

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

All Rights Reserved, Copyright © 2006, RKC INSTRUMENT INC.

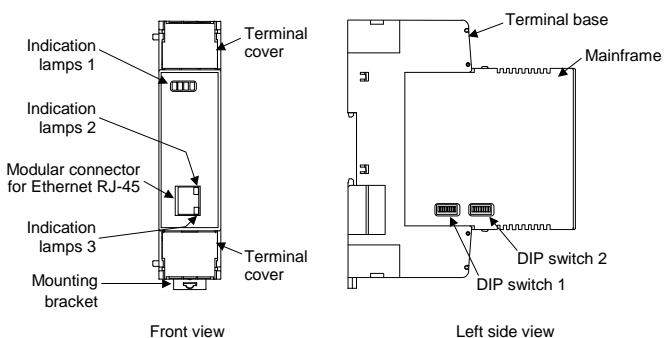
IMR01Y15-E3

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

- COM-JL [For FB100/FB400/FB900] Installation Manual (IMR01Y05-ED): Attached to the product
- COM-JL [For FB100/FB400/FB900] Communication Data List (IMR01Y21-ED): Attached to the product
- COM-JL [For FB100/FB400/FB900] Instruction Manual (IMR01Y10-ED): Separate volumes (Download or sold separately)

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

1. PARTS DESCRIPTION



• Indication lamps 1

FAIL	[Red]	Instrument normality:	Turns off
		Instrument abnormality:	Turns on
RUN	[Green]	• When normal:	Turns on
		• When abnormal [Memory backup error, controller configuration error, Input error]:	Flashes slowly
		• Data collection just after the power is turned on:	Flashes rapidly
TX	[Green]	During data send:	Flashes
RX	[Green]	During data receive:	Flashes

• Indication lamps 2

Link	10BASE-T link:	Amber lamp:	ON
	100BASE-TX link:	Green lamp:	ON

• Indication lamps 3

Activity	Half-duplex; activity:	Amber lamp:	Momentary ON
	Full-duplex; activity:	Green lamp:	Momentary ON

• Connector

Ethernet	Modular connector for Ethernet RJ-45
----------	--------------------------------------

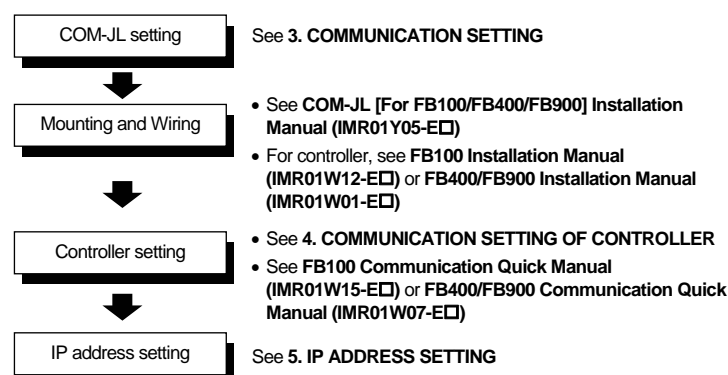
• Switches

DIP switch 1	Set the communication speed for controller communication
DIP switch 2	Don't change this setting Use it only in IP address setting by DIP switch

• Others

Terminal cover	Terminal covers above and below the COM-JL
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: sold separately).
Terminal base	Part of the terminal and base of COM-JL (There is the termination resistor transfer switch in the inside of terminal base)
Mainframe	Part of the mainframe of COM-JL

2. HANDLING PROCEDURES



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

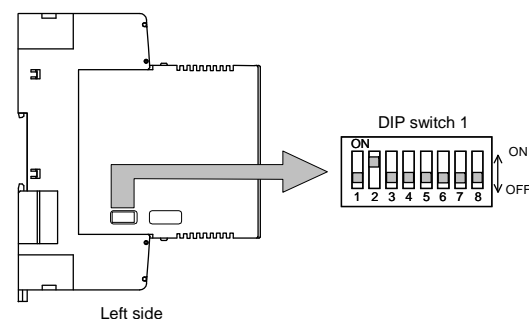
3. COMMUNICATION SETTING

CAUTION

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

Controller Communication Speed Setting

Set a communication speed of controller 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

3	4	5	6	7	8	
OFF	OFF	OFF	OFF	OFF	OFF	Fixed

Another controller communication setting
Data bit configuration: Data 8-bit, Without parity bit, Stop 1-bit

Do not change the setting of DIP switch 2.
(Use it only in IP address setting by DIP switch)

4. COMMUNICATION SETTING OF CONTROLLER

Set the communication setting of controller (FB100/400/900) as follows.

- Protocol: Modbus
- Device address: 1 to 31
- Communication speed: 19200 bps (Factory set value)
- Data bit configuration: Data 8-bit, Without parity bit, Stop 1-bit

For setting method, see **FB100 Communication Quick Manual (IMR01W15-ED)** or **FB400/FB900 Communication Quick Manual (IMR01W07-ED)**.

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

- 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.

5. IP ADDRESS SETTING

Set an IP address of a COM-JL.

For types of IP address setting are available: Setting by Web browser, Setting by Telnet, Setting by DeviceInstaller and Setting by DIP switch. This section describes the only IP address setting by Web browser.

Confirm the IP address number to the network administrator of the network (LAN) to which the COM-JL is connected.

If the IP address has been changed from the factory set address (192.168.1.1) and you do not know the current address, set the IP address using DeviceInstaller or the DIP switches.

For the IP address setting by Telnet, DeviceInstaller and DIP switch, see **COM-JL [For FB100/FB400/FB900] Instruction Manual (IMR01Y10-ED)**.

Setting by the Web Browser

It is possible to set the IP address by using the Web browser (such as Internet Explorer).

■ Preparations before setting

When setting the IP address by Web browser, it is necessary to coincide the 1st to 3rd bytes and masking range of the IP address of the Client (computer) which starts Web browser with those of the IP address of the COM-JL.

1. Connect the COM-JL and Client, and then turn on the power.

For wiring procedure, see **COM-JL [For FB100/FB400/FB900] Installation Manual (IMR01Y05-ED)**.

2. The IP address of the COM-JL is set to a factory set value of "192.168.1.1." As it is necessary to coincide the 1st to 3rd byte values of this IP address with those of the IP address of the Client, change the IP address of the Client to "192.168.1.□" (□: Any value in the range of 0 to 255, but other than 1).

3. As the subnet mask of the COM-JL is "255.255.255.0," also change the subnet mask of the Client to "255.255.255.0."

After the IP address of the Server is set, return the present IP address of the Client to the original address or change to the address meeting to be connected.

It is possible to set the IP address of the COM-JL using the Client already connected to the network. However, as the IP address of the Client is changed, that Client is disconnected from the network so far connected. In addition, when setting the IP address by this method, confirm to the network administrator whether or not no problem arises.

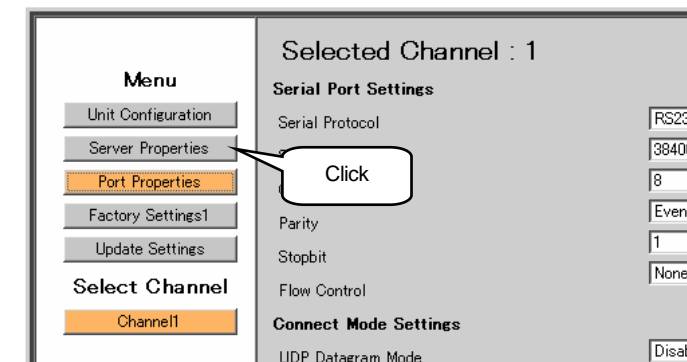
■ Setting example

An example of setting the IP address of COM-JL to "192.168.1.3" is shown in the following.

1. Start the Web browser; enter the present IP address "192.168.1.1" into the address bar and then press the Enter key.

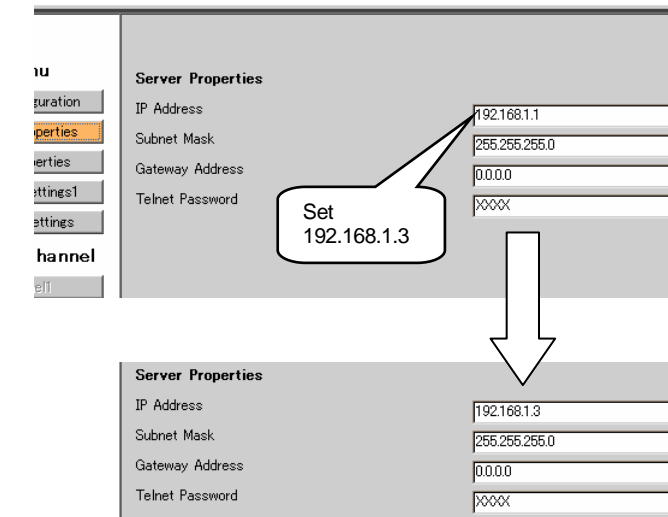


2. The initial setting applet starts. "Selected Channel: 1" is displayed on the main display with Port Properties selected on the Menu display on the left side of the screen. Under this condition, click the Server Properties button on the Menu display.



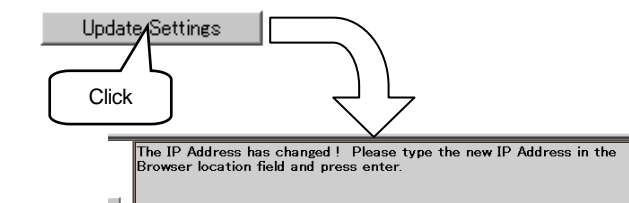
Do not change the contents of "Selected Channel: 1." If changed, device failure or error may result.

3. Display the Server Properties screen. Set "192.168.1.3" in IP Address.



Do not change any items other than the IP Address. If so, device failure or error may result.

4. Clicking the Update Settings button on the Menu display updates the setting to display the following message.



5. Enter the new IP address "192.168.1.3" into the address bar as instructed by message and then press the Enter key. Thus, a new IP address setting screen appears to end the setting.



6. MODBUS/TCP PROTOCOL

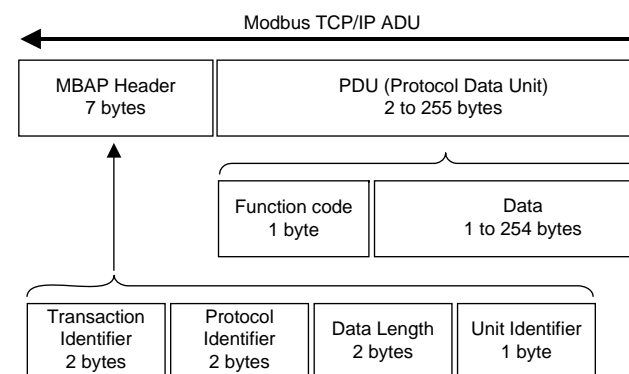
Modbus/TCP is an open field network provided with the Modbus protocol on the TCP/IP protocol of Ethernet.

The data request side (such as computer) is called Client and the data response (supply) side (COM-JL) is called Server.

For details of protocol, see **COM-JL [For FB100/FB400/FB900] Instruction Manual (IMR01Y10-ED)**.

6.1 Message Configuration

Modbus ADU (Application Data Unit) on TCP/IP is in the following configuration.



■ MBAP Header

MBAP (Modbus Application Protocol) Header contains the following fields: Transaction Identifier, Protocol Identifier, Data Length and Unit Identifier.

Fields	Length	Request (Client)	Response (Server)
Transaction Identifier	2 bytes	Unused However, data corresponding to two bytes is sent According to need, request and the response are used in order to take consistency	Returns data from the Client as is
Protocol Identifier	2 bytes	"0" fixed (Modbus protocol = 0)	Returns data from the Client as is
Data Length	2 bytes	The total number of bytes of Unit Identifier and PDU (256 bytes max.)	The total number of bytes of Unit Identifier and PDU (256 bytes max.)
Unit Identifier	1 byte	Unused However, data corresponding to one byte is sent According to need, request and the response are used in order to take consistency	Returns data from the Client as is

■ PDU

PDU (Protocol Data Unit) consists of two blocks: function codes and data.

Fields	Length	Request (Client)	Response (Server)
Function code	1 byte	03H: Read holding registers 06H: Write single register 08H: Diagnostics (loopback test) 10H: Write multiple registers 17H: Read/write multiple registers	Normal response Returns data from the Client as is Error response 80H + Function code
Data	1 to 254 bytes	Data meeting the function code	Normal response Data meeting the function code Error response Exception code 01H: Illegal function code 02H: Illegal register address 03H: Illegal data value 04H: Server failure 06H: Server busy

6.2 Message Format

■ Read holding registers [03H]

The request message specifies the starting register address number and quantity of register addresses to be read.

The contents of the registers are entered in the response message as data, divided into two parts: the high-order eight bits and low-order eight bits, arranged in the order of the register numbers.

Example: The contents of the three registers from 0000H to 0002H are the read out.

Request message [Client]

Transaction Identifier	High	00H	MBAP Header
	Low	00H	
Protocol Identifier	High	00H	MBAP Header
	Low	00H	
Data Length	High	00H	MBAP Header
	Low	06H	
Unit Identifier			00H
Function code			03H
Register address	High	00H	First register address
	Low	00H	
Quantity (Number of words)	High	00H	The setting must be between 1 (0001H) and 125 (007DH).
	Low	03H	

Normal response message [Server]

Transaction Identifier	High	00H	MBAP Header
	Low	00H	
Protocol Identifier	High	00H	MBAP Header
	Low	00H	
Data Length	High	00H	MBAP Header
	Low	09H	
Unit Identifier			00H
Function code			03H
Number of data (byte)			06H → Number of registers × 2
First register contents	High	00H	
	Low	78H	
Next register contents	High	00H	
	Low	00H	
Next register contents	High	00H	
	Low	14H	

Exception response message [Server]

Transaction Identifier	High	00H	MBAP Header
	Low	00H	
Protocol Identifier	High	00H	MBAP Header
	Low	00H	
Data Length	High	00H	MBAP Header
	Low	03H	
Unit Identifier			00H
80H + Function code			83H
Exception code			03H → When the data exceeds the setting range

■ Write single register [06H]

The request message specifies data to be written into the designated register.

Write data items are arranged in the request message in order starting from the smallest register address number. In addition, each register address is assigned in the order of high-order eight bits and low-order eight bits, respectively.

Example: When 100 (64H) is written to the register 0580H

Request message [Client]

Transaction Identifier	High	00H	MBAP Header
	Low	00H	
Protocol Identifier	High	00H	MBAP Header
	Low	00H	
Data Length	High	00H	MBAP Header
	Low	06H	
Unit Identifier			00H
Function code			06H
Register address	High	05H	Any data within the range
	Low	80H	
Write data	High	00H	Any data within the range
	Low	64H	

Normal response message [Server]

Transaction Identifier	High	00H	MBAP Header
	Low	00H	
Protocol Identifier	High	00H	MBAP Header
	Low	00H	
Data Length	High	00H	MBAP Header
	Low	06H	
Unit Identifier			00H
Function code			06H
Register address	High	05H	Contents will be the same as request message data
	Low	80H	
Write data	High	00H	Contents will be the same as request message data
	Low	64H	

Exception response message [Server]

Transaction Identifier	High	00H	MBAP Header
	Low	00H	
Protocol Identifier	High	00H	MBAP Header
	Low	00H	
Data Length	High	00H	MBAP Header
	Low	03H	
Unit Identifier			00H
80H + Function code			86H
Exception code			03H → When the data exceeds the setting range

■ Diagnostics (Loopback test) [08H]

The Client's request message will be returned as the response message from the Server. This function checks the communication system between the Client and Server (COM-JL).

Example: Loopback test

Request message [Client]

Transaction Identifier	High	00H	MBAP Header
	Low	00H	
Protocol Identifier	High	00H	MBAP Header
	Low	00H	
Data Length	High	00H	MBAP Header
	Low	06H	
Unit Identifier			00H
Function code			08H
Test code	High	00H	Test code must be set to 00H
	Low	00H	
Data	High	1FH	Any pertinent data
	Low	34H	

Normal response message [Server]

Transaction Identifier	High	00H	MBAP Header
	Low	00H	
Protocol Identifier	High	00H	MBAP Header
	Low	00H	
Data Length	High	00H	MBAP Header
	Low	06H	
Unit Identifier			00H
Function code			08H
Test code	High	00H	Contents will be the same as request message data
	Low	00H	
Data	High	1FH	Contents will be the same as request message data
	Low	34H	

Exception response message [Server]

Transaction Identifier	High	00H	MBAP Header
	Low	00H	
Protocol Identifier	High	00H	MBAP Header
	Low	00H	
Data Length	High	00H	MBAP Header
	Low	03H	
Unit Identifier			00H
80H + Function code			88H
Exception code			06H → When server is busy

■ Write multiple registers [10H]

Each data is written to registers in specified quantities starting from the specified register address. Write data items are arranged in the request message in order starting from the smallest register address number. In addition, each register address is assigned in the order of high-order eight bits and low-order eight bits, respectively.

Example: When 100 (64H) and 30 (1EH) are written to the register 0580H and 0581H (two in total)

Request message [Client]

Transaction Identifier	High	00H	MBAP Header
	Low	00H	
Protocol Identifier	High	00H	MBAP Header
	Low	00H	
Data Length	High	00H	MBAP Header
	Low	0BH	
Unit Identifier			00H
Function code			10H
Register address	High	05H	First register address
	Low	80H	
Quantity (Number of words)	High	00H	The setting must be between 1 (0001H) and 123 (007BH).
	Low	02H	
Number of data (byte)			04H → Number of registers × 2
Data to first register	High	00H	
	Low	64H	
Data to next register	High	00H	
	Low	1EH	

Normal response message [Server]

Transaction Identifier	High	00H	MBAP Header
	Low	00H	
Protocol Identifier	High	00H	MBAP Header
	Low	00H	
Data Length	High	00H	MBAP Header
	Low	06H	
Unit Identifier			00H
Function code			10H
Register address	High	05H	First register address
	Low	80H	
Quantity (Number of words)	High	00H	
	Low	02H	

Exception response message [Server]

Transaction Identifier	High	00H	MBAP Header
	Low	00H	
Protocol Identifier	High	00H	MBAP Header
	Low	00H	
Data Length	High	00H	MBAP Header
	Low	03H	
Unit Identifier			00H
80H + Function code			90H
Exception code			03H → When the data exceeds the setting range

■ Read/Write multiple registers [17H]

The contents of consecutive registers in specified quantities are read starting from the specified register address. Each data is written to registers in specified quantities starting from the specified register address.

Example: When data is read from the register 0000H (one in total) and then 100 (64H) and 30 (1EH) are written to the register 0580H and 0581H (two in total)

Request message [Client]

Transaction Identifier	High	00H	MBAP Header
	Low	00H	
Protocol Identifier	High	00H	MBAP Header
	Low	00H	
Data Length	High	00H	MBAP Header
	Low	0FH	
Unit Identifier			00H
Function code			17H
Read register address	High	00H	First read register address
	Low	00H	
Read quantity (Number of words)	High	00H	The setting must be between 1 (0001H) and 118 (0076H).
	Low	01H	
Write register address	High	05H	First write register address
	Low	80H	
Write quantity (Number of words)	High	00H	The setting must be between 1 (0001H) and 118 (0076H).
	Low	02H	
Number of write data (byte)			04H → Number of write registers × 2
Written data to first register	High	00H	
	Low	64H	
Written data to next register	High	00H	
	Low	1EH	

Normal response message [Server]

Transaction Identifier	High	00H	MBAP Header
	Low	00H	
Protocol Identifier	High	00H	MBAP Header
	Low	00H	
Data Length	High	00H	MBAP Header
	Low	05H	
Unit Identifier			00H
Function code			17H
Number of write data (byte)			04H → Number of write registers × 2
Read register contents	High	00H	
	Low	78H	

Exception response message [Server]

Transaction Identifier	High	00H	MBAP Header
	Low	00H	
Protocol Identifier	High	00H	MBAP Header
	Low	00H	
Data Length	High	00H	MBAP Header
	Low	03H	
Unit Identifier			00H
80H + Function code			97H
Exception code			03H → When the data exceeds the setting range

For the list of register address for the controller, see **COM-JL [For FB100/FB400/FB900] Communication Data List (IMR01Y21-E)**.

Ethernet is a registered trademark of Xerox Corp.
Modbus is a registered trademark of Schneider Electric
Internet Explorer is a registered trademark of Microsoft Corporation
DeviceInstaller is a trademark of Lantronix Inc.
Company names and product names used in this manual are the trademarks or registered trademarks of the respective companies.

RKC RKC INSTRUMENT INC. The first edition: MAY 2006 [IMQ00]
The third edition: FEB. 2009 [IMQ00]
HEADQUARTERS: 16-6, KUGAHARA 5-CHOME, OHTA-KU TOKYO 146-8515 JAPAN
PHONE: 03-3751-9799 (+81 3 3751 9799) E-mail: info@rkcinst.co.jp
FAX: 03-3751-8585 (+81 3 3751 8585) FEB. 2009