

Thank you for purchasing the 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 this manual in a convenient location for easy reference.

This manual describes the handling precautions, mounting, wiring and specifications only. For the basic operations, see Quick Operation Manual (IMR01W02-E□). For the detail handling procedures and various function settings, please read if necessary the following separate manuals.

- FB400/FB900 Instruction Manual (IMR01W03-E□)
- FB400/FB900 Communication Instruction Manual (IMR01W04-E□)

The above manuals can be downloaded from our website shown below.  
URL: [http://www.rkcinst.com/english/manual\\_load.htm](http://www.rkcinst.com/english/manual_load.htm)

## Product Check

Installation Manual (this manual) .....	1 *
Quick Operation Manual (IMR01W02-E□) .....	1 *
Parameter List (IMR01W06-E□) .....	1 *
Seal (SAP-306 [for Unit and Direct key type 2]) .....	1
Mounting bracket (with screw) .....	2 (FB900: 4)
Case rubber packing (FB400: KFB400-36<1>, FB900: KFB900-36<1>) .....	1

\* The German, French, Italian, Spanish and Chinese versions of the document are also available. They can be downloaded from our website.

## Safety Precautions



**WARNING**

- An external protection device must be installed if failure of this instrument could result in damage to the instrument, equipment or injury to personnel.
- 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 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 adequate measures.
- This instrument is protected from electric shock by reinforced insulation. 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 or failure, protect the power line and the input/output lines from high currents with a protection device 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 dispersion.
- 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.

## 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.

## 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

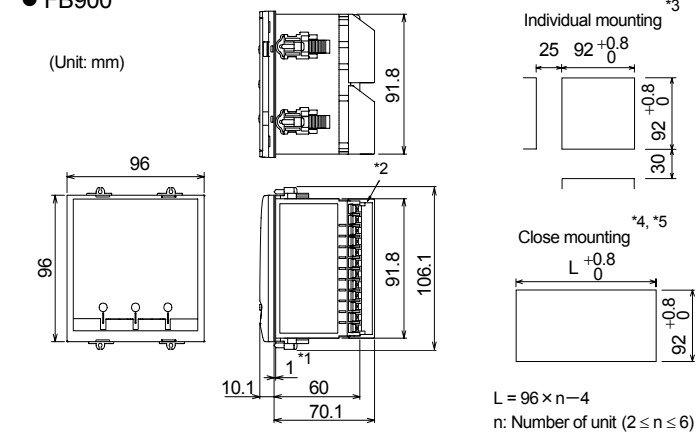
- (1) This instrument is intended to be used under the following environmental conditions. (IEC61010-1) [OVERVOLTAGE CATEGORY II, POLLUTION DEGREE 2]
  - (2) Use this instrument within the following ambient temperature and ambient humidity.
    - Allowable ambient temperature: -10 to +50 °C
    - Allowable ambient humidity: 5 to 95 % RH (Absolute humidity: MAX. W. C 29 g/m<sup>3</sup> dry air at 101.3 kPa)
  - (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) Take the following points into consideration when mounting this instrument in the panel.
    - Provide adequate ventilation space so that heat does not build up.
    - 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, or the like. However, do not allow cooled air to blow this instrument directly.
    - 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.
- (2) Mount this instrument in the horizontal direction for panel. If you did installation except a horizontal direction, this causes malfunction.

### 1.2 Dimensions

- FB400 (Unit: mm)
- 
- Individual mounting<sup>\*3</sup>  
Close mounting<sup>\*4, \*5</sup>
- L = 48 × n - 3  
n: Number of unit (2 ≤ n ≤ 6)
- Panel thickness: 1 to 10 mm  
(When mounting multiple FB400s close together, the panel strength should be checked to ensure proper support.)

### • FB900

(Unit: mm)



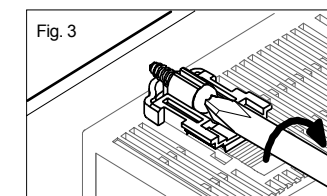
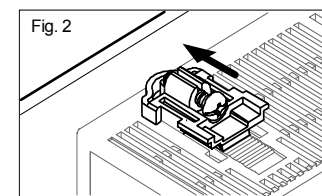
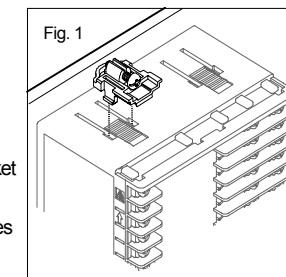
Panel thickness: 1 to 10 mm  
(When mounting multiple FB900s close together, the panel strength should be checked to ensure proper support.)

- \*1 Case rubber packing
- \*2 Terminal cover KFB400-58 <1> (option) [sold separately]
- \*3 When cutting out each mounting hole through a panel for individual mounting, observe that there is no burr or distortion along the panel cutout surface, or there is no bend on the panel surface. If so, the water resistant characteristics may worsen.
- \*4 Remove the case rubber packing. Because of closely mounting the FB400s or FB900s, protection will be compromised and not meet IP66 (NEMA 4X) by close mounting.
- \*5 When controllers are closely mounted, ambient temperature must not exceed 50 °C.

### 1.3 Procedures of Mounting and Removing

#### ■ Mounting procedures

1. Prepare the panel cutout as specified in 1.2 Dimensions.
2. Insert the instrument through the panel cutout.
3. Insert the mounting bracket into the mounting groove of the instrument. (Fig. 1)
4. Push the mounting bracket forward until the bracket is firmly secured to the panel. (Fig. 2)
5. Only turn one full revolution after the screw touches the panel. (Fig. 3)
6. The other mounting bracket should be installed the same way described in 3. to 5.

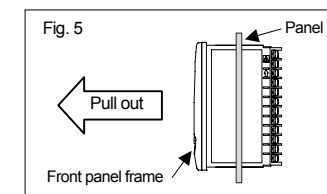
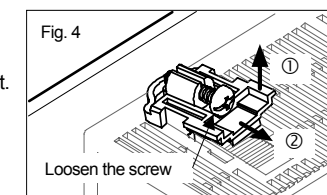


(FB900 is used in the above figures for explanation, but the same mounting procedures also apply to FB400.)

The front of the instrument conforms to IP66 (NEMA4X) 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.

#### ■ Removing procedures

1. Turn the power OFF.
2. Remove the wiring.
3. Loosen the screw of the mounting bracket. (Fig. 4)
4. Lift the latch of the mounting bracket (①), then pull the mounting bracket (②) to remove it from the case. (Fig. 4)
5. The other mounting bracket should be removed the same way described in 3. and 4.
6. Pull out the instrument from the mounting cutout while holding the front panel frame of this instrument. (Fig. 5)



## 2. WIRING



**WARNING**

To prevent electric shock or instrument failure, do not turn on the power until all the wiring is completed.

### 2.1 Wiring Cautions

- For thermocouple input, use the appropriate compensation wire.
- For RTD input, use low resistance lead wire with no difference in resistance between the three lead wires.
- To avoid noise induction, keep input 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.
- About five seconds are required as preparation time for contact output every time the instrument is turned on. Use a delay relay when the output line is used for an external interlock circuit.
- Power supply wiring must be twisted and have a low voltage drop.
- For an instrument with 24 V power supply, supply power from a SELV circuit.
- This instrument is not furnished with a power supply switch or fuse. Therefore, if a fuse or power supply switch is required, install close to the instrument. Recommended fuse rating: Rated voltage 250 V, Rated current 1 A  
Fuse type: Time-lag fuse
- Use the solderless terminal appropriate to the screw size.
  - Screw size: M3 × 6 (with 5.8 × 5.8 square washer)
  - Recommended tightening torque: 0.4 N·m (4 kgf·cm)
  - Applicable wire: Solid/twisted wire of 2 mm<sup>2</sup>
  - Recommended dimension: See Fig. 6
  - Recommended solderless terminals: Circular terminal with isolation (M3 screw, width 5.5 mm, hole diameter 3.2 mm)
- Up to two solderless terminal lugs can be connected to one terminal screw, then refer to figure 7.

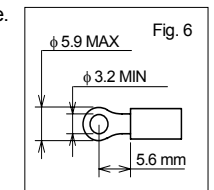
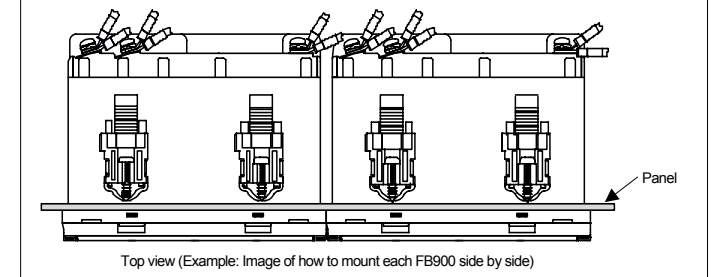
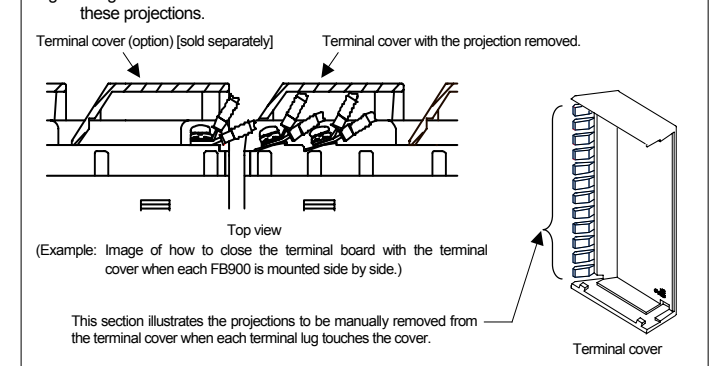


Fig. 7: Image of how to bend each solderless terminal lug



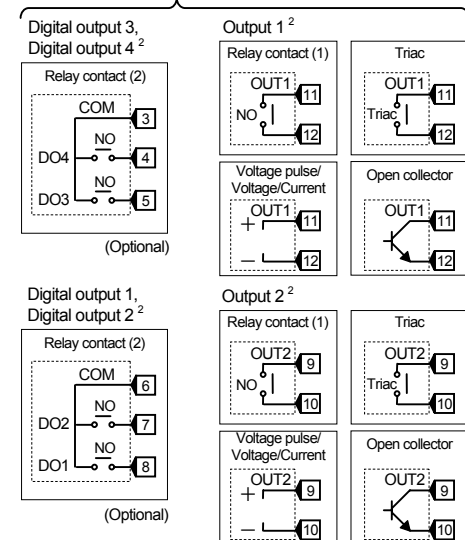
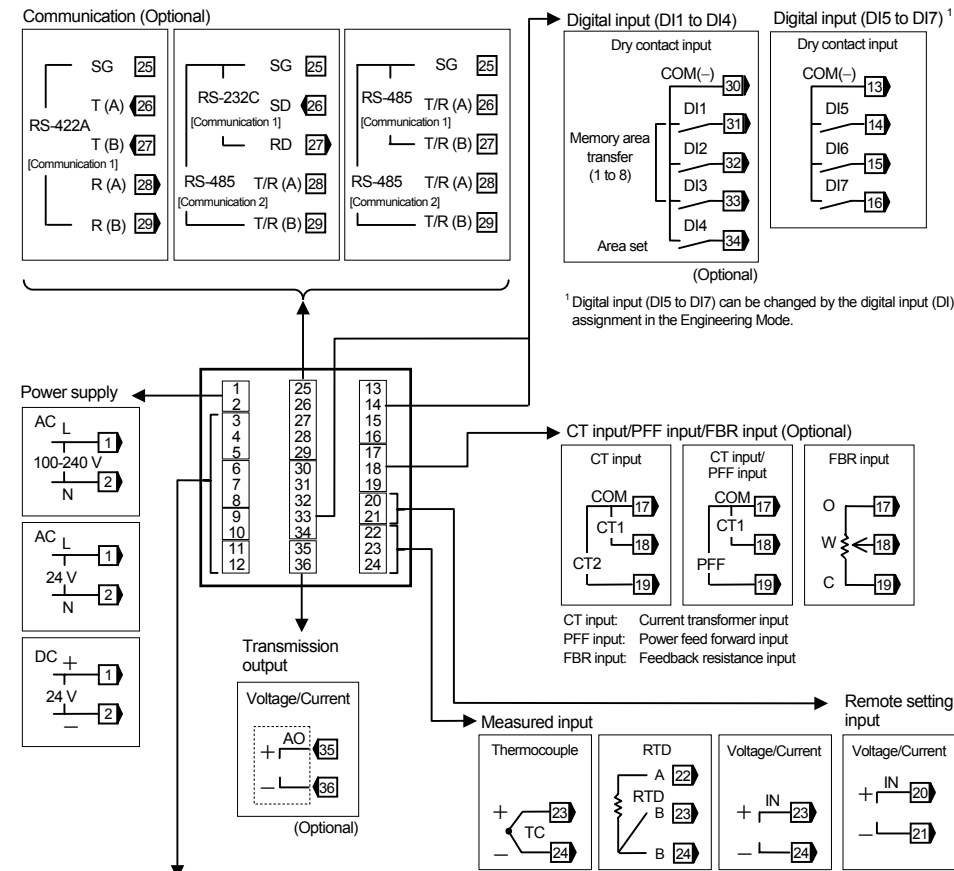
- Caution for the terminal cover usage: If each solderless terminal lug touches the terminal cover, remove each projection from the terminal cover by manually bending it in front and in rear until broken. (Fig. 8)

Fig. 8: Image of how to close the terminal board with the terminal cover and to remove these projections.



## Terminal Configuration

(All the terminal configuration of FB400 and FB900 is the same.)



**2 Output assignment**  
 Output 1 (OUT1) and Output 2 (OUT2):  
 Control output or digital output can be allocated to OUT1 and OUT2.

Digital output 1 (DO1) to Digital output 4 (DO4):  
 Output of the event function can be allocated to DO1 to DO4.

The following two methods of the output assignments are available:  
 Specify when ordering (Initial setting code)  
 Setting by Output assignment (Engineering Mode)

Output type	OUT1 OUT2	DO1 to DO4	AO
Relay contact output (1)	○		
Relay contact output (2)		○	
Voltage pulse output	○		
Current output	○		○
Voltage output 0 to 5 V DC, 1 to 5 V DC, 0 to 10 V DC	○		○
Voltage output 0 to 1 V DC			○
Triac output	○		
Open collector output	○		

(○: Indicates that an output specification is supported.)

## 3. SPECIFICATIONS

### Measured input

Number of input: 1 point  
 Input type and range: See table 2.  
 Sampling cycle: 100 ms (50 ms or 250 ms is selectable)  
 Influence of external resistance: Approx. 0.2 μV/Ω (Converted depending on TC types)  
 Influence of input lead: Approx. 0.01 %/Ω of PV (RTD input) 10 Ω or less per wire  
 Input impedance: Voltage (low) input: Approx. 1 MΩ or more  
 Voltage (high) input: Approx. 1 MΩ  
 Current input: Approx. 50 Ω  
 Approx. 250 μA (RTD input)

Sensor current:  
 Action at input break:  
 TC input, Voltage (low) input: Upscale or downscale  
 RTD input: Upscale  
 Voltage (high) input, Current input: Downscale

Action at input short circuit: Downscale (RTD input)  
 Input correction:  
 PV bias: -Input span to +Input span  
 PV ratio: 0.500 to 1.500  
 First order lag digital filter: 0.0 to 100.0 seconds (0.0: OFF)  
 Low level cutoff: 0.00 to 25.00 % of input span  
 Cold-junction temperature compensation error (TC input): Within ±1.0 °C  
 Within ±1.5 °C (range of -10 to +50 °C)

### Remote setting (RS) input

Number of input: 1 point (Not isolated from measured input)  
 Input type: Voltage (low) input: 0 to 10 mV DC, 0 to 100 mV DC, 0 to 1 V DC  
 Voltage (high) input: 0 to 5 V DC, 1 to 5 V DC, 0 to 10 V DC  
 Current input: 0 to 20 mA DC, 4 to 20 mA DC  
 Sampling cycle: Twice of the measured input sampling cycle  
 Input impedance: Voltage (low) input: Approx. 1 MΩ or more  
 Voltage (high) input: Approx. 1 MΩ  
 Current input: Approx. 50 Ω  
 Action at input break: Downscale  
 Input correction:  
 RS bias: -Input span to +Input span  
 RS ratio: 0.001 to 9.999  
 RS digital filter (first order lag): 0.0 to 100.0 seconds (0.0: OFF)  
 Allowable input voltage: Voltage (low) input: Within ±3.5 V  
 Voltage (high) input: Within ±12 V

### Current transformer (CT) input [Optional]

Number of inputs: 2 points  
 (When PFF input is selected: 1 point)  
 CT type: CTL-6-P-N or CTL-12-S56-10L-N (Sold separately)  
 Input range: CTL-6-P-N: 0.0 to 30.0 A  
 CTL-12-S56-10L-N: 0.0 to 100.0 A  
 Sampling cycle: Twice of the measured input sampling cycle

### Feedback resistance (FBR) input [Optional]

Number of input: 1 point  
 Permissible resistance range: 100 Ω to 10 kΩ (Standard: 135 Ω)  
 Input range: 0.0 to 100.0 % (for adjustment span of open and close)  
 Sampling cycle: Twice of the measured input sampling cycle  
 Action at FBR break: Upscale

### Power feed forward (PFF) input [Optional]

Number of input: 1 point (Use the special transformer)  
 Allowable voltage range: Input of instrument: 0 to 20 V  
 Allowable ambient humidity: 5 to 95 % RH  
 Load power supply voltage: 120 V AC transformer (PFT-01): 0 to 168 V AC  
 240 V AC transformer (PFT-02): 0 to 336 V AC

Insulation resistance:  
 Between measuring terminal and grounding: 20 MΩ or more at 500 V DC  
 Between power supply terminal and grounding: 20 MΩ or more at 500 V DC  
 Between power supply and measuring terminals: 20 MΩ or more at 500 V DC  
 When grounding is not provided: Between panels

### Digital input (DI)

Number of inputs: 7 points (DI1 to DI4 [optional], DI5 to DI7)  
 Input method: Dry contact input  
 Open state: 500 kΩ or more  
 Close state: 10 Ω or less  
 Contact current: 5 mA or less  
 Voltage at open: Approx. 5 V DC  
 2 sampling (measured input) times  
 Capture judgment time:

### Output

Number of outputs: 7 points (OUT1, OUT2, DO1 to DO4, AO)  
 Output type: See table 1.  
 Relay contact output (1)  
 Contact type: 1a contact  
 Contact rating (Resistive load): 250 V AC 3 A / 30 V DC 1 A  
 300,000 times or more (Rated load)  
 Mechanical life: 50 million times or more (Switching: 180 times/min)

Relay contact output (2)  
 Contact type: 1a contact  
 Contact rating (Resistive load): 250 V AC 1 A / 30 V DC 1 A  
 20 million times or more (Rated load)  
 20 million times or more (Switching: 300 times/min)

Voltage pulse output  
 Output voltage: 0/12 V DC (Rating)  
 ON voltage: 11 V or more, 13 V or less  
 OFF voltage: 0.2 V or less  
 Allowable load resistance: 600 Ω or more

Current output  
 Output current (Rating): 4 to 20 mA DC, 0 to 20 mA DC  
 Output range: 1 to 21 mA DC, 0 to 21 mA DC  
 Allowable load resistance: 600 Ω or less  
 Output impedance: 1 MΩ or more

Voltage output  
 Output voltage (Rating): 0 to 10 V DC, 0 to 5 V DC, 1 to 5 V DC  
 0 to 1 V DC (AO only)  
 -0.5 to +10.5 V DC, -0.25 to +5.25 V DC, 0.8 to 5.2 V DC, -0.05 to +1.05 V DC  
 Allowable load resistance: 1 kΩ or more  
 Output impedance: 0.1 Ω or less

Triac output  
 Output method: AC output (Zero-cross method)  
 Allowable load current: 0.5 A (Ambient temperature 40 °C or less)  
 Ambient temperature 50 °C: 0.3 A  
 Load voltage: 75 to 250 V AC  
 Minimum load current: 30 mA  
 ON voltage: 1.6 V or less (at maximum load current)  
 Open collector output  
 Output method: Sink type  
 Allowable load current: 100 mA  
 Load voltage: 30 V DC or less  
 Minimum load current: 0.5 mA  
 ON voltage: 2 V or less (at maximum load current)  
 Leakage current at OFF: 0.1 mA or less

### Communication [Optional]

Interface: Based on RS-232C, RS-485, or RS-422A, EIA standard  
 Multi-drop connection of RS-485 and RS-422A is available.  
 Protocol:  
 RKC communication (ANSI X3.28-1976 subcategory 2.5, A4)  
 Modbus-RTU  
 Termination resistor: Externally connected

### General specifications

Power supply voltage:  
 100 to 240 V AC type:  
 90 to 264 V AC [Including power supply voltage variation], 50/60 Hz (Rating 100 to 240 V AC)  
 Frequency variation: 50 Hz±10 %, 60 Hz±10 %  
 24 V AC type:  
 21.6 to 26.4 V AC [Including power supply voltage variation], 50/60 Hz (Rating 24 V AC)  
 Frequency variation: 50 Hz±10 %, 60 Hz±10 %  
 24 V DC type:  
 21.6 to 26.4 V DC [Including power supply voltage variation] (Rating 24 V DC)  
 Power consumption (at maximum load):  
 100 to 240 V AC type:  
 FB400: 7.8 VA max. (at 100 V AC), 11.9 VA max. (at 240 V AC)  
 FB900: 8.7 VA max. (at 100 V AC), 13.0 VA max. (at 240 V AC)  
 24 V AC type:  
 FB400: 8.2 VA max. (at 24 V AC) FB900: 9.3 VA max. (at 24 V AC)  
 24 V DC type:  
 FB400: 250 mA max. (at 24 V DC) FB900: 300 mA max. (at 24 V DC)  
 Rush current: 12 A or less  
 Allowable ambient temperature: -10 to +50 °C  
 Allowable ambient humidity: 5 to 95 % RH (Absolute humidity: MAX.W.C 29.3 g/m<sup>3</sup> dry air at 101.3 kPa)

Withstand voltage:  
 Time: 1 min.  
 Grounding terminal: Power terminal, Measured input terminal, Output terminal  
 Power terminal: 1500 V AC  
 Measured input terminal: 1000 V AC, 2300 V AC  
 Output terminal: 1500 V AC, 2300 V AC, 1500 V AC  
 Communication, digital input terminals: 1000 V AC, 2300 V AC, 510 V AC, 1000 V AC

Transportation and Storage environment conditions:  
 Shock: Height 800 mm or less  
 Temperature: -25 to +55 °C (at storage), -40 to +70 °C (at transport)  
 Humidity: 5 to 100 % RH (Non condensing)

Weight: FB400: Approx. 230 g  
 FB900: Approx. 290 g

### Standard

Safety standards: UL: UL61010-1  
 cUL: CAN/CSA-C22.2 No.1010.1

### CE marking:

LVD: EN61010-1  
 OVERVOLTAGE CATEGORY II,  
 POLLUTION DEGREE 2,  
 Class II (Reinforced insulation)  
 EN61326  
 EMC: AS/NZS CISPR 11 (equivalent to EN55011)  
 NEMA 4X (NEMA250), IP66 (IEC60529)  
 Panel sealing: [Front panel]

## 4. MODEL CODE

### Suffix code

FB400 -□□ - □ \* □□□□/□□ -□ □□□/□  
 FB900 (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12)

□: Indicates a specification code to be optionally specified. If this section is blank, this means that no code is described on the nameplate.

(1) Output 1 (OUT1), (2) Output 2 (OUT2)  
 N: None (OUT2 only) 6: Voltage output (1 to 5 V DC)  
 M: Relay contact output 7: Current output (0 to 20 mA DC)  
 V: Voltage pulse output 8: Current output (4 to 20 mA DC)  
 4: Voltage output (0 to 5 V DC) T: Triac output  
 5: Voltage output (0 to 10 V DC) D: Open collector output

(3) Power supply voltage  
 3: 24 V AC/DC 4: 100 to 240 V AC

(4) Digital output (DO1 to 4)  
 N: None 4: DO1 + DO2 + DO3 + DO4

(5) CT input/Power feed forward input/Feedback resistance input  
 N: None  
 T: CT (2 points)  
 1: Power feed forward input (one 100-120 V AC transformer included)  
 2: Power feed forward input (one 200-240 V AC transformer included)  
 3: CT (1 point) + Power feed forward input (one 100-120 V AC transformer included)  
 4: CT (1 point) + Power feed forward input (one 200-240 V AC transformer included)  
 F: Feedback resistance input

(6) Transmission output (AO)  
 N: None 6: Voltage output (1 to 5 V DC)\*  
 3: Voltage output (0 to 1 V DC)\* 7: Current output (0 to 20 mA DC)\*  
 4: Voltage output (0 to 5 V DC)\* 8: Current output (4 to 20 mA DC)\*  
 5: Voltage output (0 to 10 V DC)\*  
 \* If any one of the transmission outputs is specified (other than the code "N"), the digital inputs (from DI1 to 4) are automatically added.

(7) Communication function/Digital input (DI1 to 4)  
 N: None  
 1: Communication 1 (RS-232C) + No communication 2\*  
 4: Communication 1 (RS-422A) + No communication 2\*  
 5: Communication 1 (RS-485) + No communication 2\*  
 W: Communication 1 (RS-232C) + Communication 2 (RS-485)\*  
 X: Communication 1 (RS-485) + Communication 2 (RS-485)\*  
 Y: No communication 1 + Communication 2 (RS-485)\*  
 D: Digital input (DI1 to 4) [Memory area transformer]

\* If any one of the communication functions is also specified (other than the code "N"), the digital inputs (from DI1 to 4) are automatically added.

(8) Case color  
 N: White A: Black

(9) Quick start code  
 N: No quick start code (Configured at factory set value)\*  
 1: Specify quick start code 1  
 2: Specify quick start code 1 and 2  
 \* Factory set value: See the parameter list (IMR01W06-E0).

(10) Control Method [Quick start code 1]  
 No code: No specify quick start code  
 F: PID action with AT (Reverse action)  
 D: PID action with AT (Direct action)  
 G: Heat/cool PID action with AT  
 A: Heat/cool PID action with AT (for Extruder [air cooling])  
 W: Heat/cool PID action with AT (for Extruder [water cooling])  
 Z: Position proportioning PID action without FBR

(11) Measured input and Range [Quick start code 1]  
 No code: No specify quick start code  
 □□□: See range code table.

(12) Instrument specification  
 Y: Version symbol

## Initial setting code (Quick start code 2)



(1) Output assignments (OUT1, OUT2, and DO1 to DO4) 1 to 7: See output assignments table.

(2) Remote setting input  
 1: Voltage input (0 to 10 mV DC) 5: Voltage input (1 to 10 V DC)  
 2: Voltage input (0 to 100 mV DC) 6: Voltage input (1 to 5 V DC)  
 3: Voltage input (0 to 1 V DC) 7: Current input (0 to 20 mA DC)  
 4: Voltage input (0 to 5 V DC) 8: Current input (4 to 20 mA DC)

(3) Event function 1 (EV1), (4) Event function 2 (EV2), (5) Event function 3 (EV3), (6) Event function 4 (EV4)  
 N: None L: Process low<sup>1</sup>  
 A: Deviation high Q: Deviation high<sup>2</sup>  
 B: Deviation low R: Deviation low<sup>2</sup>  
 C: Deviation high/low T: Deviation high/low<sup>2</sup>  
 D: Band V: SV high  
 E: Deviation high<sup>1</sup> W: SV low  
 F: Deviation low<sup>1</sup> 1: MV high  
 G: Deviation high/low<sup>1</sup> 2: MV low  
 H: Process high 3: Cooling MV high  
 I: Process low 4: Cooling MV low  
 K: Process high<sup>1</sup> 5: Control loop break alarm (LBA)<sup>3</sup>

<sup>1</sup> With hold action  
<sup>2</sup> With re-hold action  
<sup>3</sup> Can be selected only for Event 4 (EV4)  
 (7) CT type  
 N: CT1 (None), CT2 (None)  
 P: CT1 (CTL-6-P-N), CT2 (None)  
 S: CT1 (CTL-12-S56-10L-N), CT2 (None)  
 T: CT1 (CTL-6-P-N), CT2 (CTL-6-P-N)  
 U: CT1 (CTL-12-S56-10L-N), CT2 (CTL-12-S56-10L-N)  
 (8) Communication 1 protocol  
 N: None  
 1: RKC communication (ANSI X3.28)  
 2: Modbus

Range code table  
 [Thermocouple (TC) input, RTD input]

Type	Code	Range (input span)	Code	Range (input span)
K	K35	-200.0 to +400.0 °C	KC4	-328.0 to +752.0 °F
	K40	-200.0 to +800.0 °C	KC5	-250.0 to +800.0 °F
	K41	-200.0 to +1372 °C	KC6	-328.0 to +2502 °F
	K09	0.0 to 400.0 °C	K44	0.0 to 800.0 °F
J	K10	0.0 to 800.0 °C	KA1	0 to 800 °F
	K02	0 to 400 °C	KA2	0 to 1600 °F
	K04	0 to 800 °C	JC6	-328.0 to +1200.0 °F
	J27	-200.0 to +400.0 °C	JC7	-200.0 to +700.0 °F
T	J32	-200.0 to +800.0 °C	JB9	328 to 2192 °F
	J15	-200 to +1200 °C	JB6	0.0 to 800.0 °F
	J08	0.0 to 400.0 °C	JA1	0 to 800 °F
	J09	0.0 to 800.0 °C	JA2	0 to 1600 °F
E	J02	0 to 400 °C	TC2	-328.0 to +752.0 °F
	J04	0 to 800 °C	EA9	-328.0 to +1252.0 °F
	T19	-200.0 to +400.0 °C	EB1	-328.0 to +1832 °F
	E21	-200.0 to +700.0 °C	SA7	-58 to +3214 °F
S	R07	-50 to +1768 °C	RA7	-58 to +3214 °F
	B03	0 to 1800 °C	BB2	0 to 3272 °F
	N02	0 to 1300 °C	NA7	0 to 2372 °F
	PLII	A02	0 to 1390 °C	AA2
W5ReW26Re	W03	0 to 2300 °C	WA2	0 to 4200 °F
	U04	0.0 to 600.0 °C	UB2	32.0 to 1112.0 °F
	L04	0.0 to 900.0 °C	LA9	32.0 to 1652.0 °F
	Pt100	D21	-100.0 to +200.0 °C	DD1
D34		-100.0 to +100.0 °C	DD8	-199.99 to +199.99 °F
D35		-100.0 to +850.0 °C	DD9	-328.0 to +1562.0 °F
P29		-100.0 to +100.0 °C	PC8	-199.99 to +199.99 °F
Jp100	P30	-100.0 to +640.0 °C	PC9	-328.0 to +1184.0 °F
			PD1	-200.0 to +200.0 °F

Type	Code	Range (input span)
0 to 10 mV DC	101	
0 to 100 mV DC	201	
0 to 1 V DC	301	
0 to 5 V DC	401	Programmable range -19999 to +19999 (Factory set value: 0.0 to 100.0 %)
0 to 10 V DC	501	
1 to 5 V DC	601	
0 to 20 mA DC	701	
4 to 20 mA DC	801	
-100 to +100 mV DC	901	
-1 to +1 V DC	902	
-10 to +10 mV DC	903	

Code	OUT1	OUT2	DO1	DO2	DO3	DO4
1	MV1	MV2	EV1	EV2	EV3	EV4
2	MV1	MV2	EV1	EV2	EV3	HBA
3	MV1	MV2	EV1	EV2	HBA	FAIL
4	MV1	MV2	EV1	HBA	EV3	EV4
5	MV1	HBA	EV1	EV2	EV3	EV4
6	MV1	HBA	EV1	EV2	EV3	FAIL
7	MV1	FAIL	EV1	EV2	EV3	EV4

MV1: Control output 1, MV2: Control output 2, HBA: Heater break alarm, FAIL: Fail output (De-energized only)  
 [When used as Heat/cold control or position proportioning control, select any code of 1 to 4.]

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 The first edition: DEC. 2004 [IM000]

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