DeviceNet Communication Converter

COM-JH [For FB100/FB400/FB900] Quick Instruction Manual

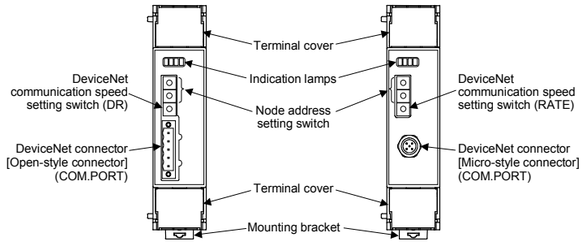
IMR01Y14-E4

This manual describes the basic operation method of the COM-JH. For the installation, the communication data, the detail handling procedures and various function settings, please refer to the following separate manuals.

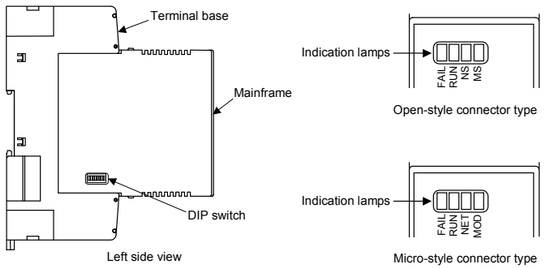
- COM-JH [For FB100/FB400/FB900] Installation Manual (IMR01Y04-E□): Enclosed with COM-JH
- COM-JH [For FB100/FB400/FB900] Communication Data List (IMR01Y19-E□): Enclosed with COM-JH
- COM-JH [For FB100/FB400/FB900] Instruction Manual (IMR01Y09-E□): Separate (Download free or purchase hard copy)

These manuals can be downloaded from the official RKC website: https://www.rkcinst.com/english/manual_load.htm

1. PARTS DESCRIPTION



Front view of open-style connector type Front view of micro-style connector type



● Indication lamps

FAIL [Red]	• When abnormally: Turns on • Communication environment setting mode by the switch: Flashes
RUN [Green]	• When normally: Turns on • Self-diagnostic error: Flashes slowly • Data collection just after the power is turned on: Flashes rapidly
NS or NET (Network status) [Green/Red]	• Network is operating normally, but communications have not yet been established: A green lamp flashes • Network is operating normally (communications established): A green lamp turns on • I/O connection is timeout: A red lamp flashes • A fatal communications error has occurred Network communications are not possible: A red lamp turns on
MS or MOD (Module status) [Green/Red]	• When DeviceNet communication is normal: A green lamp turns on • Controller communication error: A green lamp flashes • Memory backup error: A red lamp turns on

● Switches

Node address setting switch	• Set the node address for DeviceNet • Used for the PLC communication environment setting
DeviceNet communication speed setting switch	• Set the communication speed for DeviceNet • Used for the PLC communication environment setting
DIP switch	• Set the communication speed for controller communication • Set the number of communication data items when conducting DeviceNet Polling I/O communication

● Others

Terminal cover	Terminal covers above and below the COM-JH
Mounting bracket	• Used for the DIN rail mounting • When panel mounted, two mounting brackets are required for the upper and lower sides (one required for the upper side: separately sold).
Terminal base	Part of the terminal and base of COM-JH (There is the termination resistor transfer switch in the inside of terminal base)
Mainframe	Part of the mainframe of COM-JH

2. HANDLING PROCEDURES

A handling procedure is shown in the following when the COM-JH is connected to a PLC as a master.

COM-JH communication setting	Refer to **3. COMMUNICATION SETTING**
Communication environment setting	Refer to **4. COMMUNICATION ENVIRONMENT SETTING**
Mounting and Wiring	• Refer to **COM-JH [For FB100/FB400/FB900] Installation Manual (IMR01Y04-E□)** • For controller, refer to **FB100 Installation Manual (IMR01W12-E□)** or **FB400/FB900 Installation Manual (IMR01W01-E□)**
PLC setting	Refer to **6.2 Setting of Use Instruments and Instruction Manual for the used PLC**
Controller setting	• Refer to **6.2 Setting of Use Instruments** • Refer to **FB100 Communication Quick Manual (IMR01W15-E□)** or **FB400/FB900 Communication Quick Manual (IMR01W07-E□)**
DeviceNet communication setting	Refer to **5. POLLING I/O COMMUNICATION** and **6.3 Details of Communication**
Programming	Refer to **6.3 Details of Communication**

To avoid error at operation start-up, COM-JH must be powered on LAST (after the controller, PLC, etc.).

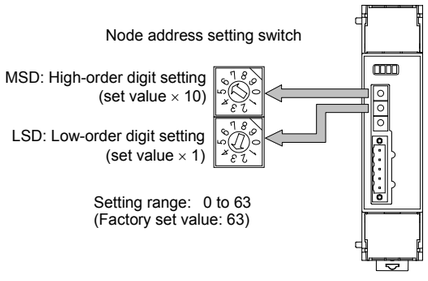
3. COMMUNICATION SETTING

CAUTION

Do not separate the mainframe from the terminal base with the power turned on. If so, instrument failure may result.

3.1 Node Address Setting

To identify each device connected to the network, it is necessary to set a different address to each device (node). For the DeviceNet, as it is possible to connect up to 64 devices including a master to the network, node address (MAC ID) from 0 to 63 can be set.
For this setting, use a small blade screwdriver.



Set the address such that it is different to the other addresses on the same line. Otherwise, problems or malfunction may result.

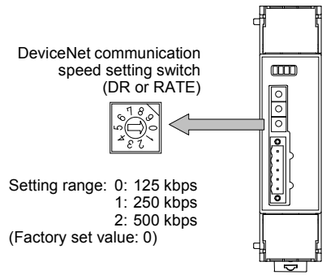
- The above figure is open-style connector type. The figure of micro-style connector type is the same as an open-style connector type.
- When any number exceeding 64 is set, the node address number becomes "63."

Address setting for the controller
There are two address settings for the controller (FB100/400/900) connecting to the COM-JH: Continuous setting and Free setting. (Set by the communication environment setting.)

- For the Continuous setting (factory set value), consecutive numbers starting from 1 are set to each controller.
- Free settings can be made in the range of 1 to 31.

3.2 DeviceNet Communication Speed Setting

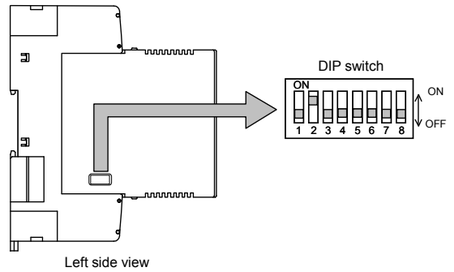
Set a communication speed for the DeviceNet using a small blade screwdriver.



- The above figure is open-style connector type. The figure of micro-style connector type is the same as an open-style connector type.
- When any number between 3 and 9 is set, the communication speed becomes "500 kbps."

3.3 DIP Switch Setting

With the DIP switch which there is on the left side of mainframe, set the controller communication speed and set the number of communication data items when conducting DeviceNet Polling I/O communication.



1	2	Controller communication speed
OFF	OFF	38400 bps
ON	OFF	9600 bps
OFF	ON	19200 bps
ON	ON	38400 bps

Factory set value: 19200 bps

4	5	Number of communication data items when conducting DeviceNet Polling I/O communication
OFF	OFF	7 words
ON	OFF	25 words
OFF	ON	45 words
ON	ON	100 words

Factory set value: 7 words

Switch No. 3, 6, 7 and 8: OFF fixed. (Don't change this one)

The number of communication data items when conducting Polling I/O communication can also be set via Explicit message communication, or by the configuration tool or rotary switch. However, when the number of communication data items is set via Explicit message communication, or by the configuration tool or rotary switch, the value set by the DIP switch may be ignored.

- For the number of communication data items when conducting Polling I/O communication can also be set via Explicit message communication and by the configuration tool, refer to **COM-JH [For FB100/FB400/FB900] Instruction Manual (IMR01Y09-E□)**.
- The number of communication data items set by rotary switch when conducting Polling I/O communication, refer to **4. COMMUNICATION ENVIRONMENT SETTING**.

4. COMMUNICATION ENVIRONMENT SETTING

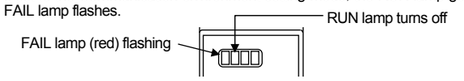
Set communication environment of Polling I/O communication of DeviceNet by using the Node address setting switch and the DeviceNet communication speed setting switch which are the rotary switch of the COM-JH.

The setting details cannot be check afterwards. When checking the details thus set, check them via Explicit message communication. In addition, as each switch position is moved during the setting, record the switch setting state before making the setting.

● Setting procedure

1. Turn off the power supply.
2. Before communication environment, record the switch positions of Node address setting switch and DeviceNet communication speed setting switch. (When this module is used for the first time, no recording is required.)
3. Set all the values of a Node address setting switch and a DeviceNet communication speed setting switch to "9."

4. Turning on the power sets the module to the Communication environment setting mode. If set to the Communication environment setting mode, the RUN lamp goes off and the FAIL lamp flashes.



5. Select a setting item number with MSD of the Node address setting switch, and set data with LSD of the Node address setting switch.
6. Set the DeviceNet communication speed setting switch in the order of "9," "0" and "1." The RUN lamp turns on and then it turns off after registration of the set data is complete (after a lapse about 3 seconds).
7. Repeat the steps from ***5.*** to ***6.*** of above, and set other setting items. However, set the DeviceNet communication speed setting switch in the order of "1," "0" and "1" from the second setting.
8. First check that the RUN lamp goes off, and then turn off the power.
9. Return the switch positions of Node address setting switch and DeviceNet communication speed setting switch to the positions already recorded.
10. Turn on the power again. The set data valid if the power is turned on again.

List of communication environment setting items

Node address setting switch MSD		Node address setting switch LSD	Factory set value
No.	Setting item	Data range	
0	Action mode selection	Address setting method 0: Continuous setting [1] 1: Free setting [1] 2: Continuous setting [2] 3: Free setting [2] 4 to 9: Don't set this one	0
1	Number of Polling I/O communication controllers	0: 1 controller 1 to 8: 2 to 30 controllers (= set value × 4 – 2) 9: 31 controllers	10 controllers
2	Unused	Don't set this one	—
3	Unused	Don't set this one	—
4	Number of communication measured data items (IN) when conducting Polling I/O communication	0 to 8: 0 to 80 words (= set value × 10) 9: 200 words	0 Depends on the DIP switch setting (7 words)
5	Number of communication setting data items (OUT) when conducting Polling I/O communication	0 to 8: 0 to 80 words (= set value × 10) 9: 200 words	0 Depends on the DIP switch setting (7 words)
6	Controller communication transmission wait time	0 to 5: 0 to 20 ms (= set value × 4) 6: 30 ms 7: 50 ms 8: 70 ms 9: 100 ms	0
7	Unused	Don't set this one	—
8	Controller address setting	0: Controller 1 to 31: 1 to 31 1: Controller 1: 1 Controller 2 to31: 0 2 to 8: Don't set this one 9: Automatic acquisition of controller address	0
9	Set value initialization	0 to 8: Unused 9: Communication environment setting initialization execution Initialize each communication environment setting data item which can be set by the rotary switch.	—

[1] The PID/AT transfer by Polling I/O communication is invalid.
[2] The PID/AT transfer by Polling I/O communication is valid.

The above setting other than Controller communication transmission wait time and Set value initialization are enabled via Explicit message communication. In addition, it is possible to set the number of Polling I/O communication controllers, the number of communication measured data items (IN) and the number of communication setting data items (OUT).

5. POLLING I/O COMMUNICATION

COM-JH has supported Polling I/O communication and Explicit message communication as a communication method of DeviceNet. Details of Polling I/O communication are shown below.

For Explicit message communication, refer to **COM-JH [For FB100/FB400/FB900] Instruction Manual (IMR01Y09-E□)**.

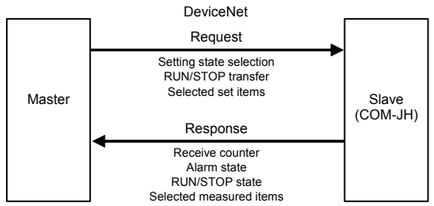
■ Communication outline

Polling I/O communication is the communication that master and slave always execute transmission and reception of data. Set the following items before communication start.

- Communication items (setting items and measured items)
- Number of communication controllers
- Number of communication data items

Polling made once enables the following data items to be read or written via Polling I/O communication.

Request: setting data items (OUT)	Response: measured data items (IN)
Setting state selection	Receive counter
RUN/STOP transfer	Alarm state
Selected set items	RUN/STOP state
	Selected measured items



Outline of Polling I/O communication

For data processed in actual communication, its decimal point is ignored. In addition, data with a minus sign is expressed as 2's complement data.

■ Request: setting data items (OUT)

A master transmits data of the following for slave (COM-JH).

Communication data (setting data items) contents

No.	Items	Data range
1	Setting state selection (All controller)	Bit data Bit 0: Data setting disabled/enabled 0: Depending on the setting contents of communication data No. 2 and No. 3 1: All-controller setting enabled (include RUN/STOP) Bit 1 to 15: Unused [Decimal number: 0 to 1]
2	Setting state selection (Controller 1 to 16)	Bit data Bit 0 to 15: Data setting disabled/enabled (Controller 1 to 16) 0: Setting disabled 1: Setting enabled [Decimal number: 0 to 65535]
3	Setting state selection (Controller 17 to 31, RUN/STOP)	Bit data Bit 0 to 14: Data setting disabled/enabled (Controller 17 to 31) Bit 15: RUN/STOP transfer disabled/enabled 0: Setting disabled 1: Setting enabled [Decimal number: 0 to 65535]
4	RUN/STOP transfer (Controller 1 to 16)	Bit data Bit 0 to 15: RUN/STOP transfer* (Controller 1 to 16) 0: RUN 1: STOP [Decimal number: 0 to 65535]
5	RUN/STOP transfer (Controller 17 to 31)	Bit data Bit 0 to 14: RUN/STOP transfer* (Controller 17 to 31) 0: RUN 1: STOP Bit 15: Unused [Decimal number: 0 to 32767]
On and after 6	Selected set items Setting items are set by the configuration tool or via Explicit message communication are assigned by the number of controllers similarly set. [Factory set value: Set value (SV)]	Same as the range of setting items selected

* It is possible to change the logic of RUN/STOP by Explicit message communication.

- Communication data Nos. 1 to 5 (corresponding to 5 words) are fixed communication data items.
- In order to validate data after communication data No. 6, it is necessary to set the controllers corresponding to communication data Nos. 2 and 3 to "1: Setting enabled" or to communication data No. 1 to "1: All-controller setting enabled."

For setting procedure and detail of setting items, refer to **COM-JH [For FB100/FB400/FB900] Instruction Manual (IMR01Y09-E□)**.

■ Response: measured data items (IN)

A master transmits data of the following for slave (COM-JH).

Communication data (measured data items) contents

No.	Items	Data range
1	Receive counter [1]	0 to 65535 Increments each time the COM-JH receives the setting item (OUT) data.
2	Alarm state (Controller 1 to 16)	Bit data Bit 0 to 15: Alarm state (Controller 1 to 16) 0: Alarm OFF 1: Alarm ON [Decimal number: 0 to 65535]
3	Alarm state (Controller 17 to 31, Setting update flag/ Flag during Polling I/O communication updating)	Bit data Bit 0 to 14: Alarm state (Controller 17 to 31) 0: Alarm OFF 1: Alarm ON Bit 15: Setting update flag/Flag during Polling I/O communication updating [2] 0: Setting update is completed 1: During setting update [Decimal number: 0 to 65535]
4	RUN/STOP state (Controller 1 to 16)	Bit data Bit 0 to 15: RUN/STOP state[3] (Controller 1 to 16) 0: RUN 1: STOP [Decimal number: 0 to 65535]
5	RUN/STOP state (Controller 17 to 31)	Bit data Bit 0 to 14: RUN/STOP state[3] (Controller 17 to 31) 0: RUN 1: STOP Bit 0 15: Unused [Decimal number: 0 to 32767]
On and after 6	Selected measured items Measured items set by the configuration tool or via Explicit message communication are assigned by the number of controllers similarly set. [Factory set value: Measured value (PV)]	Same as the range of measured items selected

[1] The counter is reset when the power is turned on or when it exceeds 65535.

[2] *OR* operation is performed to the Setting update flag and the Flag during Polling I/O communication updating.

[3] It is possible to change the logic of RUN/STOP by Explicit message communication.

Communication data Nos. 1 to 5 (corresponding to 5 words) are fixed communication data items.

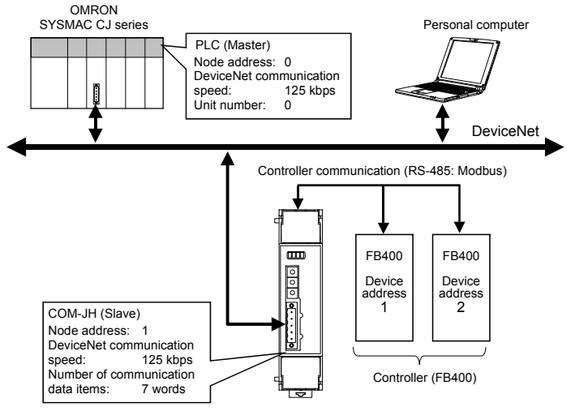
For setting procedure and detail of measured items, refer to **COM-JH [For FB100/ FB400/FB900] Instruction Manual (IMR01Y09-E□)**.

6. APPLICATION EXAMPLE

An example of using DeviceNet communication is explained when the COM-JH is connected to a PLC as a master.

6.1 System Configuration

This application example is described according to the following system configuration.



■ Use instruments

- DeviceNet communication converter: COM-JH
- Controller (temperature controller): FB400: Two instruments
- OMRON SYSMAC CJ series: CPU unit: CJ1M
  DeviceNet master unit: CJ1W-DRM21
- Personal computer: The configuration tool must be installed in a personal computer.

6.2 Setting of Use Instruments

Setting of the PLC, COM-JH and controller is shown in the following

■ PLC setting

[DeviceNet communication requirement]

- Node address: 0
- DeviceNet communication speed: 125 kbps
- Unit number: 0
- Communication cycle time:
  (Number of COM-JH communication data items× 1.2 + 50) [ms] or more
  = 7 × 1.2 + 50 = 58.4 [ms] or more

For setting procedure, refer to PLC Instruction Manual.

■ COM-JH setting

[DeviceNet communication requirement]

- Node address: 1
- DeviceNet communication speed: 125 kbps
- Number of communication data items: 7 words

For setting procedure, refer to **3. COMMUNICATION SETTING**.

■ Controller (FB400) setting

[Controller communication requirement: Use communication 1 side]

- Protocol: Modbus
- Device address: 1 and 2
- Communication speed: 19200 bps (factory set value)
- Data bit configuration: Data 8-bit, without parity, stop 1-bit

For setting procedure, refer to **FB400/FB900 Communication Quick Manual (IMR01W07-E□)**.

6.3 Details of Communication

The following shows the details of communication when conducting communication via Polling I/O communication.

Polling I/O communication is called Remote I/O communication in OMRON PLC related instruction manuals.

■ Contents of communication parameter setting

- Communication items:
  Measured data item (IN): Measured value (PV) [Attribute ID: 1] (factory set value)
  Setting data item (OUT): Set value (SV) [Attribute ID: 45] (factory set value)
- Number of communication controllers: Two controllers
- Number of communication date items: 7 words (factory set value)

It is possible to set the above communication parameter with Explicit message communication or the configuration tool. For setting procedure, refer to **COM-JH [For FB100/FB400/FB900] Instruction Manual (IMR01Y09-E□)**.

■ Memory allocation

Allocate the memory by using the configuration tool.

- Allocation method: Manual allocation
- Data area: Measured data item (IN) area: D00000 to D00006 (7 words)
  Setting data item (OUT) area: D10000 to D10006 (7 words)

■ Response: measured data items (IN)

No.	Items	Storage location of read data
1	Receive counter	D00000
2	Alarm state (Controller 1 to 16)	D00001
3	Alarm state (Controller 17 to 31), Setting update flag	D00002
4	RUN/STOP state (Controller 1 to 16)	D00003
5	RUN/STOP state (Controller 17 to 31)	D00004
6	Measured value (PV) [Controller 1]	D00005
7	Measured value (PV) [Controller 2]	D00006

■ Request: setting data items (OUT)

No.	Items	Data contents	Storage location of write data
1	Setting state selection (All controller)	0	D10000
2	Setting state selection (Controller 1 to 16)	As there are two controllers, only Bit 0 (controller 1) and Bit 1 (controller 2) can be used. 0000000000000000 Bit 1 Bit 0 [Decimal number: 0 to 3]	D10001
3	Setting state selection (Controller 17 to 31, RUN/STOP)	Only Bit 15 (RUN/STOP transfer disabled/enabled) can be used. 0000000000000000 Bit 15 [Decimal number: 0 to 32768]	D10002
4	RUN/STOP transfer (Controller 1 to 16)	As there are two controllers, only Bit 0 (controller 1) and Bit 1 (controller 2) can be used. 0000000000000000 Bit 1 Bit 0 [Decimal number: 0 to 3]	D10003
5	RUN/STOP transfer (Controller 17 to 31)	0	D10004
6	Set value (SV) [Controller 1]	100	D10005
7	Set value (SV) [Controller 2]	200	D10006

(Continued on the next column↗)

■ Sample program (ladder)

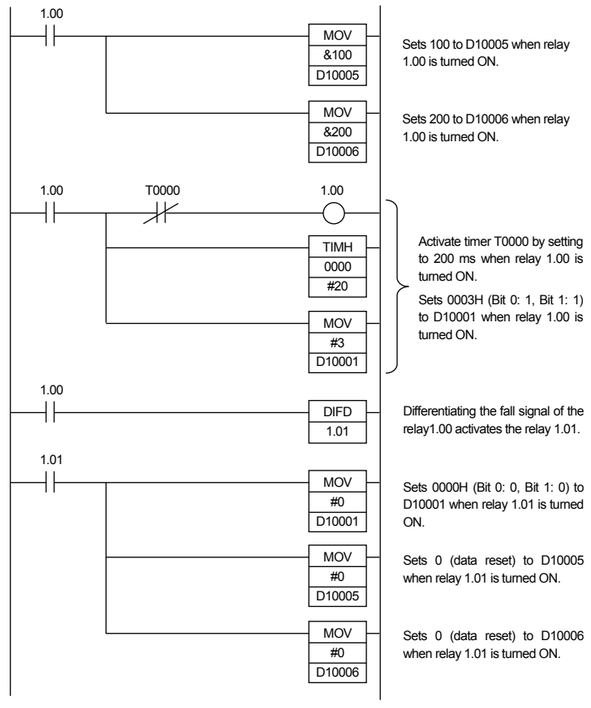
● Measured data items (IN)

Data corresponding to the measured data item (IN) can be checked only by reading the data storage register assigned by the configuration tool.

● Setting data items (OUT)

The following procedure is required for setting data to the controller.

1. Sets 100 to "Set value (SV): D10005" of Controller 1.
2. Sets 200 to "Set value (SV): D10006" of Controller 2.
3. Set Bit 0 (Controller 1) and Bit 1 (Controller 2) for "Setting state selection: D10001" to "1: Setting enabled."
4. Set Bit 0 (Controller 1) and Bit 1 (Controller 2) for "Setting state selection: D10001" to "0: Setting disabled" after a lapse of preset time* (example: 200 ms).
   * Sets any time longer than the "communication cycle time" set to the PLC.
5. Sets 0 (reset) to "Set value (SV): D10005" of Controller 1.
6. Sets 0 (reset) to "Set value (SV): D10006" of Controller 2.



This product has been self-tested by RKC at DeviceNet Protocol Conformance Test Software Version A-17.

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