CC-Link Communication Converter

COM-MC∗01/03 [For FB/FZ/GZ series]

Installation Manual

IMR02E42-E1

In order to achieve maximum performance and ensure proper operation of the instrument, carefully read all the instructions in this manual. Please place the manual in a convenient location for easy reference. This manual describes the mounting, wiring and specifications only.

For detailed handling procedures and various function settings, refer to separate **COM-MC∗01 [For FB series, FZ/GZ series (FB series compatible setting)] Instruction Manual** or **COM-MC∗03 [For GZ series (HA series compatible setting)] Instruction Manual**.
The manual can be downloaded from the official RKC website:
https://www.rkcinst.co.jp/english/download-center/

■ Product check

COM-MC∗01/03 [For FB/FZ/GZ series] Installation Manual (IMR02E42-E1) 1
Joint connector cover (KSRZ-517A) 2
Power terminal cover (KSRZ-518A).....1

■ Safety precautions

⚠ WARNING

- To prevent injury to persons, damage to the instrument and the equipment, a suitable external protection device shall be required.
- All wiring must be completed before power is turned on to prevent electric shock, fire or damage to the instrument and the equipment.
- This instrument must be used in accordance with the specifications to prevent fire or damage to the instrument and the equipment.
- This instrument is not intended for use in locations subject to flammable or explosive gases.
- Do not touch high-voltage connections such as power supply terminals, etc. to avoid electric shock.
- RKC is not responsible if this instrument is repaired, modified or disassembled by other than factory-approved personnel. Malfunction may occur and warranty is void under these conditions.

⚠ CAUTION

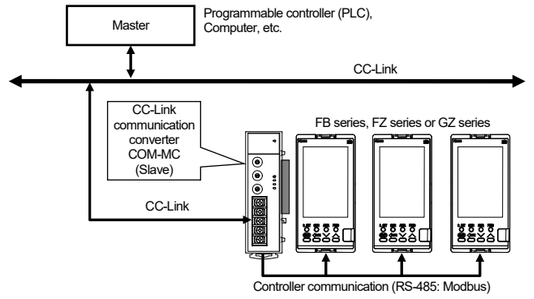
- This product is intended for use with industrial machines, test and measuring equipment. (It is not designed for use with medical equipment and nuclear energy plant.)
- This is a Class A instrument. In a domestic environment, this instrument may cause radio interference, in which case the user may be required to take additional measures.
- Be sure to provide an appropriate surge control circuit respectively for the following:
  – If input/output or signal lines within the building are longer than 30 meters.
  – If input/output or signal lines leave the building, regardless the length.
- This instrument is designed for installation in an enclosed instrumentation panel. All high-voltage connections such as power supply terminals must be enclosed in the instrumentation panel to avoid electric shock to operating personnel.
- All precautions described in this manual should be taken to avoid damage to the instrument or equipment.
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- All wiring must be in accordance with local codes and regulations.
- To prevent instrument damage as a result of failure, protect the power line and the input/output lines from high currents with a suitable overcurrent protection device with adequate breaking capacity such as a fuse, circuit breaker, etc.
- A malfunction in this product may occasionally make control operations impossible or prevent alarm outputs, resulting in a possible hazard. Take appropriate measures in the end use to prevent hazards in the event of malfunction.
- Prevent metal fragments or lead wire scraps from falling inside instrument case to avoid electric shock, fire or malfunction.
- Tighten each terminal screw to the specified torque found in the manual to avoid electric shock, fire or malfunction.
- For proper operation of this instrument, provide adequate ventilation for heat dissipation.
- Do not connect wires to unused terminals as this will interfere with proper operation of the instrument.
- Turn off the power supply before cleaning the instrument.
- Do not use a volatile solvent such as paint thinner to clean the instrument. Deformation or discoloration may occur. Use a soft, dry cloth to remove stains from the instrument.

NOTICE

- This manual assumes that the reader has a fundamental knowledge of the principles of electricity, process control, computer technology and communications.
- The figures, diagrams and numeric values used in this manual are only for explanation purpose.
- RKC is not responsible for any damage or injury that is caused as a result of using this instrument, instrument failure or indirect damage.
- RKC is not responsible for any damage and/or injury resulting from the use of instruments made by imitating this instrument.
- Periodic maintenance is required for safe and proper operation of this instrument. Some components have a limited service life, or characteristics that change over time.
- Every effort has been made to ensure accuracy of all information contained herein. RKC makes no warranty, expressed or implied, with respect to the accuracy of the information. The information in this manual is subject to change without prior notice.
- No portion of this document may be reprinted, modified, copied, transmitted, digitized, stored, processed or retrieved through any mechanical, electronic, optical or other means without prior written approval from RKC.
- Various symbols are used on the equipment, they have the following meaning.
  ⚠ : Caution (This symbol is used where the instruction manual needs to be consulted for the safety of operator and equipment.)
  This symbol on the left side of the product denotes caution for electric shock and damages to the equipment. Read the following items before using this product.
  - ■ **Safety precautions** "**WARNING**"
  - **3. MOUNTING** "**WARNING**" and **4. WIRING** "**WARNING**"

1. OUTLINE

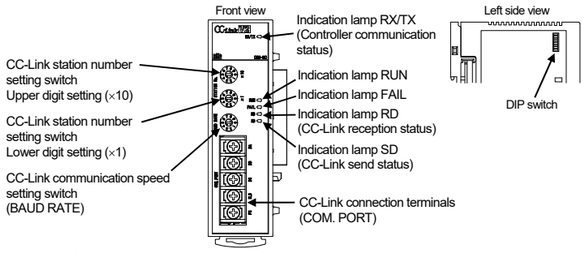
The model COM-MC∗01/03 [For FB/FZ/GZ series] (hereinafter called the COM-MC) is a communication converter for connecting the FB100/FB400/FB900, FZ110/FZ400/ FZ900 or GZ400/GZ900 (hereinafter called the controller) to CC-Link.



(In the above figure FZ400 is used for explanation.)

2. PARTS DESCRIPTION

■ Main unit



Indication lamps

RX/TX (Controller communication status)	[Green]	During controller communication data send and receive: Green lamp turns on
RUN	[Green]	• While in normal state: Green lamp turns on • Self-diagnostic error (Recoverable fault): Green lamp blinks (1000 ms cycle) • Initialization of controller communication Green lamp blinks (200 ms cycle)
FAIL	[Red]	• Self-diagnostic error (Major fault) and CC-Link setting error: Red lamp turns on • CC-Link operation error: Red lamp blinks (2000 ms cycle) • CC-Link setting is changed: Red lamp blinks (800 ms cycle)
RD (CC-Link reception status)	[Green]	• While not receiving: Turns off • While receiving: Green lamp turns on
SD (CC-Link send status)	[Green]	• While not sending: Turns off • While sending: Green lamp turns on

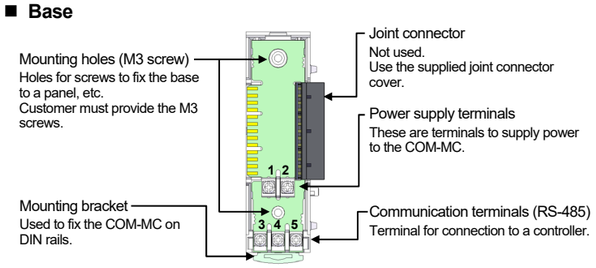
CC-Link connection terminals

COM. PORT	This is a communication terminal block for connecting a CC-Link master (PLC) and a slave device.

Switches

CC-Link station number setting switch (×10, ×1)	Set the station number for CC-Link.
CC-Link communication speed setting switch (BAUD RATE)	Set the communication speed for CC-Link.
DIP switch	• Sets communication speed corresponding to controller communication. • Set the number of Occupied station/Extension cyclic for CC-Link.

■ Base



3. MOUNTING

⚠ WARNING

To prevent electric shock or instrument failure, always turn off the power before mounting or removing the instrument.

3.1 Mounting Cautions

(1) This instrument is intended to be used under the following environmental conditions.
(IEC 61010-1) [POLLUTION DEGREE 2]

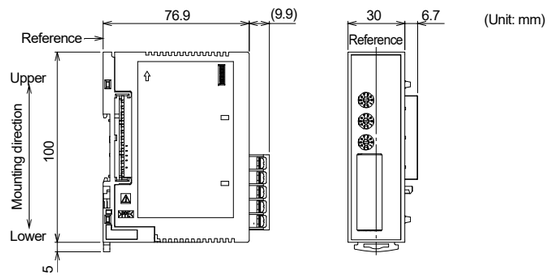
(2) Use this instrument within the following environment conditions:
- Allowable ambient temperature: 0 to 55 °C
- Allowable ambient humidity: 5 to 95 %RH (Absolute humidity: MAX. W. C 29 g/m^3 dry air at 101.3 kPa)
- Installation environment conditions: Indoor use, Altitude up to 2000 m

(3) Avoid the following conditions when selecting the mounting location:
- Rapid changes in ambient temperature which may cause condensation.
- Corrosive or inflammable gases.
- Direct vibration or shock to the main unit.
- Water, oil, chemicals, vapor or steam splashes.
- Excessive dust, salt or iron particles.
- Excessive induction noise, static electricity, magnetic fields or noise.
- Direct air flow from an air conditioner.
- Exposure to direct sunlight.
- Excessive heat accumulation.

(4) Mount this instrument in the panel considering the following conditions:
- Ensure at least 50 mm space on top and bottom of the instrument for maintenance and environmental reasons.
- Do not mount this instrument directly above the equipment that generates large amount of heat (heaters, transformers, semi-conductor functional devices, large-wattage resistors.)
- If the ambient temperature rises above 55 °C, cool this instrument with a forced air fan, cooler, etc. Cooled air should not blow directly on this instrument.
- In order to improve safety and the immunity to withstand noise, mount this instrument as far away as possible from high voltage equipment, power lines, and rotating machinery.
  High voltage equipment: Do not mount within the same panel.
  Power lines: Separate at least 200 mm.
  Rotating machinery: Separate as far as possible.
- Do not connect the COM-MC module to the others. Otherwise the communication may not be established properly.

(5) In case this instrument is connected to a supply by means of a permanent connection, a switch or circuit-breaker shall be included in the installation. This shall be in close proximity to the equipment and within easy reach of the operator. It shall be marked as the disconnecting device for the equipment.

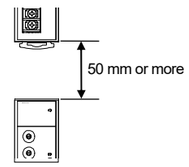
3.2 Dimensions



Allowable tilt angle is ± 90°, back and force, right and left from the reference.

● **Space required between each instrument vertically**

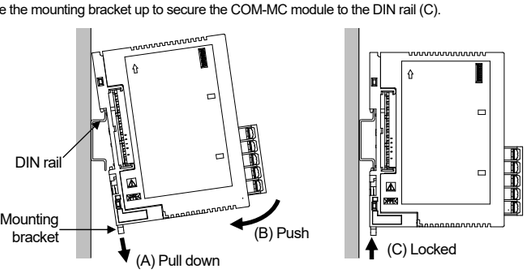
To install/uninstall the main unit of the COM-MC on/from the Base unit, the main unit needs to be slightly inclined and thus requires at least 50 mm clearance above and below it.



3.3 DIN Rail Mounting

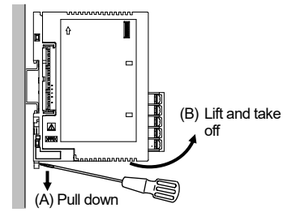
■ Mounting procedures

1. Pull down the mounting bracket at the bottom of the base (A). Attach the hooks on the top of the base to the DIN rail and push the lower section into place on the DIN rail (B).
2. Slide the mounting bracket up to secure the COM-MC module to the DIN rail (C).



■ Removing procedures

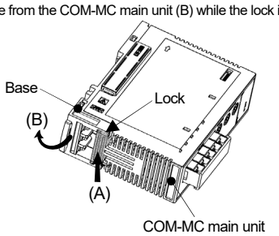
1. Turn the power OFF.
2. Remove the wiring.
3. Pull down a mounting bracket with a slotted screwdriver (A). Lift the COM-MC module from bottom, and take it off (B).



Mounting with screws
The module can be also mounted with screws. For detailed mounting procedure, refer to **COM-MC∗01 [For FB series, FZ/GZ series (FB series compatible setting)] Instruction Manual (IMR02E45-E□)** or **COM-MC∗03 [For GZ series (HA series compatible setting)] Instruction Manual (IMR02E47-E□)**.

3.4 How to Separate the COM-MC Module and Base

Remove the base from the COM-MC main unit (B) while the lock is pressed (A).



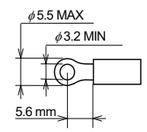
4. WIRING

⚠ WARNING

To prevent electric shock or instrument failure, do not turn on the power until all wiring is completed. Make sure that the wiring is correct before applying power to the instrument.

4.1 Wiring Cautions

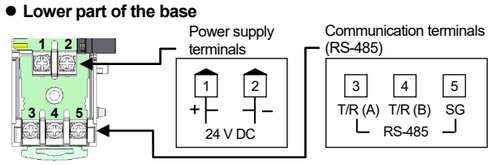
- To avoid noise induction, keep communication signal wire away from instrument power line, load lines and power lines of other electric equipment.
- If there is electrical noise in the vicinity of the instrument that could affect operation, use a noise filter.
  – Shorten the distance between the twisted power supply wire pitches to achieve the most effective noise reduction.
  – Always install the noise filter on a grounded panel. Minimize the wiring distance between the noise filter output and the instrument power supply terminals to achieve the most effective noise reduction.
  – Do not connect fuses or switches to the noise filter output wiring as this will reduce the effectiveness of the noise filter.
- Power supply wiring must be twisted and have a low voltage drop.
- For an instrument with 24 V power supply input, supply power from a "SELV" circuit defined as IEC 60950-1.
- A suitable power supply should be considered in the end-use equipment.
  The power supply must be in compliance with a limited-energy circuit (maximum available current of 5.6 A).
- When connecting the wiring to the terminals, use the recommended solderless terminals. Only these recommended solderless terminals can be used due to the insulation between the terminals.
  Screw Size:
  - Power supply terminals and Communication terminals: M3 × 7 (with 5.8 × 5.8 square washer)
  - CC-Link connection terminals: M3 × 6
  Recommended tightening torque:
  - Power supply terminals and Communication terminals: 0.4 N·m (4 kgf·cm)
  - CC-Link connection terminals: 0.49 N·m (5 kgf·cm)
  Applicable wire:
  - Power supply terminals and Communication terminals: Solid/twisted wire of 0.25 to 1.65 mm^2
  - CC-Link connection terminals: AWG20
  Recommended solderless terminal:
  Manufactured by J.S.T MFG CO., LTD. Circular terminal with isolation V1.25–MS3



- Make sure that during field wiring parts of conductors cannot come into contact with adjacent conductive parts.

4.2 Terminal Configuration

● **Lower part of the base**



4.3 Connection to Controller

Conduct wiring of the COM-MC and the controller by referring to the following connection example.

Base
Communication terminals

Communication terminals (RS-485)

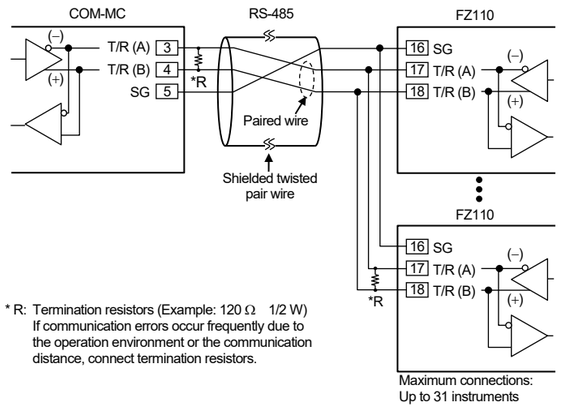
Terminal No.	Symbol	Signal name
3	T/R (A)	Send data/Receive data
4	T/R (B)	Send data/Receive data
5	SG	Signal ground

■ Wiring example (FZ110)

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

☞ Refer to the instruction manual of the relevant model for the details of the size of the solderless terminal and how to conduct transition wiring.

- FB100/FB400/FB900 Communication Instruction Manual (IMR01W04-E□)
- FZ110/FZ400/FZ900 Instruction Manual [Host Communication] (IMR03A07-E□)
- GZ400/GZ900 Instruction Manual [Host Communication] (IMR03D07-E□)



* 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.

FB100/FB400/FB900 Communication terminals (RS-485)

Terminal No.		Symbol	Signal name
FB100	FB400/FB900		
13	25	SG	Signal ground
14	26	T/R (A)	Send data/Receive data
15	27	T/R (B)	Send data/Receive data

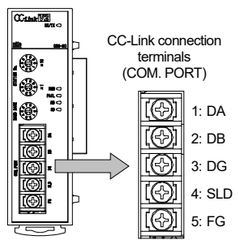
FZ110/FZ400/FZ900 Communication terminals (RS-485)

Terminal No.		Symbol	Signal name
FZ110	FZ400/FZ900		
16	34	SG	Signal ground
17	35	T/R (A)	Send data/Receive data
18	36	T/R (B)	Send data/Receive data

GZ400/GZ900 Communication terminals (RS-485)

Terminal No.	Symbol	Signal name
34	SG	Signal ground
35	T/R (A)	Send data/Receive data
36	T/R (B)	Send data/Receive data

4.5 Connection to CC-Link



Terminal No.	Signal name	Symbol	Cable color
1	Data A	DA	Blue
2	Data B	DB	White
3	Data ground	DG	Yellow
4	Shield (Grounding wire)	SLD	—
5	Frame ground	FG	—

Terminal screws
Screw size: M3 × 6
Recommended tightening torque:
0.49 N·m (5 kgf·cm)

The CC-Link connecting terminal cannot do on-line installation or dismount for terminal block of dismount impossibility. The device cannot be replaced unless the link is set off-line. In addition, FG (frame ground) terminal of terminal number 5 is FG in a CC-Link function, and it is not FG of instrument all.

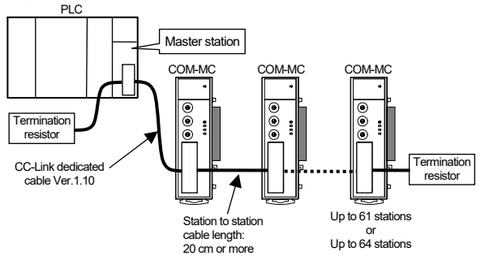
Ground both ends of the shield wire on the CC-Link dedicated cable Ver.1.10 via the SLD or FG terminal of each module. In addition, the SLD terminal is internally connected with the FG terminal.

Do not ground the instrument together with other equipment. In addition, use grounding wires with a cross section of 2.0 mm² or more. (Ground resistance: 100 ohm or less)

☞ For cable specifications, connection method and vendor, refer to the website of CC-Link Partner Association.
URL: https://www.cc-link.org/

■ Connection example

The PLC (master station) and COM-MC make multi-drop connection in CC-Link dedicated cable Ver.1.10.



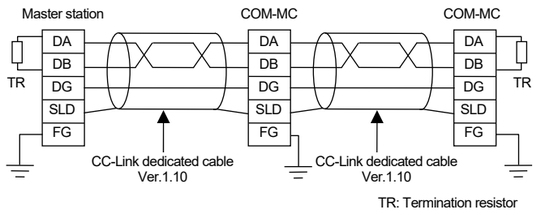
Communication speed and maximum transmitter distance

Communication speed	Station to station cable length	Maximum transmitter distance (maximum length of network)
10 Mbps	20 cm or more	100 m
5 Mbps		160 m
2.5 Mbps		400 m
625 kbps		900 m
156 kbps		1200 m

☞ For communication speed and cable length, refer to the “CC-Link Cable Wiring Manual” of CC-Link Partner Association.

■ Connection diagram

Always connect a termination resistor between the DA and DB terminals of the module to be located at the far end.
Termination resistor: 110 Ω ± 5 % 1/2 W

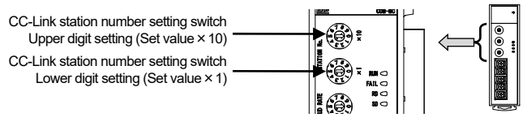


5. CC-Link COMMUNICATION SETTING

5.1 CC-Link Station Number Setting

Set the station number of CC-Link using a small blade screwdriver.

The setting will not be reflected if it is changed while the instrument is powered on. The FAIL lamp flashes to indicate it. The FAIL lamp also flashes when a set value outside the setting range is entered. To activate the setting, turn off the power once and turn it back on again.



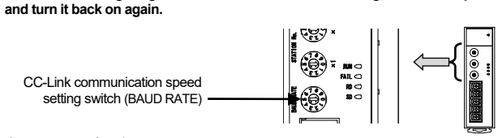
Setting range:
1 to 61 (4 stations occupied 1 time, 4 stations occupied 2 times)
1 to 64 (1 station occupied 1 time, 1 station occupied 4 times, 1 station occupied 8 times)

Factory set value: 0

5.2 CC-Link Communication Speed Setting

Set the communication speed of CC-Link using a small blade screwdriver.

The setting will not be reflected if it is changed while the instrument is powered on. The FAIL lamp flashes to indicate it. The FAIL lamp also flashes when a set value outside the setting range is entered. To activate the setting, turn off the power once and turn it back on again.



Setting range: 0 to 4
Factory set value: 0 (156 kbps)

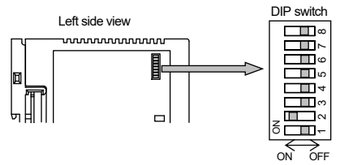
Communication speed and maximum transmitter distance
[Use the CC-Link dedicated cable Ver. 1.10]

Communication speed setting	Communication speed	Maximum transmitter distance
0	156 kbps	1200 m
1	625 kbps	900 m
2	2.5 Mbps	400 m
3	5 Mbps	160 m
4	10 Mbps	100 m
5 to 9	Do not set this one	

☞ For communication speed and cable length, refer to the “CC-Link Cable Wiring Manual” of CC-Link Partner Association.

5.3 Occupied Stations/Extended Cyclic and Controller Communication Speed Setting

DIP switches are used to set the number of CC-Link occupied stations/extended cyclic and controller communication speed.



1	2	Controller communication speed	
OFF	OFF	38400 bps	
ON	OFF	9600 bps	
OFF	ON	19200 bps	← A
ON	ON	57600 bps *	

* When the switch is set to 57600 bps, the controller communication with the FB series is not possible.

A: Factory set value: 19200 bps

• COM-MC∗01 [For FB series, FZ/GZ series (FB series compatible setting)]

3	4	5	Number of occupied stations/extended cyclic setting		
OFF	OFF	OFF	4 stations occupied 1 time (8 channels assignment)	8 instruments	← A
ON	OFF	OFF	4 stations occupied 1 time (16 channels assignment)	16 instruments	
OFF	ON	OFF	4 stations occupied 2 times (16 channels assignment)	16 instruments	
ON	ON	OFF	4 stations occupied 2 times (31 channels assignment)	31 instruments	
OFF	OFF	ON	1 station occupied 1 time (1 channel assignment)	1 instrument	
ON	OFF	ON	1 station occupied 1 time (2 channels assignment)	2 instruments	
OFF	ON	ON	Do not set this one		
ON	ON	ON			

A: Factory set value: 4 stations occupied 1 time (8 channels assignment) 8 instruments

• COM-MC∗03 [For GZ series (HA series compatible setting)]

3	4	5	Number of occupied stations/extended cyclic setting		
OFF	OFF	OFF	1 station occupied 1 time (2 channels assignment)	1 instrument	← A
ON	OFF	OFF	1 station occupied 4 times (2 channels assignment)	1 instrument	
OFF	ON	OFF	1 station occupied 8 times (2 channels assignment)	1 instrument	
ON	ON	OFF	4 stations occupied 1 time (2 channels assignment)	1 instrument	
OFF	OFF	ON	Do not set this one		
ON	OFF	ON			
OFF	ON	ON			
ON	ON	ON			

A: Factory set value: 1 station occupied 1 time (2 channels assignment) 1 instrument

6	7	8	
OFF	OFF	OFF	Fixed (Do not change)

CC-Link version varies according to the specification of Occupied station/Extended cyclic of the COM-MC. Select CC-Link version of PLC by setting the following CC-Link specifications:
- 1 station occupied 1 time/4 stations occupied 1 time: CC-Link Ver. 1.10
- 1 station occupied 4 times/1 station occupied 8 times/4 stations occupied 2 times: CC-Link Ver. 2.00

● Relation between the Number of Occupied stations/Extended cyclic and the Number of connected controllers

Number of occupied station/ extended cyclic	Maximum connections *	Model code
1 station occupied 1 time	2 instruments	COM-MC∗01
	1 instrument	COM-MC∗03
1 station occupied 4 times	1 instrument	COM-MC∗03
1 station occupied 8 times	1 instrument	COM-MC∗03
4 stations occupied 1 time	16 instruments	COM-MC∗01
	1 instrument	COM-MC∗03
4 stations occupied 2 times	31 instruments	COM-MC∗01

* The number of channels used depends on the data type.

6. SPECIFICATIONS

■ CC-Link communication

Protocol: CC-Link Ver. 2.00/Ver. 1.10
Communication speed: 156 kbps, 625 kbps, 2.5 Mbps, 5 Mbps, 10 Mbps
Station number: 1 to 61 (4 stations occupied 1 time, 4 stations occupied 2 times)
1 to 64 (1 station occupied 1 time, 1 station occupied 4 times, 1 station occupied 8 times)
Connection cable: CC-Link dedicated cable Ver.1.10 (3-core twisted cable with shield)
Connection method: Terminals
Termination resistor: External installation is necessary (Between the DA and DB terminals: 110 Ω ± 5 % 1/2 W)
Communication data length: See table shown below

Number of occupied station/extended cyclic	Remote Input/Output (RX/RY)	Remote register (RWr/RWw)	Maximum connections
4 stations occupied 1 time	128 bits each	16 words each	1, 8 or 16 instruments
4 stations occupied 2 times	244 bits each	32 words each	16 or 31 instruments
1 station occupied 1 time	32 bits each	4 words each	1 or 2 instruments
1 station occupied 4 times	64 bits each	16 words each	1 instrument
1 station occupied 8 times	128 bits each	16 words each	1 instrument

Number of occupied station/extended cyclic and CC-Link version:
CC-Link Ver. 1.10: 1 station occupied 1 time or 4 stations occupied 1 time
CC-Link Ver. 2.00: 1 station occupied 4 times, 1 station occupied 8 times, or 4 stations occupied 2 times

■ Controller communication

Interface: Base on RS-485, EIA standard
Synchronous method: Half-duplex start-stop synchronous type
Communication speed: 9600 bps, 19200 bps, 38400 bps, 57600 bps *
* When the switch is set to 57600 bps, the controller communication with the FB series is not possible.
Data bit configuration: Start bit: 1
Data bit: 8
Parity bit: None
Stop bit: 1
Protocol: Modbus-RTU
Maximum connections: COM-MC∗01: Controller (FB100/FB400/FB900, FZ110/FZ400/FZ900, or GZ400/GZ900): 31 instruments
COM-MC∗03: Controller (GZ400/GZ900): 1 instrument
Connection method: Terminals
Termination resistor: Externally connected (Example: 120 Ω 1/2 W)

■ General specifications

Power supply voltage: 24 V DC (Rating)
21.6 V to 26.4 V DC [Including power supply voltage variation]
Power consumption (at maximum load):
45 mA max. (24 V DC)
Rush current: 15 A or less
Allowable ambient temperature:
0 to 55 °C
Allowable ambient humidity:
5 to 95 %RH (Absolute humidity: MAX.W.C 29 g/m³ dry air at 101.3 kPa)
Weight: Approx. 130 g

7. MODEL CODE

COM-MC ∗ □ - □
(1) (2)

(1) Corresponding to the RKC controller
01: FB100/FB400/FB900, FZ110/FZ400/FZ900 (FB series compatible setting) or GZ400/GZ900 (FB series compatible setting)
03: GZ400/GZ900 (HA series compatible setting)

(2) RUN/STOP logic selection
1: 0: RUN
1: STOP
2: 0: STOP
1: RUN

The first edition: DEC. 2024 [IMQ00]

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