input span [3] (Unit: °C [°F]) Voltage (V)/Current (I) inputs: 0.1 to 1000.0 % of input span	TC/RTD inputs: 30 V/I inputs: 30.0
14	Integral time [cool -side]	050D	1293	R/W	0 to 3600 seconds or 0.0 to 1999.9 seconds [1] (0, 0.0: PD action) [2]	240
15	Derivative time [cool -side]	050E	1294	R/W	0 to 3600 seconds or 0.0 to 1999.9 seconds [1] (0, 0.0: PI action)	60
16	Overlap/Deadband	050F	1295	R/W	TC/RTD inputs: −Input span to +Input span (Unit:°C [°F]) Voltage (V)/Current (I) inputs: −100.0 to +100.0 % of input span Minus (−) setting results in Overlap. However, the overlapping range is within the proportional range.	0
17	Manual reset	0510	1296	R/W	−100.0 to +100.0 %	0.0
18	Setting change rate limiter (up)	0511	1297	R/W	0 to Input span/Unit time * (0: Unused)	0
19	Setting change rate limiter (down)	0512	1298	R/W	* Unit time: 60 seconds (factory set value)	0
20	Area soak time	0513	1299	R/W	0 to 11999 seconds or 0 to 5999 minutes Data range of Area soak time can be selected on the Soak time unit.	0
21	Link area number	0514	1300	R/W	0 to 8 (0: No link)	0
22	Unused	0515	1301	—	—	—

[1] Varies with the setting of the Integral/Derivative time decimal point position selection.

[2] When the heat-side or cool-side Integral time is set to zero for Heat/Cool PID control, PD action will take place for both heat-side and cool-side.

[3] Varies with the setting of the Decimal point position selection.

Note 1: PID control, Position proportioning control: 0 Heat/Cool PID control: 2

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