

OP10 Installation Manual

Thank you for purchasing this RKC product. In order to achieve maximum performance and ensure proper operation of your new 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 the operations, refer to **OP10 Operation Manual (IMS01W02-E3)**. For the controller connected to the OP10, refer to the instruction manual for the respective controller.

The controller manuals can be downloaded from the official RKC website: http://www.rkcinst.com/english/manual_load.htm.

Accessories check

OP10 Installation Manual (IMS01W01-E3)	1
OP10 Operation Manual (IMS01W02-E3)	1

Other peripherals and accessories (Sold separately)

Mounting frame (KCA100-526)
Communication cable for RS-485 [With termination resistor] (W-BO-01-□, □: Cable length)
Communication cable for RS-485 [Modular type] (W-BO-04-□, □: Cable length)
Communication cable for RS-422A [Modular type] (W-BO-05-□, □: Cable length)
Socket for DIN rail mounting (ATC180041, Panasonic product)
Socket for panel mounting (AT78051, Panasonic product)

Safety precautions



WARNING

- To prevent injury to persons, damage to instrument and 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 instrument and equipment.
- This instrument must be used in accordance with the specifications to prevent fire or damage to instrument and 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 can occur and warranty is void under these conditions.

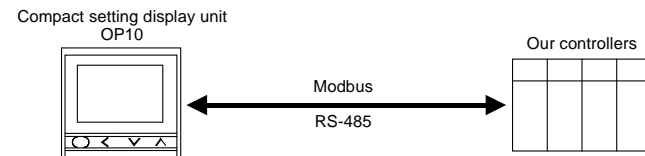
CAUTION

- 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.)
- 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.
- This instrument is basic insulation between the power supply and the unused terminals (No. 1 and 2). Provide reinforced insulation between the wire for the input signal and the wires for instrument power supply, source of power and loads.
- 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 by operating personnel.
- All precautions described in this manual should be taken to avoid damage to the instrument or equipment.
- 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 fuse, circuit breaker, etc.
- 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 dispensation.
- 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 will occur. Use a soft, dry cloth to remove stains from the instrument.
- To avoid damage to instrument display, do not rub with an abrasive material or push front panel with a hard object.
- 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 purpose of illustration.
- 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.

The OP10 is a compact setting display unit that connects to our controller and is used to monitor and set data.



The maximum number of display channels: 99 channels

Connectable controllers

SRZ	<ul style="list-style-type: none"> Z-TIO-□ module The OP10 can be connected to a Z-TIO-□ module with a Z-DIO-A module connected, however, it cannot be used to set or display data of the Z-DIO-A module. Z-COM-A module
SRV	V-TIO-E/F module (Can be connected to the OP10 when RS-422A is a communication interface.)
SR Mini HG SYSTEM	H-PCP-J module (Can be connected to the OP10 when RS-422A and RS-485 are communication interface.)

1. MOUNTING



WARNING

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

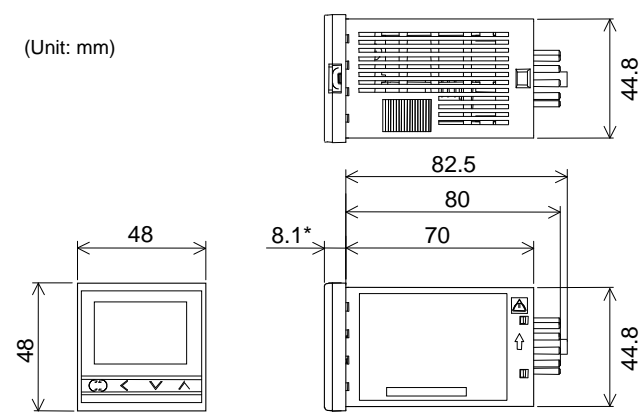
1.1 Mounting Cautions

- This instrument is intended to be used under the following environmental conditions. (IEC61010-1) [OVERVOLTAGE CATEGORY II, POLLUTION DEGREE 2]
 - Use this instrument within the following environment conditions:
 - Allowable ambient temperature: 0 to 50 °C
 - Allowable ambient humidity: 45 to 85 % RH
(Absolute humidity: MAX. W. C 29.3 g/m³ dry air at 101.3 kPa)
 - Installation environment conditions: Indoor use
Altitude up to 2000 m
- 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.
- 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 equipment that generates large amount of heat (heaters, transformers, semi-conductor functional devices, large-wattage resistors).
 - If the ambient temperature rises above 50 °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.
- 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

1.2 Dimensions

External dimensions

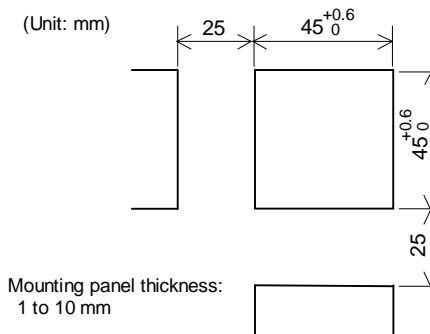
(Unit: mm)



* Waterproof/Dustproof (IP66) type: 9.1 mm

Panel cutout

(Unit: mm)



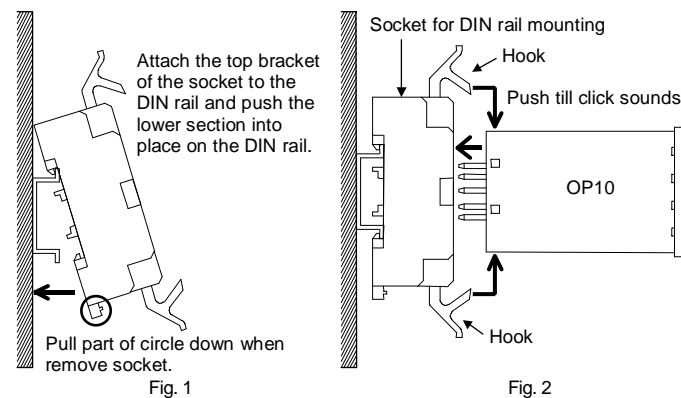
Installation Conditions:

The display cannot be seen from the outside of the visual field range. The visual field range of OP10 is 40° to the upper side, and 30° to the lower side from the center of the display vertically.

1.3 Mounting Procedures

DIN rail mounting

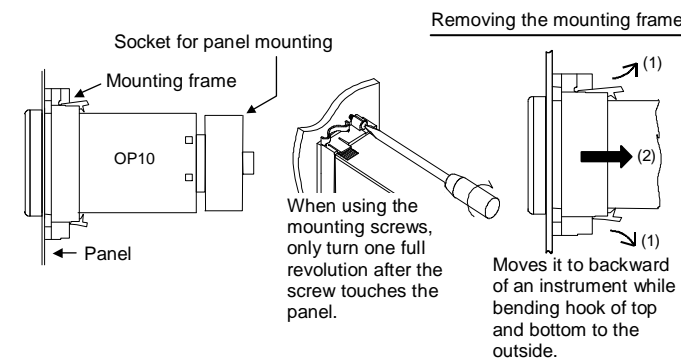
- Mounting the socket to the DIN rail. (Fig. 1)
- Wiring to the socket. Then, mounting the OP10 to the socket.
- Secure the OP10 by locking it with the hooks at the top and bottom of the socket. (Fig. 2)



Recommended socket for DIN rail mounting: ATC180041 (Panasonic product, Sold separately)

Panel mounting

- Prepare the panel cutout as specified in 1.2 Dimensions.
- Insert the OP10 through the panel cutout.
- Insert the mounting frame into the mounting from the rear of the OP10.
- Push the mounting frame forward until the frame is firmly secured to the panel.
- Mounting the socket to the OP10.



Mounting frame type: KCA100-526 (RKC product, Sold separately)

Recommended socket for panel mounting: AT78051 (Panasonic product, Sold separately)

The waterproof/dustproof option on the front of the instrument conforms to IP66 when mounted on the panel. For effective waterproof/dustproof, the gasket must be securely placed between instrument and panel without any gap. If gasket is damaged, please contact RKC sales office or the agent.

2. WIRING

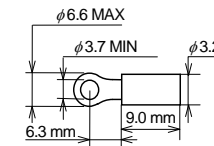


WARNING

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.

2.1 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.
- The instrument has a basic insulation between the power supply and inputs/outputs. Additional Supplementary insulation is required between the mains supply and the mains connections on the OP10 (mains input) by adding a separating safety transformer, providing at least a supplementary insulation for 240 V AC in accordance with IEC/UL/CSA 61010-1.
- Power supply wiring must be twisted and have a low voltage drop.
- This instrument with 24 V power supply is not provided with an overcurrent protection device. For safety install an overcurrent protection device (such as fuse) with adequate breaking capacity close to the instrument.
 - Fuse type: Time-lag fuse (Approved fuse according IEC60127-2 and/or UL248-14)
 - Fuse rating: Rated current: 0.4 A
- For an instrument with 24 V power supply input, supply power from "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 8 A).
- When connecting the wiring to the power supply terminals, use the specified solderless terminals. Only these specified solderless terminals can be used due to the insulation between the terminals.
 - Screw size: M3.5 × 7 (with 7.4 × 7.4 square washer)
 - Recommended tightening torque: 0.8 N·m (8 kgf·cm)
 - Applicable wire: Solid/twisted wire of 0.25 to 1.65 mm²
 - Specified solderless terminal:
 - Manufactured by J.S.T MFG CO., LTD.
 - Circular terminal with isolation V1.25-M3 (RAV1.25-3.5)
- Make sure that during field wiring parts of conductors can not come into contact with adjacent conductive parts.

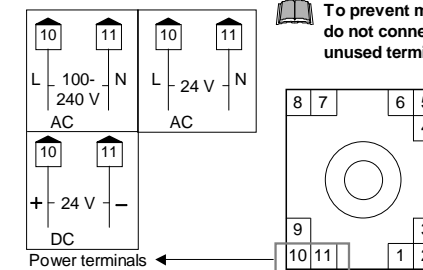


2.2 Terminal Configuration

Wire the power terminals only.

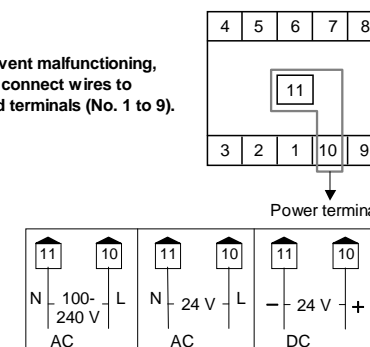
Socket for DIN rail mounting (ATC180041)

To prevent malfunctioning, do not connect wires to unused terminals (No. 1 to 9).



Socket for panel mounting (AT78051)

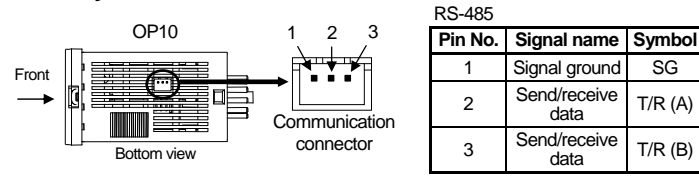
To prevent malfunctioning, do not connect wires to unused terminals (No. 1 to 9).



2.3 Connection to Controllers

W-BO-01, W-BO-04 or W-BO-05 communication cable (RKC product) can be used as communication cable (sold separately). If noise is a factor, customer should use a twisted pair cable (not included) or something to that effect.

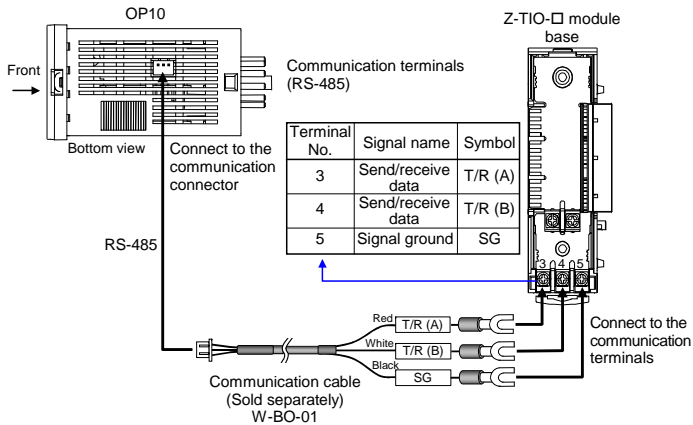
Pin layout of communication connector



Housing: XHP-3 (Manufactured by J.S.T MFG CO., LTD.)
Recommended cable: AWG30 to 22

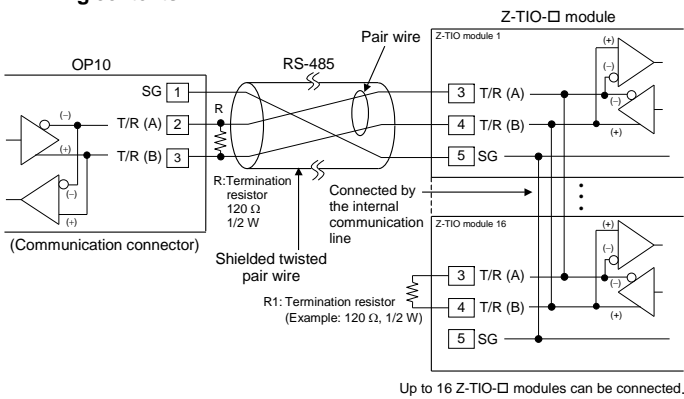
Connection to Z-TIO-□ module

Use communication cable (W-BO-01) to connect the OP10 and the Z-TIO-□ module.



Do not bend the contraction tube section (with termination resistor) of the communication cable. This may damage the cable.

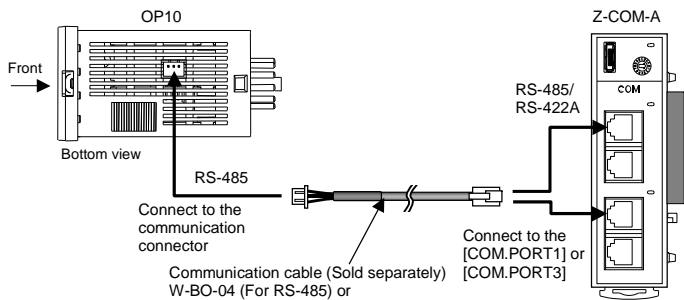
Wiring contents



Up to 16 Z-TIO-□ modules can be connected.

Connection to Z-COM-A module

Use communication cable (W-BO-04 or W-BO-05) to connect the OP10 and the Z-COM-A module.

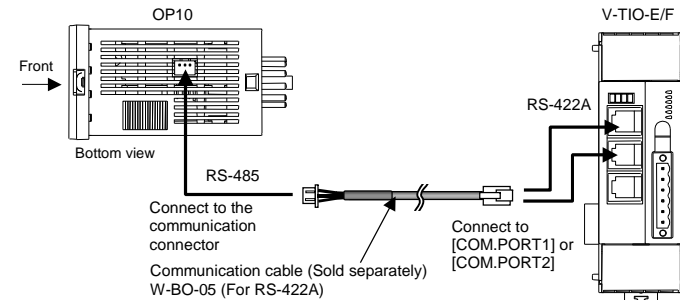


Up to 16 Z-COM-A modules can be connected (however, up to 99 channels).

Do not bend the contraction tube section (with termination resistor) of the communication cable. This may damage the cable.

Connection to V-TIO-E/F module

Use communication cable (W-BO-05) to connect the OP10 and the V-TIO-E/F module.

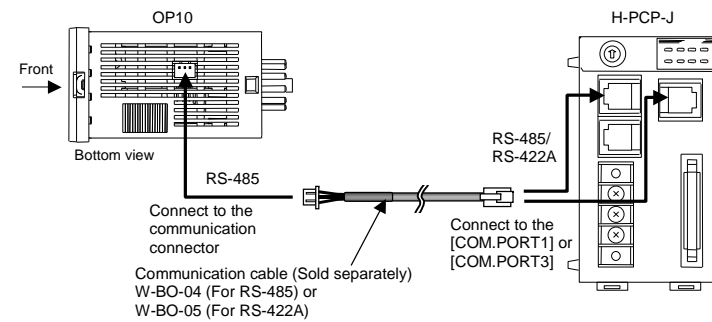


Up to 16 V-TIO-E/F modules can be connected (however, up to 99 channels).

Do not bend the contraction tube section (with termination resistor) of the communication cable. This may damage the cable.

Connection to H-PCP-J module

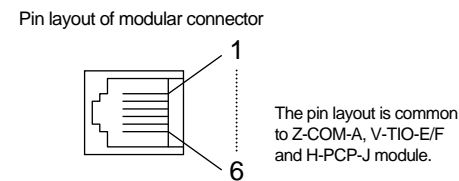
Use communication cable (W-BO-04 or W-BO-05) to connect the OP10 and the H-PCP-J module.



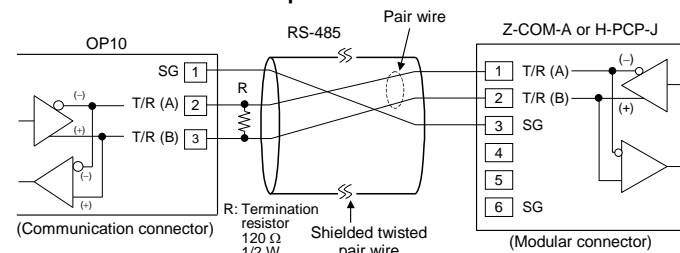
Up to 16 H-PCP-J modules can be connected (however, up to 99 channels).

Do not bend the contraction tube section (with termination resistor) of the communication cable. This may damage the cable.

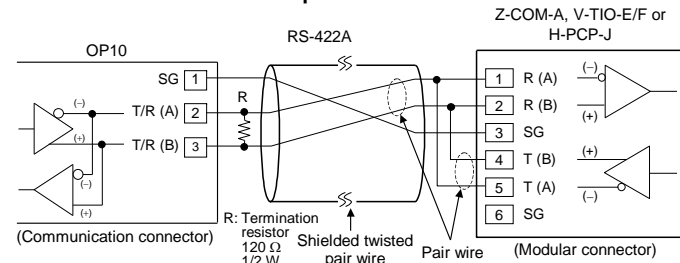
Wiring contents (Modular connector)



Connection to the RS-485 port of the controller

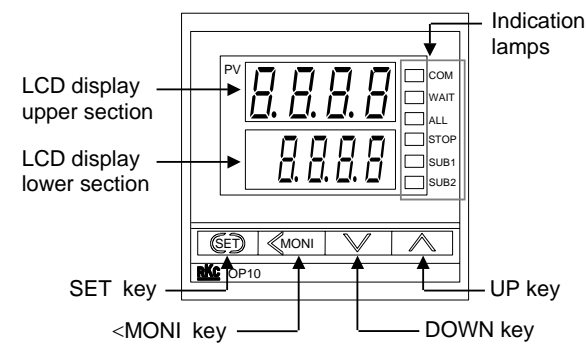


Connection to the RS-422A port of the controller



If communication error repeats frequently because of operating environment and/or communication distance, try to connect a terminal resistor also on the controller side. Refer to the instruction manual of the relevant controller for details of the terminal resistor on the controller side.

3. PARTS DESCRIPTION



LCD display upper section [Green]	Displays measured value (PV) or various parameter symbols of setting items.	
LCD display lower section [Orange]	Displays set value (SV) or various parameter set values. For level 0 (monitor items), displays various parameter symbols of monitor items.	
Indication lamp	COM [Green]	ON: During normal communication Flashing: Communication error
	WAIT [Green]	Lights while waiting for controller processing.
	ALL [Green]	Lights when operated in batch setting mode.
	STOP [Orange]	OFF: During normal operation ON: Adjustment/Maintenance Mode (Turn off the power once and the STOP lamp goes off when turn it on again.)
	SUB1 [Orange]	Cannot be used in this specification.
SUB2 [Orange]	Cannot be used in this specification.	
SET key	Used for parameter calling up and set value registration.	
<MONI key (Shift/Monitor key)	Use to change to monitor items [level 0]. Use to start changing settings. Use to move to a different digit when changing a setting.	
DOWN key	Use to decrease a numerical value. Use to change back to the previous channel.	
UP key	Use to increase a numerical value. Use to change to the next channel.	

4. SPECIFICATIONS

Display

Display method: LCD display
Display digit: Upper section: 4 digits (Green) Lower section: 4 digits (Orange)

Communication

Interface: Base on RS-485, EIA standard
Connection method: 2-wire system, half-duplex multi-drop connection
Synchronous method: Start/stop synchronous type
Communication speed: 4800 bps, 9600 bps, 19200 bps, 38400 bps
Data bit configuration: Start bit: 1
Data bit: 8
Parity bit: Without, Odd or Even
Stop bit: 1

Protocol:

Modbus-RTU
Maximum connections: Z-TIO-□ module: 16 modules

The OP10 can be connected to a Z-TIO-□ module with a Z-DIO-A module connected, however, it cannot be used to set or display data of the Z-DIO-A module.

Z-COM-A module: 16 modules (However, up to 99 channels)
V-TIO-E/F module: 16 modules (However, up to 99 channels)
H-PCP-J module: 16 modules (However, up to 99 channels)

Self-diagnostic function

Function stop: EEPROM data write error [Error code 2]
Watchdog timer error [Error code 128]

Action stop (Error number is not displayed): Power supply voltage monitoring

Instrument status: The LCD display upper section shows "Err," and the LCD display lower section shows the error code.

Power

Power supply voltage: 85 to 264 V AC [Including power supply voltage variation], 50/60 Hz
Rating: 100 to 240 V AC
21.6 to 26.4 V AC [Including power supply voltage variation], 50/60 Hz
Rating: 24 V AC
21.6 to 26.4 V DC [Including power supply voltage variation]
Rating: 24 V DC
4 VA max. (at 100 V AC) 7 VA max. (at 240 V AC)
4 VA max. (at 24 V AC) 100 mA max. (at 24 V DC)

Standard

Safety standard: UL: UL61010-1
cUL or CSA: CAN/CSA-C22.2 No.61010-1
CE marking: LVD: EN61010-1
OVERVOLTAGE CATEGORY II, POLLUTION DEGREE 2
EMC: EN61326-1
EN55011

C-Tick:

General specifications

Insulation resistance: Between unused terminals (No. 1, 2) and grounding: 20 MΩ or more at 500 V DC
Between power supply terminals and grounding: 20 MΩ or more at 500 V DC

Withstand voltage:

Time: 1 min.	①	②	③
① Grounding terminal			
② Power terminals	1500 V AC		
③ Unused terminals (No. 1, 2)	1000 V AC	1500 V AC	

This instrument is basic insulation between the power supply and the unused terminals (No. 1 and 2). This instrument is not the reinforced insulation.

Power failure: A power failure of 20 ms or less will not affect the control action.

Memory backup: Backed up by non-volatile memory (EEPROM)

Number of writing: Approx. 100,000 times.

Data storage period: Approx. 10 years

Allowable ambient temperature: 0 to 50 °C

Allowable ambient humidity: 45 to 85 %RH

(Absolute humidity: MAX.W.C 29.3 g/m³ dry air at 101.3 kPa)

Mounting method: DIN rail mounting or Panel mounting

Waterproof/Dustproof: The front of the instrument conforms to IP66 with the instrument mounted on the panel (Optional).

Weight: Approx. 120 g

5. MODEL CODE

OP10-□*□□□
(1) (2) (3)

(1) Power supply voltage

3: 24 V AC/DC 4: 100 to 240 V AC

(2) Waterproof/Dustproof

N: No Waterproof/Dustproof 1: Waterproof/Dustproof

(3) Connection type

01: Z-COM-A module (SRZ)

02: Z-TIO-□ module (SRZ)

03: V-TIO-E/F module (SRV)

[Can be connected to the OP10 when RS-422A is a communication interface]

04: H-PCP-J module (SR Mini HG SYSTEM)

[Can be connected to the OP10 when RS-422A/RS-485 are communication interface]

The connection type is selectable. Go to "TYPE" in the initial items [Level 4].

6. ERROR DISPLAYS

Self-diagnostic error

In an error is detected by the self-diagnostic function, the LCD display upper section shows "Err," and the LCD display lower section shows the error code. When two or more errors occur simultaneously, the error code numbers are totaled and displayed as one number

LCD Display		Description	Solution
Upper	Lower		
Err	2	EEPROM data write error	Turn off the power at once. If an error occurs after the power is turned on again, please contact RKC sales office or the agent.
	128	Watchdog timer error	

Over-scale and Underscale

Display	Description	Solution
□□□□ [Flashing]	Over-scale Display value becomes more than 10000 (No decimal place).	Check input type, input range, sensor and sensor connection of controller.
□□□□ [Flashing]	Underscale Display value becomes less than -2000 (No decimal place).	

Communication error

Display	Indication lamp	Description	Solution
- - - - [Flashing]	COM [Green] Flashing	Communication error occurred	Confirm the connection condition of communication cable and connect correctly. Confirm the communication setting (communication speed, data bit configuration, address etc.) and set them correctly.

Modbus is a registered trademark of Schneider Electric.
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: JAN. 2007 [IMQ00]
The third edition: JUL. 2013 [IMQ00]
HEADQUARTERS: 16-6, KUGAHARA 5-CHOME, OHTA-KU TOKYO 146-8515 JAPAN
PHONE: 03-3751-9799 (+81 3 3751 9799) E-mail: info@rkinst.co.jp
FAX: 03-3751-8585 (+81 3 3751 8585) Website: http://www.rkinst.com/ JUL. 2013