Ethernet Modbus/TCP Communication Converter

COM-ME-1 [For FZ series/GZ series] Installation Manual

IMR02E32-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-ME-1 [For FZ series/GZ series] Instruction Manual**.
The manual can be downloaded from the official RKC website:
https://www.rkcinst.co.jp/english/download-center/

■ Product check

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

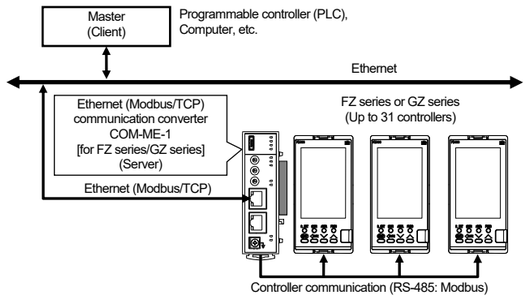
- This product is intended for use with industrial machines, test and measuring equipment. (It is not designed for use with medical equipment and nuclear energy plant.)
- This is a Class A instrument. In a domestic environment, this instrument may cause radio interference, in which case the user may 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.
- Do not connect modular connectors to telephone line.

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**"

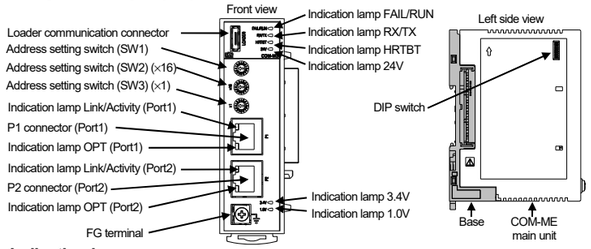
1. OUTLINE

The model COM-ME-1 [for FZ series/GZ series] (hereinafter called the COM-ME) is a communication converter for connecting the FZ series [FZ110/400/900] or GZ series [GZ400/900] controller (hereinafter called the controller) to Ethernet (Modbus/TCP).



2. PARTS DESCRIPTION

■ COM-ME main unit



Indication lamp

FAIL/RUN	[Green or Red]	• While in normal state: • During setting of IP address setting: • Self-diagnostic error (Recoverable fault): • Self-diagnostic error (Major fault):	Green lamp turns on Green lamp blinks Green lamp blinks Red lamp turns on
RX/TX	[Green]	During controller communication data send and receive:	Green lamp turns on
HRTBT	[Green]	While software is properly running:	Green lamp turns on
24V	[Green]	While 24 V power is supplied:	Green lamp turns on
3.4V	[Green]	While 3.4 V power is properly supplied:	Green lamp turns on
1.0V	[Green]	While 1.0 V power is properly supplied:	Green lamp turns on
Link/Activity (Port1/Port2)	[Green]	• No link or No activity: • Link is being established or in data communication:	Turns off Green lamp turns on
OPT (Port1/Port2)	[Yellow]	• When connected at 100 Mbps or when not in communication: • When connected at 10 Mbps:	Turns off Yellow lamp turns on

Communication port (modular connector) and communication connector

Loader communication connector	Used to connect the communication converter and personal computer when loader communication is performed.
P1 connector (Port1) P2 connector (Port2)	Connector for connection to networks (Modbus/TCP).

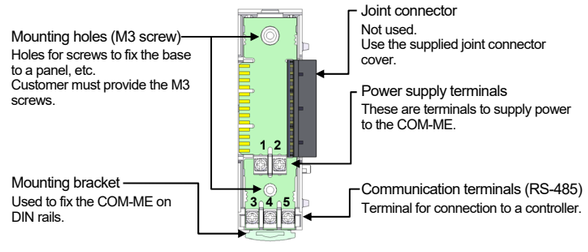
Switch

Address setting switch (SW1)	• Used to set the IP address.
Address setting switch (SW2, SW3) (×16, ×1)	• Sets the IP address in hexadecimal.
DIP switch	• Sets communication speed corresponding to controller communication. • Sets DIP switch setting enable/disable. • Used to set the IP address setting and how it works.

Terminal

FG terminal	Terminal for grounding

■ 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]

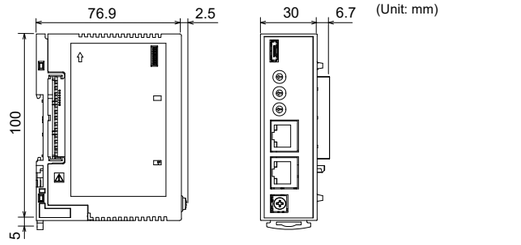
(2) Use this instrument within the following environment conditions:
- Allowable ambient temperature: –10 to +55 °C
- Allowable ambient humidity: 5 to 95 %RH
  (Absolute humidity: MAX. W. C 29 g/m^3 dry air at 101.3 kPa)
- Installation environment conditions: Indoor use, Altitude up to 2000 m

(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 mainframe.
- 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.
- Don't connect the COM-ME module to the others. Otherwise the communication may not be established properly.

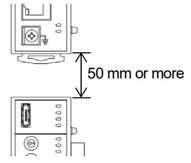
(5) In case this instrument is connected to a supply by means of a permanent connection, a switch or circuit-breaker shall be included in the installation. This shall be in close proximity to the equipment and within easy reach of the operator. It shall be marked as the disconnecting device for the equipment.

3.2 Dimensions



● Space required between each instrument vertically

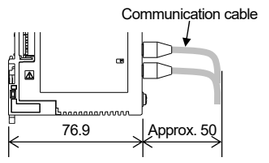
To install/uninstall the main unit of the COM-ME on/from the Base unit, the main unit needs to be slightly inclined and thus requires at least 50mm clearance above and below it.



● Depth for communication cables mounting

Space for communication cables must be considered when installing

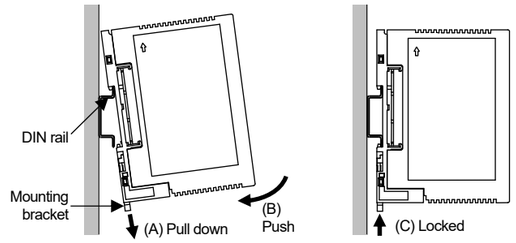
(Unit: mm)



3.3 DIN Rail Mounting

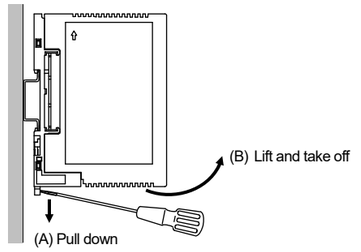
■ Mounting procedures

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-ME module to the DIN rail (C).



■ Removing procedures

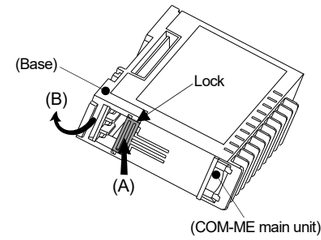
1. Turn the power OFF.
2. Remove the wiring.
3. Pull down a mounting bracket with a slotted screwdriver (A). Lift the COM-ME module from bottom, and take it off (B).



Mounting with screws
The module can be also mounted with screws. For detailed mounting procedure, refer to **COM-ME-1 [For the FZ series/GZ series] Instruction manual (IMR02E33-E□).**

3.4 How to Separate the COM-ME Module and Base

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



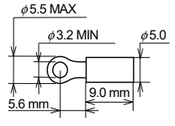
4. WIRING

⚠ WARNING

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

4.1 Wiring Cautions

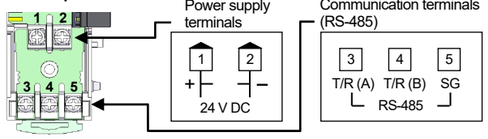
- To avoid noise induction, keep communication signal wire away from instrument power line, load lines and power lines of other electric equipment.
- If there is electrical noise in the vicinity of the instrument that could affect operation, use a noise filter.
  – Shorten the distance between the twisted 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 end-use equipment.
  The power supply must be in compliance with a limited-energy circuits (maximum available current of 5.6 A).
- When connecting the wiring to the terminals, use the specified solderless terminals. Only these specified solderless terminals can be used due to the insulation between the terminals.
  Screw Size: Power supply terminals, Communication terminals:
  M3 × 7 (with 5.8 × 5.8 square washer)
  FG terminal M3 × 6
  Recommended tightening torque: 0.4 N·m (4 kgf·cm)
  Applicable wire: Solid/twisted wire of 0.25 to 1.65 mm^2
  Specified solderless terminal:
  Manufactured by J.S.T MFG CO., LTD.
  Circular terminal with isolation V1.25–MS3
  (M3 screw, width 5.5 mm, hole diameter 3.2 mm)



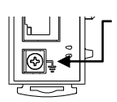
- Make sure that during field wiring parts of conductors cannot come into contact with adjacent conductive parts.

4.2 Terminal Configuration

● **Lower part of the base**



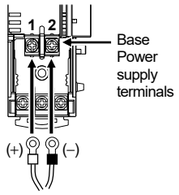
● **Lower part of the front**



FG terminal

Ground the instrument separately from other equipment.
The grounding resistance should be 100 Ω or less. Use grounding wires with a cross section area of 2 mm^2 or more.

4.3 Wiring of Power Supply Terminals



1. Turn the power OFF.
2. Remove the COM-ME main unit from the base.
3. Remove the power terminal cover on the base.
4. Attach the solderless terminals to the power supply terminals with a Phillips head screwdriver.
   When attaching the terminals, make sure that the polarity (+ and –) is correct.
5. Attach the power suppy terminal cover on the terminal and return the COM-ME main unit to the base. This completes the wiring work.

4.4 Connection to Controller

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

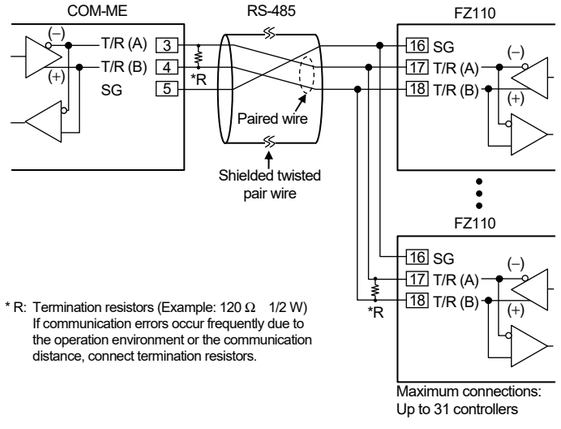
Communication terminals (RS-485)

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.
- 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.

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

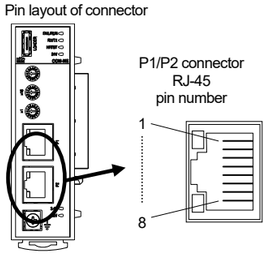
Terminal No.		Symbol	Signal name
FZ110	FZ400/FZ900		
16	34	SG	Signal ground
17	35	T/R (A)	Send data/Receive data
18	36	T/R (B)	Send data/Receive data

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 Ethernet

Pin layout of connector



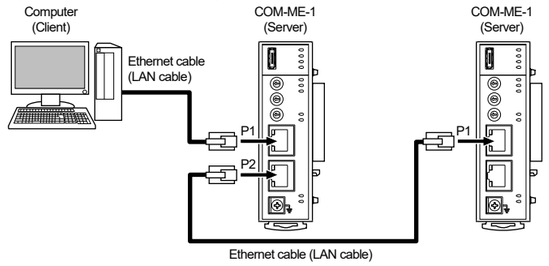
Communication terminal number and signal details

Pin No.	Signal name	Symbol
1	Send data +	TX+
2	Send data –	TX–
3	Receive data +	RX+
4	Unused	—
5	Unused	—
6	Receive data –	RX–
7	Unused	—
8	Unused	—

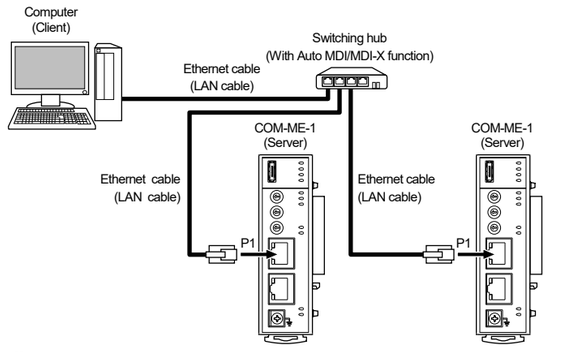
■ Connection Example

The Ethernet cable (LAN cable) which is marketed can be connected. The Ethernet cable (LAN cable) must be provided by the customer.

● Daisy-chain connection
Daisy-chain connection is available only when the converter is used on the 100BASE-TX network.



● When a switching hub is used
Use a switching hub when the 10BASE-T standard is used.

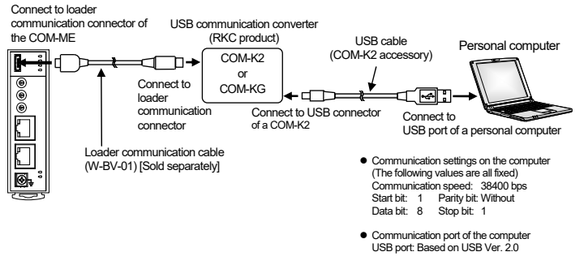


Use category 5 Ethernet cable (LAN cable).

Identification of the COM-ME on Ethernet network is done by the IP address of the COM-ME. To use two or more COM-ME, set a unique IP address to each COM-ME.

■ Loader communication

Connect a USB communication converter between the personal computer and the COM-ME. Loader communication makes it possible to check and set data of the COM-ME and the controller. Our communication tool PROTEM2 can be used to check and set the data.



The Loader port is only for parameter setup. Not used for data logging during operation.

During the loader communication, the COM-ME requires an external power source. The COM-ME will not function on the USB power from a personal computer alone.

The module address for loader communication is fixed at "0."

☞ Refer to the instruction manual of the relevant USB communication converter for the details of the COM-K2 and the COM-KG"

5. COMMUNICATION SETTINGS

To establish communication between devices, the initial setting of communication related data is required. Refer to the instruction manual of the relevant model for the details of setting.

☞ For the communication initial settings of the COM-ME and Ethernet, refer to the **COM-ME-1 [for FZ series/GZ series] Instruction Manual (IMR02E33-E□)**.

Communication initial setting:
- IP address of the COM-ME
- TCP port number
- Client IP address
- Ethernet IP address
- Ethernet subnet mask
- Communication speed of controller communication
- Data bit configuration for controller communication

☞ For the communication initial settings of the controllers connected to the COM-ME, refer to the instruction manual of each controller.
- **FZ110/FZ400/FZ900 Instruction Manual [Host Communication] (IMR03A07-E□)**
- **GZ400/GZ900 Instruction Manual [Host Communication] (IMR03D07-E□)**

Contents of Communication initial setting:
- Communication protocol for controller communication
- Controller device address
- Communication speed of controller communication
- Data bit configuration for controller communication
- Input data type (Be sure to set a single word)

6. SPECIFICATIONS

■ Ethernet communication

Physical layer:	10BASE-T/100BASE-TX automatic recognition
User layer:	MODBUS/TCP
Connector type:	RJ-45 (2 ports)
IP address:	0.0.0.0 to 255.255.255.255 The Local Loopback Address (127.0.0.1 to 127.255.255.254) cannot be used.
Subnet mask:	0.0.0.0 to 255.255.255.255

■ Controller communication

Interface:	Base on RS-485, EIA standard
Synchronous method:	Start/stop synchronous type
Communication speed:	9600 bps, 19200 bps, 38400 bps, 57600 bps
Data bit configuration:	Start bit: 1 Data bit: 8 Parity bit: Without, Odd or Even Stop bit: 1 or 2
Protocol:	Modbus Signal transmission mode: Remote Terminal Unit (RTU) mode
Maximum connections:	31 controllers (FZ110/400/900 or GZ400/900)
Connection method:	Terminal block
Termination resistor:	Externally connected (Example: 120 Ω, 1/2 W)

■ Loader communication

Synchronous method:	Start/Stop synchronous type
Communication speed:	38400 bps
Data bit configuration:	Start bit: 1 Data bit: 8 Parity bit: Without Stop bit: 1
Protocol:	RKC communication (ANSI X3.28-1976 subcategories 2.5 and B1)
Maximum connections:	One module
Connection method:	Connection with a loader communication cable for our USB communication converter COM-K2 or COM-KG. (COM-K□ are sold separately)

■ General specifications

Power supply voltage:	24 V DC
Power supply voltage range:	20.4 V to 26.4 V DC [Including power supply voltage variation]
Power consumption (at maximum load):	150 mA max. (24 V DC) Rush current: 15 A or less
Allowable ambient temperature:	–10 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:	Indoors use, Altitude up to 2000 m
Weight:	Approx. 150 g

■ Standard

Safety standard:	UL:	UL 61010-1
	cUL:	CAN/CSA-C22.2 No.61010-1
CE marking:	EMC:	EN61326-1
	RoHS:	EN50581
RCM:		EN55011

7. MODEL CODE

COM-ME-1 5 ∗ 07
(1)(2) (3)

(1) Network communication type
1: MODBUS/TCP

(2) Controller communication
5: RS-485

(3) Corresponding to the RKC controller
07: FZ series/GZ series

■ Other peripherals and accessories (Sold separately)

- End plate (DEP-01, Package of 2 plates)
- Communication converter COM-K2-1 (Optional: with loader communication cable)
- Communication converter COM-KG-1N (Optional: with loader communication cable)

The first edition: DEC. 2020 [IMQ00]

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DEC. 2020