

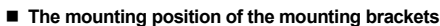


For detailed handling procedures and key operations, refer to separate **PF900/PF901 Instruction Manual** on the CD-ROM.  
The manual can be downloaded from the official RKC website:  
<https://www.rkcinst.co.jp/english/download-center/>

- An external protection device must be installed if failure of this instrument could result in damage to the instrument, the equipment or injury to personnel.
- 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.

- 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.
- 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.

To keep the instrument as waterproof as possible, make sure that the panel surface has no burr or distortion where the hole is to be cut out.



Install two mounting brackets each on top and the bottom of the instrument. Do not install them in the grooves located on the side surfaces.

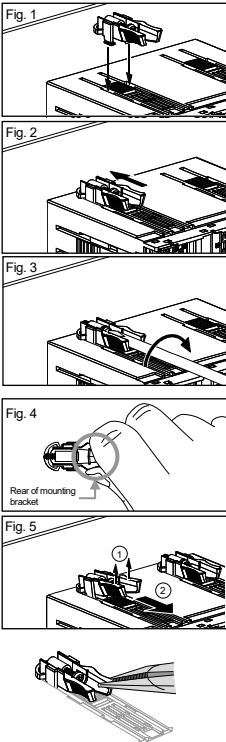


- This instrument is designed for installation in an enclosed instrumentation panel. All high-voltage connections such as power supply terminals must be enclosed in the instrumentation panel to avoid electric shock to operating personnel.
- All precautions described in this manual should be taken to avoid damage to the instrument or equipment.
- All wiring must be in accordance with local codes and regulations.
- All wiring must be completed before power is turned on to prevent electric shock, instrument damage, or incorrect action. The power must be turned off before repairing work for input break and output failure including replacement of sensor, contactor or SSR, and all wiring must be completed before power is turned on again.
- 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 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. Degreasing or discoloration may occur. Use a soft, dry cloth to remove stains from the instrument.
- To avoid damage to the instrument display, do not rub with an abrasive material or push the front panel with a hard object.
- When high alarm with hold action is used for Event function, alarm does not turn on while hold action is in operation. Take measures to prevent overheating which may occur if the control device fails.

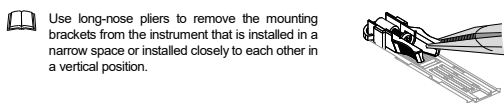
- This manual assumes that the reader has a fundamental knowledge of the principles of electricity, process control, computer technology and communications.
- The figures, diagrams and numeric values used in this manual are only for purpose of illustration.
- RKC is not responsible for any damage or 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.

### < Mounting procedures >

1. Prepare the panel cutout as specified in **1.2 Dimensions**.
2. Set the Waterproof/dustproof rubber packing on the case from the back side of the instrument. 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. Tighten the screw for the mounting bracket with a Phillips screwdriver. Turn only one full revolution after the screw touches the panel. (Fig. 3)  
If the screw has been rotated too tight, the screw may turn idle. In such a case, loosen the screw once and tighten it again until the instrument is firmly fixed.
6. The other mounting bracket(s) should be installed in the same way as described in 3 to 5.



1. Turn the power OFF.
2. Remove the wiring.
3. Loosen the screw of the mounting bracket.
4. Remove the mounting bracket by pulling it up and forward (Fig. 5 ②) while holding the rear panel.
5. The other mounting bracket(s) should be removed in the same way as described in **3** and **4**.
6. Pull out the instrument from the mounting cabinet by holding the front panel frame of this instrument.



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

(1) This PF900/901 is intended to be used under the following environmental conditions:

- IEC 61010-1 OVERVOLTAGE CATEGORY II, POLLUTION DEGREE 2  
Indoor use, Altitude up to 2000 m

(2) Use this instrument within the following allowable range:

- Allowable ambient temperature: -10 to +55 °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) Do not use this instrument in the following environment:

- Sudden change in ambient temperature
- Condensation or icing
- Corrosive or inflammable gases.
- Strong vibration or impact
- 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.
- Direct radiant heat

- (4) To avoid problems, consider the following cautions when mounting the PF900/901:
- Allow space for draft to release heat.
  - Make sure to cool down the ambient temperature by using forced-air cooling system when the ambient temperature exceeds 55 °C. Do not expose this instrument directly to cool air from the forced-air cooling system.
  - Do not mount this instrument directly above the equipment that generates large amount of heat (e.g., high voltage transformers, semiconductor functional devices, large-wattage resistors).
  - To improve noise immunity or safety, consider the following cautions:
    - High voltage equipment: Do not mount within the same panel.
    - Power lines: Separate at least 200 mm.
    - Rotating machinery: Separate as far as possible.

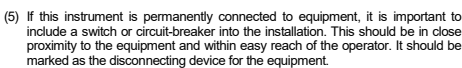
To prevent electric shock or instrument failure, do not turn on the power until all wiring is completed. Make sure that the wiring is correct before applying power to the instrument.

- 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 5 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 input, supply power from a SELV circuit.
- 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).
- 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.
  - Fuse type: Time-lag fuse
  - Recommended fuse rating: Rated voltage: 250 V AC  
Rated current: 1 A
- Use the solderless terminal appropriate to the screw size.
  - Screw size: M3 × 7 (with 5.8 × 5.8 square washer)
  - Recommended tightening torque:  
0.4 N·m (4 kgf·cm)

Applicable wire: Solid/twisted wire of 0.25 to 1.65 mm<sup>2</sup>  
 Specified dimension: Refer to Fig. at the right  
 Specified solderless terminal:

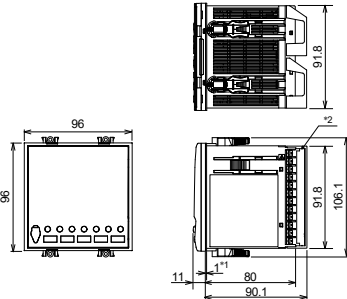
Manufactured by J.S.T MFG CO., LTD.  
 Circular terminal with isolation V1.25-MS3

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



## ■ Dimensions

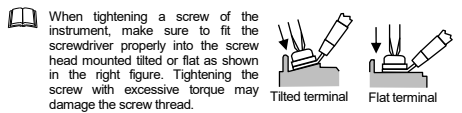
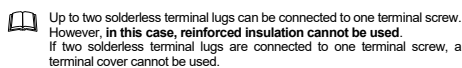
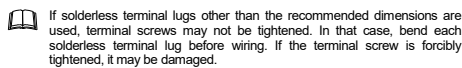
Unit: mm



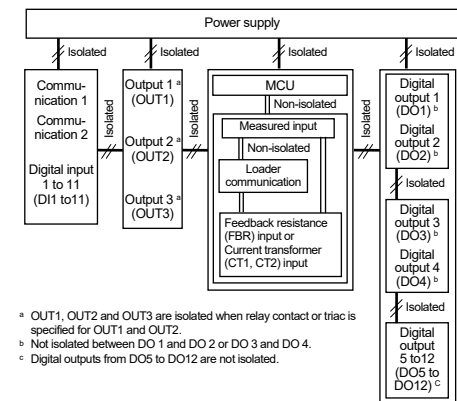
Panel thickness: 1 to 10 mm

\*1 Waterproof/dustproof rubber packing (Model code: KER900-36 <1>)

\*2 Terminal cover [sold separately] (Model code: KFB 400-511(1))



 For isolation block diagram of the instrument, refer to the following:



- a OUT1, OUT2 and OUT3 are isolated when relay contact or triac is specified for OUT1 and OUT2.
- b Not isolated between DO 1 and DO 2 or DO 3 and DO 4.
- c Digital outputs from DO5 to DO12 are not isolated.

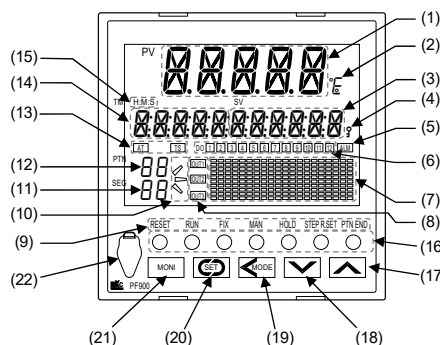
Figure 1-1: Terminal block diagram of the instrument. The diagram shows a 24-pin terminal block with various input and output connections. Key sections include:




- Digital inputs (DI1 to DI6)**: Located at the top, with pins 1 through 6. Includes a 'Dry contact COM(-)' input at pin 20.
- Digital outputs (DO1 to DO4)**: Located on the left, with pins 7 through 10. Includes relay contact and triac output diagrams.
- Power supply**: Located on the left, with pins 11 through 14. Includes AC and DC input diagrams.
- Communication ports**: Located at the top right, with pins 15 through 24. Includes RS-232C, RS-422A, and RS-485 communication diagrams.
- Feedback resistance (FBR) input**: Located on the right, with pins 19 through 21. Includes a variable resistor diagram.
- Current transformer (CT) input**: Located on the right, with pins 19 through 21. Includes CT input (1 point) and CT input (2 points) diagrams.
- Measured input [universal input]**: Located on the right, with pins 22 through 24. Includes TC, RTD, and Voltage/Current input diagrams.
- Output 1 (OUT1), Output 2 (OUT2), and Output 3 (OUT3)**: Located at the bottom, with pins 11 through 14. Includes relay contact and triac output diagrams.








Legend: The dotted box diagram describes the output state of the instrument.

[---]: The dotted box diagram describes the output state of the instrument.

### ■ Front Panel View

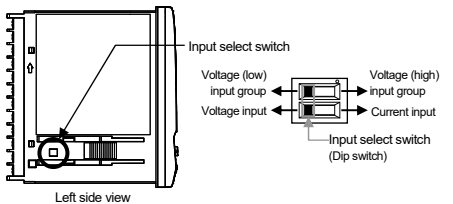


(1)	PV display [PF900: Green/PF901: White]	Displays Measured value (PV) or various parameter symbols.
(2)	PV unit display [PF900: Green/PF901: White]	Displays °C, °F or %. Displays % only for parameters on a percentage basis.
(3)	SV display [PF900: Orange/PF901: White]	Displays segment level, Set value (SV), Manipulated output value (MV) or various parameter set values.
(4)	Set lock display [PF900: Orange/PF901: White]	Displays key character "T" when the key operation is prohibited.
(5)	ALM lamp [Red]	Lights when Event occurs (Event 1 through 4, HBA <sup>1</sup> , HBA2, LBA, Self-diagnostic error, communication error or FAIL). Event type may be checked by Event state monitor (except Self-diagnostic error, Event state monitor and FAIL).
(6)	DO lamp/DO number lamp [PF900: Green/PF901: White]	DO: Lights alphabet of the DO lamp at all times (when the power is on). DO number [1] to [12]: Lights when the output corresponding to each lamp is ON.
(7)	Dot display [White] (20 dots for horizontal axis, 10 dots for vertical axis)	The bar graph displays the progress of program pattern, or increase and decrease of Manipulated output value (MV). Segments in process flash in the Program control mode. It is possible to change the color of dots into red for Event or Self-diagnostic error.
(8)	Output lamp [PF900: Green/PF901: White]	OUT1: Lights when output 1 is turned on.* OUT2: Lights when output 2 is turned on.* OUT3: Lights when output 3 is turned on.* * For voltage output or current output, the output lamp flashes when the output value goes below 0 % and lights when the value goes above 0 %.
(9) State display lamp		
	<b>RESET</b> [Green or Orange]	Reset mode (RESET) light will be orange. When other modes are selected the light will be green.
	<b>RUN</b> [Green or Orange]	Program control mode (RUN) light will be orange. When other modes are selected the light will be green.
	<b>FIX</b> [Green or Orange]	Fixed set point control mode (FIX) light will be orange. When other modes are selected the light will be green.
	<b>MAN</b> [Green or Orange]	Manual control mode (MAN) will be orange. When other modes are selected the light will be green.
	<b>HOLD</b> [Green]	Light is green when HOLD key is operative.
	<b>STEP R.SET</b> [Green]	Light is green when STEP R.SET key is operative.
	<b>STEP R.SET</b> [Green]	Light is green when STEP R.SET key is operative.
	<b>PTN END</b> [Green]	Light is green when PTN END key is operative.
	<b>PTN END</b> [Green]	Light is green when PTN END key is operative.
(10)	Gradient state lamp [PF900: Green/PF901: White]	Lights the lamp of the gradient in process. <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">             Rise   </div> <div style="text-align: center;">             Soak   </div> <div style="text-align: center;">             Drop   </div> </div>

(11)	SEG display [PF900: Green/PF901: White]	Displays segment number (from 1 to 99). In the Reset mode (RESET): Displays the segment number before running the operation. In the Program control mode (RUN): Displays the segment number in process. In the Fixed set point control mode (FIX) or the Manual control mode (MAN): Displays the segment being displays in the previous mode.
(12)	PTN display [PF900: Green/PF901: White]	Displays program pattern number (from 1 to 99). In the Reset mode (RESET): Displays the Program pattern number being set. In the Program control mode (RUN): Displays the program pattern number in process. In the Fixed set point control mode (FIX) or the Manual control mode (MAN): Displays Program pattern number in the previous mode.
(13)	TS lamp [PF900: Green/PF901: White]  AT lamp [PF900: Green/PF901: White]	Lights when Time signal output is turned on.  Flashes during the Autotuning (including Autotuning with learning function). (AT end: AT lamp turns off)
(14)	TIME display [PF900: Orange/PF901: White]	Displays segment time or character of parameter.
(15)	Time unit display [PF900: Green/PF901: White]	Displays time unit of Segment time. [hour (H): minute (M) or minute (M): second (S)]
(16)	Direct keys	
	RESET key [RESET lamp]	Press the RESET key to go to the Reset mode (RESET).
	RUN key [RUN lamp]	Press the RUN key to go to the Program control mode (RUN).
	FIX key [FIX lamp]	Press the FIX key to go to the Fixed set point control mode (FIX).
	MAN key [MAN lamp]	Press the MAN key to go to the Manual control mode (MAN).
	HOLD key [HOLD lamp]	Press the HOLD key to suspend the operation in process. Press again to release the Hold mode. [Hold (HOLD) function]
	STEP R.SET key [STEP R.SET lamp]	It is possible to skip one segment of the program pattern in progress by pressing the STEP R.SET key. [Step (STEP) function]
	STEP R.SET key [STEP R.SET lamp]	Press the  key once to go back to the previous parameter when passing the parameter setting item to be changed.
	PTN END key [PTN END lamp]	Switch display to the setting display of the Execution pattern number [P* n].
	PTN END key [PTN END lamp]	Switch display to the Program end screen [P* End].
(17)	Up key 	- Increase numerals. - Press the Up key to set segment time in the Program control mode (RUN). To scroll through numbers faster, press and hold the Up key.
(18)	Down key 	- Decrease numerals. - Press the DOWN key to turn back to the previous value when passing the segment time to be set in the Program control mode. To scroll back through numbers faster, press and hold the DOWN key.
(19)	Shift key 	- Shift digits when settings are changed. - Used to selection operation between modes.
(20)	Set (SET) key 	Used for parameter calling up and set value registration.
(21)	Monitor key 	Use to switch the monitor screen. Pressing the  key while any screen other than the Monitor mode screen is being displayed returns to the PV/SV monitor screen.
(22)	Loader communication connector	Designed to connect with W-BV-03 cable for loader communication (RKC product)

 To avoid damage to the instrument, never use a sharp object to press keys.

■ Side view



To change the input type, select the input group that includes the desired input type. In addition to setting on the input selector switch, you also need a configuration setting in the engineering mode.

**To avoid damage to the instrument, disconnect measurement input terminals before switching input groups.**

Input group		Input select switch
Voltage (low) input group	TC input	
	RTD input	
	Voltage (low) input	
Current input group	Current input	
Voltage (high) input group	Voltage (high) input	

## 4. SPECIFICATIONS

### ■ Measured input

Number of input:	1 point
Input type:	• Voltage (low) input group * TC: K, J, T, S, R, E, B, N (JIS C1602-1995), PLII (NBS), W5Re/W26Re (ASTM-E988-96), U, L (DIN43710-1985), PR40-20 (ASTM-E1751-00) RTD: Pt100 (JIS C1604-1997), JPt100 (JIS C1604-1981 of Pt100) Voltage: 0 to 10 mV DC, -10 to +10 mV DC, 0 to 100 mV DC, -100 to +100 mV DC, 0 to 1 V DC, -1 to +1 V DC • Voltage (high) input group * Voltage: 0 to 5 V DC, 1 to 5 V DC, 0 to 10 VDC, -5 to +5 V DC, -10 to +10 V DC • Current input group * Current: 0 to 20 mA DC, 4 to 20 mA DC * Universal input (Use the input select switch to change input group.)

Input accuracy:	Input type	Input range	Accuracy
*1	K, J, T, PLII, E, U, L	Less than -100 °C -100°C or more, Less than +500°C	±1.0 °C ±0.5 °C
	S, R, N, W5Re/W26Re	+500 °C or more Less than 1000 °C	±(0.1 % of Reading) ±2.0 °C
	B	1000 °C or more Less than 400 °C	±(0.1 % of Reading) ±70 °C
*2	B	400 °C or more, Less than 1000 °C	±1.4 °C
	PR40-20	1000 °C or more Less than 400 °C	±(0.1 % of Reading) ±20 °C
	PR40-20	400 °C or more, Less than 1000 °C	±10 °C
*1	PT100, JPt100	1000 °C or more Less than 200 °C	±(0.1 % of Reading) ±0.2 °C
	PT100, JPt100	200 °C or more	±0.1 % of Reading
	Voltage/Current		±0.1 % of Input span

\*1: Accuracy is not guaranteed for less than -100 °C

\*2: Accuracy is not guaranteed for less than 400 °C for TC input type S, R, W5Re/W26Re B and PR40-20.

Voltage pulse output (OUT1 to OUT3): Output voltage: 0/12 V DC (Rating) ON voltage: 11 to 13 V OFF voltage: 0.2 V or less Allowable load resistance: 600 Ω or more (20 mA or less) OUT1: 300 Ω or more when not using OUT2. (40 mA or less) Time proportional cycle:0.1 to 100.0 seconds (When control output is selected) Minimum ON/OFF time of proportioning cycle: 0 to 1000 ms (Valid only for time proportional output)	Allowable load current: 100 mA Load voltage: 30 V DC or less Voltage drop at ON: 2 V or less (at maximum load current) Leakage current at OFF: 0.1 mA or less Energized/De-energized: OUT1: Energized (FIX) OUT2, OUT3 or DO: Selectable (Validate for Event output)
Current output (OUT1 to OUT3): Output current (Rating): 4 to 20 mA DC, 0 to 20 mA DC (Specify when ordering) Output range: 3 to 21 mA DC, 0 to 21 mA DC Allowable load resistance: 600 Ω or less	■ Communication function [optional] ■ Communication 1 (For the host communication) Interface: Based on RS-422A, EIA standard, Based on RS-485, EIA standard, Based on RS-232C, EIA standard Multi-drop connection of RS-485 and RS-422A is available. Connection method: RS-422A: 4-wire system, half-duplex multi-drop connection RS-485: 2-wire system, half-duplex multi-drop connection RS-232C: 3-wire system, point-to-point connection Synchronous method: Start/Stop synchronous type Communication speed: 2400 bps, 4800 bps, 9600 bps, 19200 bps, 38400 bps, 57600 bps Protocol: RKC communication (ANSI X3.28-1976 subcategories 2.5 and A4) MODBUS-RTU Maximum connections: 31 points (RS-485 and RS-422A) 1 point (RS-232C)
Voltage output (OUT1 to OUT3): Output voltage (Rating):0 to 1 V DC *, 0 to 5 V DC, 1 to 5 V DC, 0 to 10 V DC (Specify when ordering) * Available for OUT3 Output range: -0.05 to +1.05 V DC, -0.25 to +5.25 V DC, 0.8 to 5.2 V DC, -0.5 to +10.5 V DC Allowable load resistance: 1 kΩ or more	● Communication 2 (For the intercontroller communication) Function: Send the Set value (SV) to the slave controllers being connected to link operation. It is possible to link PID memory area. Interface: Based on RS-485, EIA standard Connection method: RS-485: 2-wire system, half-duplex multi-drop connection Synchronous method: Start/Stop synchronous type Communication speed: 9600 bps, 19200 bps, 38400 bps Protocol: Modbus-RTU Slave connections: Up to 4 controllers 0 to 4 (0: Link OFF) Slave controllers: FB series, RB series or PF900/901
Triac output (OUT1 and OUT2): Output method: AC output (Zero-cross method) Allowable load current: 0.5 A (Ambient temperature 40 °C or less) (Derating: -0.02A/°C when ambient is 40 °C or more) Load voltage: 75 to 250 V AC Minimum load current: 30 mA ON voltage: 1.6 V or less (at maximum load current) Time proportional cycle:0.1 to 100.0 seconds (When control output is selected) Minimum ON/OFF time of proportioning cycle: 0 to 1000 ms (Valid only for time proportional output)	■ General specifications Power supply voltage: • 100 to 240 V AC type 85 to 264 V AC [Including power supply voltage variation], 50/60 Hz, (Rating 100 to 240 V AC) Frequency variation: 50/60 Hz (-10 % to +5 %) • 24 V AC type 20.4 to 26.4 V AC [Including power supply voltage variation], 50/60 Hz, (Rating 24 V AC) Frequency variation: 50/60 Hz (-10 % to +5 %) • 24 V DC type 20.4 to 26.4 V DC [Including power supply voltage variation] (Rating 24 V DC)
Open collector output (OUT1 to OUT3): Allowable load current: 100 mA Load voltage: 30 V DC or less Voltage drop at ON: 2 V or less (at maximum load current) Leakage current at OFF: 0.1 mA or less Time proportional cycle:0.1 to 100.0 seconds (When control output is selected) Minimum ON/OFF time of proportioning cycle: 0 to 1000 ms (Valid only for time proportional output)	
Open collector output (DO5 to DO12): Output method: Sink type Use same common terminal for DO5 to DO8 and DO9 to DO12.	

Some output types are not specifiable. Refer to separate **PF900/PF901 Instruction Manual** on the CD-ROM.

### ■ Quick start code 2 (Initial setting code)

□ - □ □ □ □ - □ □  
(1) (2) (3) (4) (5) (6) (7)

- (1) DI assignment  
□: Refer to DI Assignment Code Table
- (2) Digital output 1 (DO1), (3) Digital output 2 (DO2), (4) Digital output 3 (DO3), (5) Digital output 4 (DO4)
- N: None  
A: Event \* deviation high  
B: Event \* deviation low  
C: Event \* deviation high/low  
D: Event \* band  
E: Event \* deviation high with hold action  
F: Event \* deviation low with hold action  
G: Event \* deviation high/low with hold action  
H: Event \* process high  
J: Event \* process low  
K: Event \* process high with hold action  
L: Event \* process low with hold action  
P: Heater break alarm 1 (HBA1)  
Q: Heater break alarm 2 (HBA2)  
R: Control loop break alarm (LBA)  
S: FAIL (de-energized fixed)  
T: Feedback resistance (FBR) input error
- (6) CT type  
N: No CT1 and CT2  
P: CT1: CTL-6-P-N  
S: CT1: CTL-12-S56-10L-N  
T: CT1: CTL-6-P-N  
U: CT1: CTL-12-S56-10L-N  
CT2: No use  
CT2: No use  
CT2: CTL-6-P-N  
CT2: CTL-12-S56-10L-N  
CT2: CTL-12-S56-10L-N
- (7) Communication 1 protocol  
N: None  
1: RKC communication (ANSI X3.28-1976)  
2: Modbus

\* DO1 can be used as Event 1, DO2 as Event 2, DO3 as Event 3, and DO4 as Event 4.

Range Code Table

● TC input

Type	Code	Range
K	K02	0 to 400 °C
	K06	0 to 1200 °C
	K09	0.0 to 400.0 °C
	K23	0.0 to 1300.0 °C
	K35	-200.0 to +400.0 °C
	K41	-200.0 to +1372 °C
	K42	-200.0 to +1372.0 °C
	K44	0.0 to 800.0 °F
	K84	0.0 to 2400.0 °F
	KC5	-328 to 2502 °F
J	JK9	-328 to 2502.0 °F
	J15	-200 to +1200 °C
	J16	0.0 to 1200.0 °C
	J27	-200.0 to +400.0 °C
	J29	-200.0 to +1200.0 °C
	JB5	0.0 to 2100.0 °F
	JB6	0.0 to 800.0 °F
	JB9	-328 to 2192 °F
	JC9	-328.0 to +2192.0 °F
	T06	0.0 to 400.0 °C
T	T13	-200.0 to +200.0 °C
	T16	-200 to +400 °C
	T19	-200.0 to +400.0 °C
	TA7	0.0 to 700.0 °F
	TB7	-300.0 to +700.0 °F
	TC2	-328.0 to +752.0 °F
	TC9	-328 to +752 °F
	E06	-328 to +1000 °C
	E08	0.0 to 1000.0 °C
	E17	-200.0 to +200.0 °C
E	E20	-200.0 to +1000.0 °C
	EA6	0.0 to 1800.0 °F
	EB1	-328 to +1832 °F
	EB3	-328.0 to +1832.0 °F
	L04	0.0 to 900.0 °C
	L05	0.0 to 900 °C
	LA3	0.0 to 1652 °F
	LA6	0.0 to 1600.0 °F
	LB1	0.0 to 1652.0 °F
	U04	0.0 to 600.0 °C
U	U08	0.0 to 600 °C
	UB1	0.0 to 1100.0 °F
	UB3	0.0 to 1112.0 °F
	UB4	0.0 to 1112 °F
	N02	0.0 to 1300 °C
	N05	0.0 to 1300.0 °C
	NA4	0.0 to 2300.0 °F
	NA7	0.0 to 2372 °F
	NA8	0.0 to 2372.0 °F
	NA8	0.0 to 2372.0 °F

Type	Code	Range
R	R05	0.0 to 1700.0 °C
	R07	-50 to +1768 °C
	R08	-50.0 to +1768.0 °C
	RA5	0.0 to 3200.0 °F
	RA7	-58 to +3214 °F
	RA8	-58.0 to +3214.0 °F
	S04	0.0 to 1700.0 °C
	S06	50 to +1768 °C
	S07	-50.0 to +1768.0 °C
	SA5	0.0 to 3200.0 °F
S	SA7	-58 to +3214 °F
	SA8	-58.0 to +3214.0 °F
	B03	0.0 to 1800 °C
	B04	0.0 to 1800.0 °C
	BA9	0.0 to 3200.0 °F
	BB2	0.0 to 3272 °F
	BB3	0.0 to 3272.0 °F
	W03	0 to 2300 °C
	W04	0.0 to 2300.0 °C
	W06	0.0 to 1200.0 °C
W5Re/W26Re	WA2	0.0 to 4200 °C
	WA6	0.0 to 4200.0 °C
	WA8	0.0 to 4200.0 °F
	PLII	A02 0.0 to 1380 °C
	A05	0.0 to 1300.0 °C
	A06	0.0 to 1380.0 °C
	AA2	0.0 to 2534 °F
	AA5	0.0 to 2300.0 °F
	AA7	0.0 to 2534.0 °F
	F01	0.0 to 1800.0 °C
PR40-20	F02	0 to 1800 °C
	FA1	0.0 to 3200.0 °F
	FA2	0 to 3200 °F

Type	Code	Range
PT100	D21	-200.0 to +200.0 °C
	D25	-200.0 to +600.0 °C
	D34	-100.00 to +150.00 °C
	D35	-200.0 to +850.0 °C
	D36	-200 to +850 °C
	D88	-300.0 to +1200.0 °F
	DC9	-328.0 to +1562.0 °F
	DD2	-328 to +1562 °F
	P10	0.0 to 500.0 °C
	P21	-200.0 to +200.0 °C
JPt100	P26	-200.0 to +600.0 °C
	P29	-100.00 to +150.00 °C
	P30	-200.0 to +640.0 °C
	P31	-200 to +640 °C

Sampling cycle:	100 ms (50 ms or 250 ms is selectable)
Influence of external resistance: (TC input):	Approx. 0.2 μV/Ω (Converted depending on TC types)
Influence of input lead (RTD input):	Approx. 0.01 %/Ω of span (10 Ω or less per wire) If the resistance is 10 Ω or more, the measuring range may be limited.
Input impedance (Voltage/Current input):	1 MΩ or more [Voltage (Low)/Voltage (High)], Approx. 50 Ω (Current)
Measured current (RTD input):	Approx. 0.25 mA
Action at input break:	TC input and Voltage (low) input: Upscale or Downscale (selectable) RTD input: Upscale Voltage (high) input and Current input: Downscale (Indicates value near 0)
Action at input short circuit:	Downscale (RTD input)
Input error determination:	Setting range of Input error determination point (high/low): Input range low -5 % of Input span to Input range high +5 % of Input span
Measured input correction:	PV bias: -Input span to +Input span Within the range: -19999 to +32000 (Except decimal point) PV ratio: 0.001 to 9.999 PV digital filter (First order lag digital filter): 0.0 to 100.0 seconds (0.0: Filter OFF)
Input filter:	
Allowable input range:	Within ±5 V (High voltage group: Within ±12 V)
Square root extraction (Voltage/Current input):	Calculation method: Measured value = √(Input value) × PV ratio + PV bias PV low input cut-off: 0.00 to 25.00 % of Input span

### ■ Current transformer (CT) input [optional]

Number of inputs:	2 points
CT type:	CTL-6-P-N or CTL-12-S56-10L-N (Sold separately)
Measurable current range:	0.0 to 30.0 A (CTL-6-P-N) 0.0 to 100.0 A (CTL-12-S56-10L-N) 200 ms (twice of the measured input sampling cycle) 100 ms (twice of the measured input sampling cycle) 500 ms (twice of the measured input sampling cycle)
Sampling cycle:	

Power consumption/Current (at maximum load):	• 100 to 240 V AC type 9.5 VA max. (at 100 V AC), 13.5 VA max. (at 240 V AC) Rush current: 7.5 A or less (at 100 V AC), 17.5 A or less (at 240 V AC) Power saving mode: 7.1 VA [Approximately 15 % OFF] (at 100 V AC) 10.9 VA [Approximately 16 % OFF] (at 240 V AC) Varies from condition • 24 V AC type 8.5 VA max. (at 24 V AC) Rush current: 8.5 A or less Power saving mode: 6.2 VA [Approximately 16 % OFF] Varies from condition • 24 V DC type 230 mA max. (at 24 V DC) Rush current: 6.0 A or less Power saving mode: 173 mA [Approximately 19 % OFF] Varies from condition
Power failure:	A power failure of 20 ms or less will not affect the control action.
Memory backup:	Backed up by non-volatile memory Number of writing: Approximately ten billion times (FRAM) (Depending on storage and operating conditions.) Data storage period: Approximately 10 years (FRAM)
Weight:	Approx. 470 g

### ● Voltage/Current input

Type	Code	Input group	Range
0 to 10 mV DC	101	Voltage (low) input group	Programmable range Setting range: -19995 to +32000 [The decimal point position is selectable] (Factory set value: 0.0 to 100.0)
0 to 100 mV DC	201		
0 to 1 VDC	301		
0 to 5 V DC	401	Voltage (high) input group	
0 to 10 V DC	501		
1 to 5 V DC	601		
0 to 20 mA DC	701	Current input group	
4 to 20 mA DC	801		
-100 to +100 mV DC	901		
-1 to +1 V DC	902	Voltage (low) input group	
-10 to +10 mV DC	903		
-10 to +10 V DC	904		
-5 to +5 V DC	905	Voltage (high) input group	

DI Assignment Code Table (D11 to D16: Optional D17 to D111: Standard function)

DI number	0	1	2	3	4	5
Digital input 1 (D11)	PTN1	PTN1	WAIT release	WAIT release	WAIT release	WAIT release
Digital input 2 (D12)	PTN2	PTN2	WAIT release	WAIT release	WAIT release	WAIT release
Digital input 3 (D13)	PTN4	PTN4	WAIT release	WAIT release	WAIT release	WAIT release
Digital input 4 (D14)	PTN8	PTN8	WAIT release	WAIT release	WAIT release	WAIT release
Digital input 5 (D15)	PTN16	PTN16	WAIT release	WAIT release	WAIT release	WAIT release
Digital input 6 (D16)	P.SET	P.SET	WAIT release	WAIT release	WAIT release	WAIT release
Digital input 7 (D17)	RESET	RESET	PTN1	PTN1	RESET	RESET
Digital input 8 (D18)	RUN	RUN	PTN2	PTN2	RUN	RUN
Digital input 9 (D19)	STEP	STEP	PTN4	PTN4	STEP	STEP
Digital input 10 (D110)	HOLD	PTN32	PTN8	PTN8	HOLD	HOLD
Digital input 11 (D111)	PTN32	PTN64	P.SET	PTN16	Direct/Reverse	PTN_INC

PTN1, 2, 4, 8, 16, 32, 64: Pattern number switch

P.SET: Pattern set

WAIT release: Wait state release

RESET: Reset mode (RESET) setting

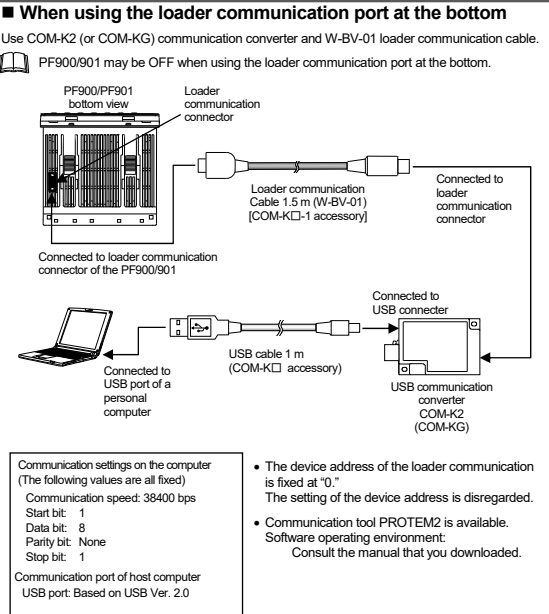
RUN: Program control mode (RUN) setting

STEP: Step (STEP) function

HOLD: Hold (HOLD) function

Direct/Reverse: Direct/Reverse action switching

PTN\_INC: Pattern increment



### ■ Input error displays

Display	Description	Solution
Measured value (PV) [Flashing]	• Measured value (PV) exceeds the Input scale high/low. • Measured value (PV) exceeds the Input error determination point (high/low limit).	Prior to replacing the sensor, always turn the power OFF or change the mode to STOP. Check input range, sensor and sensor connection.
Over-scale [Flashing]	Measured value (PV) is above the input display range high (or +99999).	
Underscale [Flashing]	Measured value (PV) is below the input display range low (or -19999).	

## 7. CONNECTING A LOADER CONNECTOR

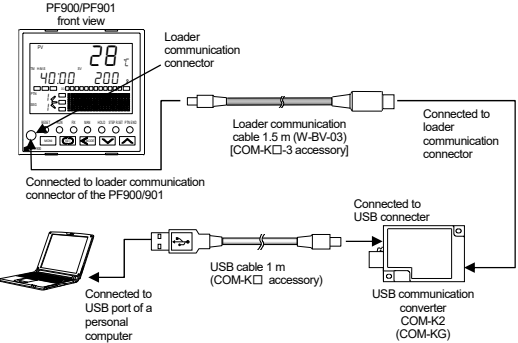
Connect the controller, COM-K2 (or COM-KG), and personal computer using a USB cable and a loader communication cable. Make sure the connectors are oriented correctly when connecting.

Both loader communication ports cannot be used at the same time.

### ■ When using the loader communication port in front

Use COM-K2 (or COM-KG) communication converter and W-BV-03 loader communication cable.

Turn ON the PF900/901 first when using the loader communication port in front.



CT ratio (Number of turns): 0 to 9999  
CTL-6-P-N: 800  
CTL-12-S56-10L-N: 1000

### ■ 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:	200 ms (twice of the measured input sampling cycle) 100 ms (twice of the measured input sampling cycle) 500 ms (twice of the measured input sampling cycle)
Action at FBR break:	Upscale
■ Digital input (DI)	
Number of inputs:	Up to 11 points (6 points: DI1 to DI6 [optional], 5 points: DI7 to DI11 [standard])
Input method:	Dry contact input OFF (Open state): 10 kΩ or more ON (Close state): 1 kΩ or less Contact current: 5 mA or less Voltage at open: Approx. 5 V DC
Capture judgment time:	200 ms max. + 1 sampling cycle

### ■ Output

Number of outputs:	Up to 15 points (OUT1 to 3, DO1 to DO12) OUT3 and DO6 to DO12 is optional
Relay contact output (OUT1, OUT2):	Contact type: 1a contact Contact rating (Resistive load): 250 V AC 3 A,