

New-generation PXF Series

Digital Temperature Controller

Fast!

Compact!

User-friendly!



PXF9
96 × 96 mm



PXF5
48 × 96 mm



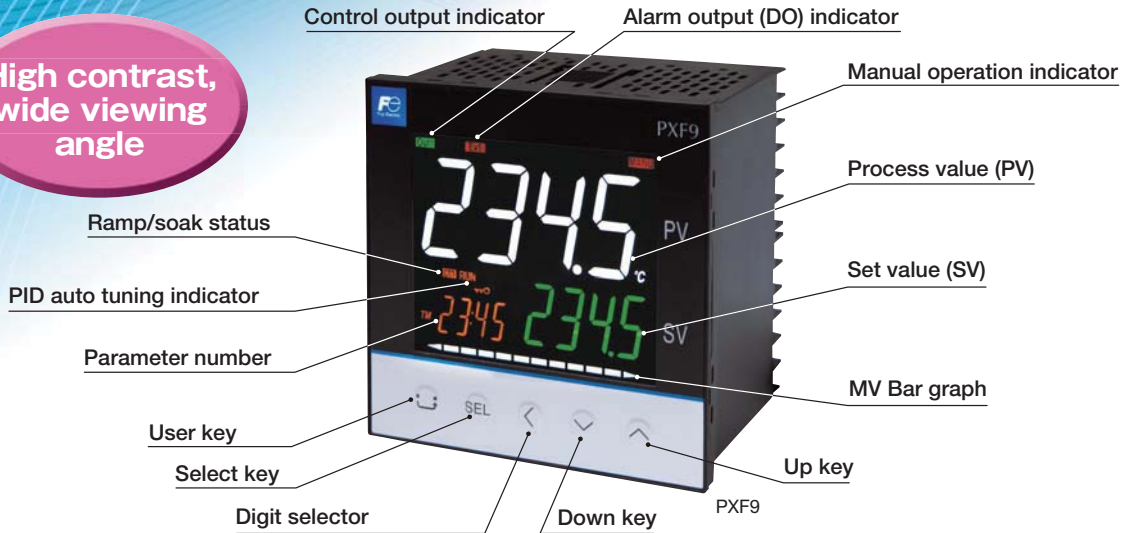
PXF4
48 × 48 mm

Features

- Largest bright color LCD in the industry
- High speed sampling : 50ms
Fast processing : 100ms
- Universal input
- The best-in-class compact : 58mm depth
- Multidrop master function (option)

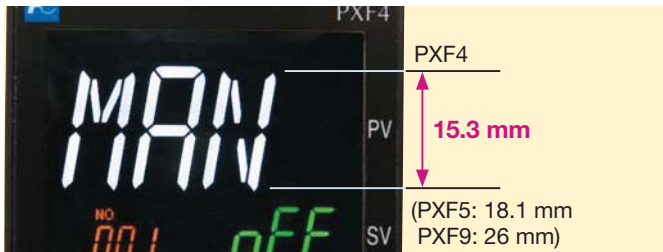
Easy-to-See color LCD! Fast control!

High contrast, wide viewing angle

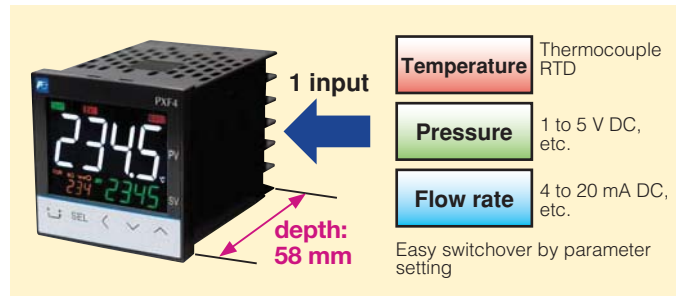


Tallest PV characters in the industry

Optimal bright and clear white PV display



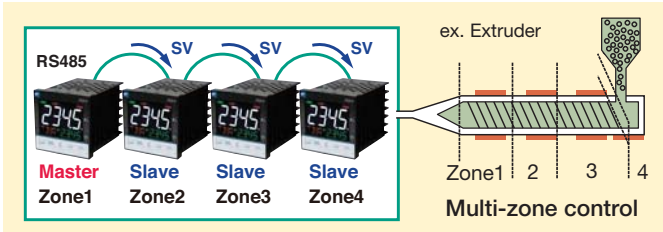
Universal input



Multidrop master function

Cooperative operation function

SV can be transmitted to multi-PXFs through communication. Synchronous temperature rise control is available in combination with 2-degrees-of-freedom PID.

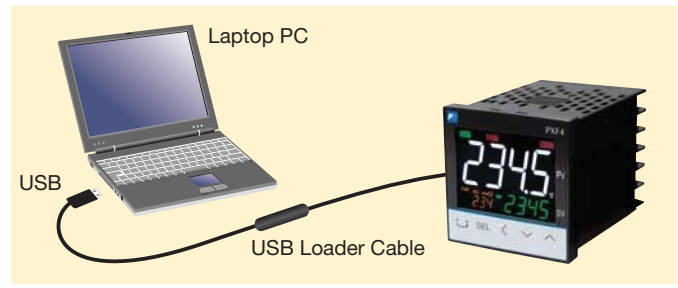


Parameter copy function

Parameter settings can be copied to multi-PXFs simultaneously and easily through communication.

Bus-powered USB interface equipped

Directly connectable to PC via USB port with optional cable. No need of power supply to the PXF.

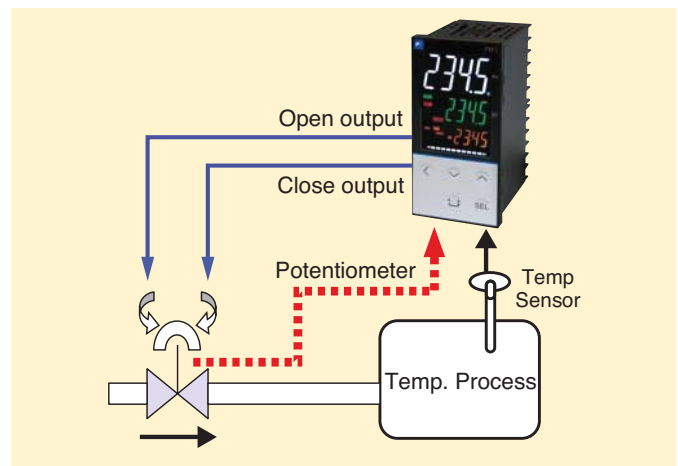


Smart Ramp-Soak up to 64 segments/15 patterns




Simple power monitoring function/preventive maintenance alarm

Free loader software - user-friendly key operation and easy to find parameters.

Position feedback and servo control is available to valve control



Versatile controller for any applications

Type	PXF4	PXF5	PXF9	
Appearance				
Front panel size	48 × 48 mm	48 × 96 mm	96 × 96 mm	
Depth	58 mm			
Display digits	4-digit (PV and SV)			
Character height (PV)	15.3 mm	18.1 mm	26 mm	
Indication accuracy	RTD input: $\pm 0.2\%$ ± 1 digit or $\pm 0.8^{\circ}\text{C} \pm 1$ digit, whichever is larger Thermocouple input: $\pm 0.3\%$ ± 1 digit or $\pm 1^{\circ}\text{C} \pm 1$ digit, whichever is larger Voltage and current input: $\pm 0.3\%$ FS ± 1 digit			
Sampling rate	50 ms			
Input signal	Process value input	Universal input (RTD, thermocouple, voltage/current)		
	Option Remote SV input	Voltage/current		
	Current transformer (CT) input	Dedicated CT (1 to 100 A)		
	Motorized valve position input	-	100Ω to 2.5kΩ (3-wire)	
	Digital input (DI)	Up to 3 points	Up to 5 points	
Output signal	Control output	Relay contact	●	
		SSR/SSC drive output	●	
		Current output (linear)	●	
		Voltage output (linear)	●	
	Option	Motorized valve control output	●	
		Analog re-transmission output (voltage)	●	
		Analog re-transmission output (current)	●	
		Heater burnout alarm	●	
Operating days alarm	●			
Alarm/event contact output (DO)	Up to 3 points	Up to 5 points		
Control method (*with auto tuning)	ON/OFF control	●		
	PID control*	●		
	Fuzzy control*	●		
	2-degrees-of-freedom PID control*	●		
	Open-loop system supported (PID2 control)	●		
	Self tuning	●		
	Ramp/soak (simple program control)	up to 64 steps		
	Option Heating/cooling control*	●		
	Motorized valve control	●		
Function	Number of PV/PID patterns	Up to 8		
	SV/PID switchover	●		
	Soft start	●		
	Simple power-monitoring	●		
	Operating days	●		
	Manual operation	●		
	User key	●		
Communication	Loader interface	●		
	Option RS-485 (MODBUS)	●		
Power supply voltage	100 to 240 V AC, 50/60 Hz	●		
	Option 24 V DC/AC	●		
Power consumption	10 VA MAX.	13 VA MAX.	13 VA MAX.	
Screw terminals for external connection	M3			

Note: Some functions may be unavailable depending on the model. For more detail, please refer to the specifications.

Advanced control functions

Parameter setting is available using the front keys or a PC with loader software.

Standard functions	1 On/Off control
	2 PID control with auto tuning
	3 Fuzzy control with auto tuning
	4 2-degrees-of-freedom PID control with auto tuning
	5 Open-loop supported PID2 control
	6 Self tuning
	7 Ramp soak function (simple program control)

Optional functions	1 Heating/cooling control with auto tuning
	2 Motorized valve control

1 On/Off control

When process value (PV) is below the set value (SV), output is turned on and the heater is energized as shown below. When PV is above SV, output is turned off and the heater is de-energized. In this way, output is turned on/off repeatedly with respect to the SV to keep the temperature constant. This method of control is called "on/off action (2-position action)"

* When "0" is assigned to parameter P, the on/off action will be selected.

2 PID control with auto tuning

Typical PID control. Overshoot may occur due to external disturbance.

3 Fuzzy control with auto tuning

Fuzzy control is used to suppress overshoot so that the response to external disturbance is improved. By monitoring PV, overshoot is suppressed with startup time remaining unchanged. Also, disturbance can be settled quickly.

● Comparison between fuzzy control and conventional control

4 2-degrees-of-freedom PID control with auto tuning

This function achieves stable control against external disturbances, while suppressing overshoot and undershoot at startup or at SV change.

- Conventional PID
- 2-degrees-of-freedom PID (before adjusting α and β)
- 2-degrees-of-freedom PID (with optimal α and β)

5 Open-loop supported PID2 control

Reduces overshoot in the processes where the control target is turned off and then on again.

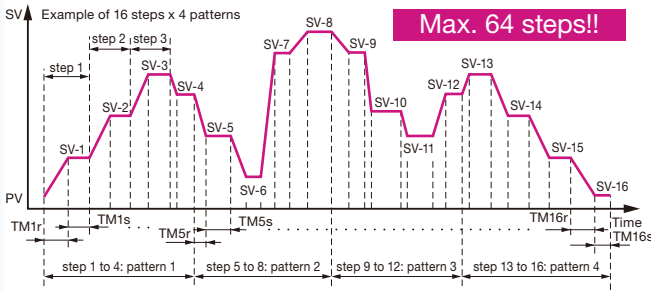
6 Self tuning

At power up, SV change, or during external disturbance, tuning is made automatically so that the PID parameters are re-optimized.

Note: For some objects of control, PID values can not be optimized.

7 Ramp soak function (simple program control)

Function of automatically changing the set point value with the elapsing of time, in accordance with the preset pattern, as shown below. This function is capable of programming 15 program patterns. Max.64 steps.



Basic functions

- ① [h · min] or [min · s]
- ② Guarantee soak
- ③ Repeat action
- ④ PV start
- ⑤ Delay start
- ⑥ Power failure recovery

Number of steps and patterns

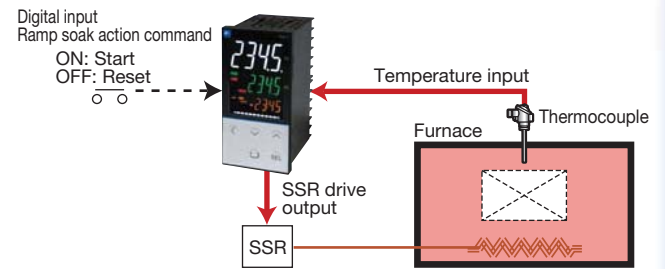
Steps	Patterns
64	1
32	2
16	4
8	8

Operation

Start/stop/suspension can be performed by various ways (a user key, parameter setting, digital input, or communication)

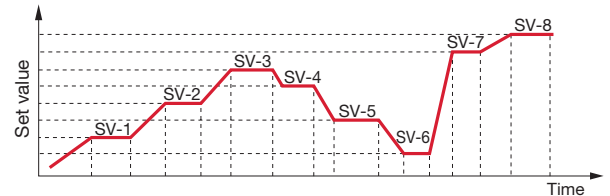
Temperature gradient control of furnace

For control in a heat pattern



[Ramp soak function]

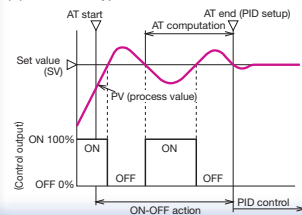
Temperature rise/fall pattern is controlled by setting a heat pattern having a gradient. Action start/resetting can be commanded externally.



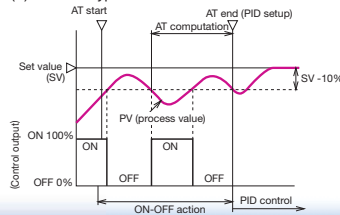
PID auto tuning

PID parameters are automatically set by the controller's measurement and computation function. This instrument provides 2 types of auto-tuning functions; the standard type (auto-tuning with SV used as reference) and the low SV type (auto-tuning with the value 10% below SV used as reference).

(a) Standard type

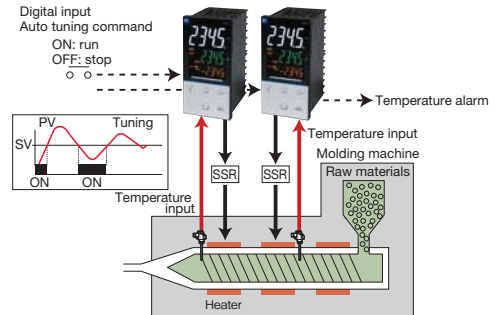


(b) Low-PV type



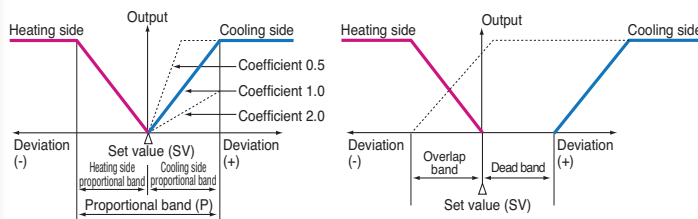
Temperature control of plastic molding machine

Start/stop of auto tuning can be commanded externally.



1 Heating/cooling control (option)

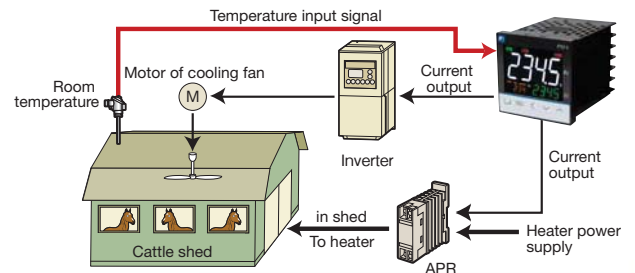
By a single controller, both heating and cooling control output are obtained.



Note: For the cooling side proportional band, set a coefficient with respect to the heating side proportional band. (ON-OFF control if coefficient is 0.)

Energy saving in livestock barns

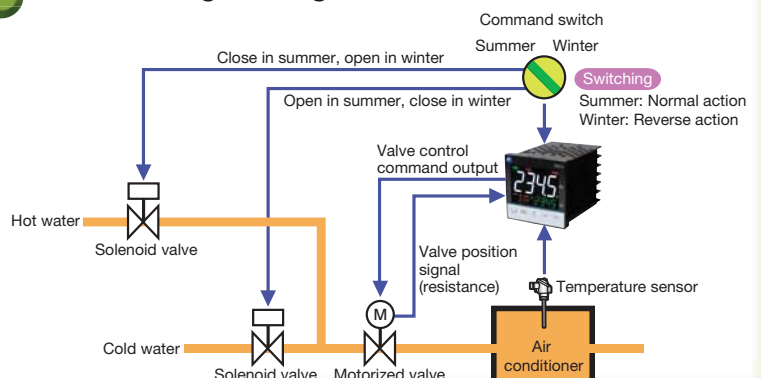
- Both heating and cooling are controlled with only one temperature controller utilizing its 2 control outputs.
- Power consumption can be curbed by controlling a cooling fan motor with inverter.



2 Motorized valve control (option)

- Position feedback control based on motorized valve position signal
- Servo control without valve position signal

Heating/cooling control of air conditioner



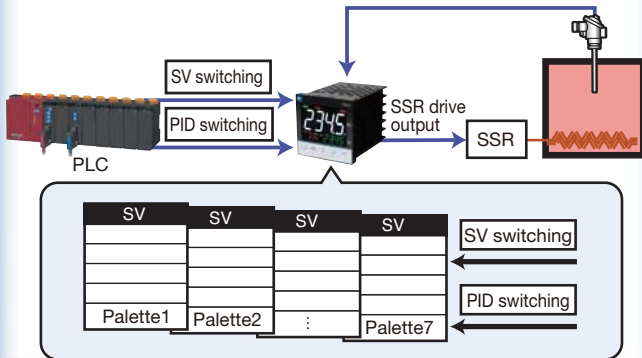
Even more functions which extend the possibilities of temperature controller

Standard functions	1 SV and PID selection
	2 Soft start
	3 Simple power-monitoring
	4 Operating days alarm

Optional functions	1 Re-transmission output
	2 Remote SV input
	3 Heater burnout alarm
	4 Alarm output
	5 Digital input
	6 RS-485 Communication

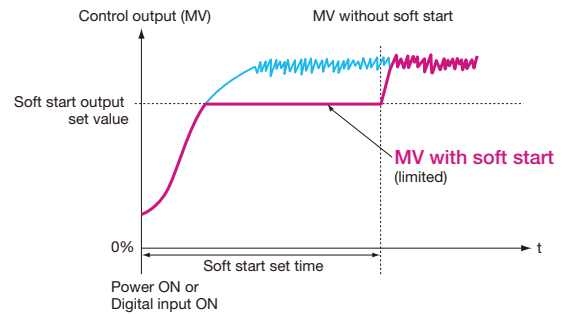
1 SV and PID selection

Allows you to register up to 8 sets of SV setting and PID setting, and to switch among them, enabling optimum PID setting for changing process, materials, or PV. You can perform SV selection only, or PID selection only.



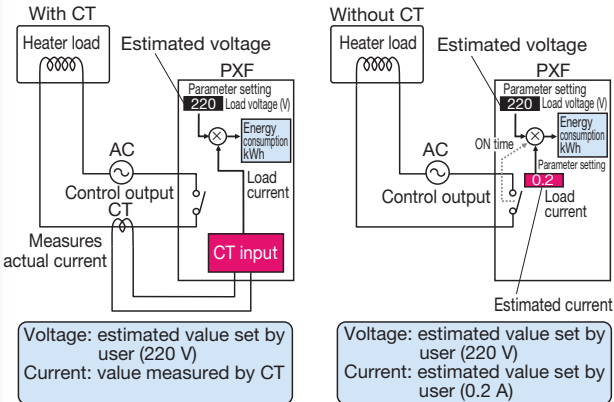
2 Soft start

This function controls the maximum output produced when turning on the equipment (including the temperature controller). This function is useful for effects such as suppressing the heater output during equipment startup, or lightening the load.



3 Simple power-monitoring

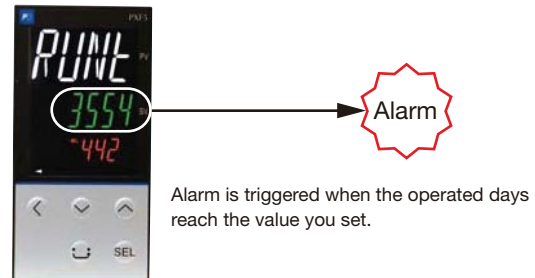
Calculates the energy consumption by connecting an optional current transformer. (See page 10.)



4 Operating days alarm

- Operating days indication
- Operating days alarm output

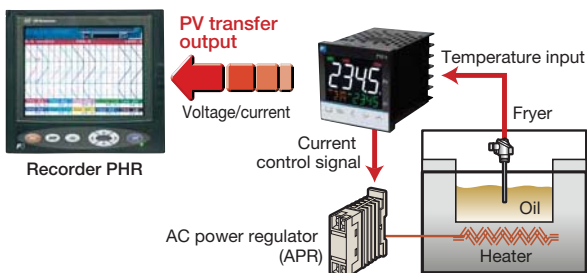
This function is useful for preventive maintenance because it let you know the appropriate time for maintenance work.



1 Re-transmission output (option)

A cost corresponding to one temperature sensor can be reduced just by connecting a PV transfer signal to a recorder.

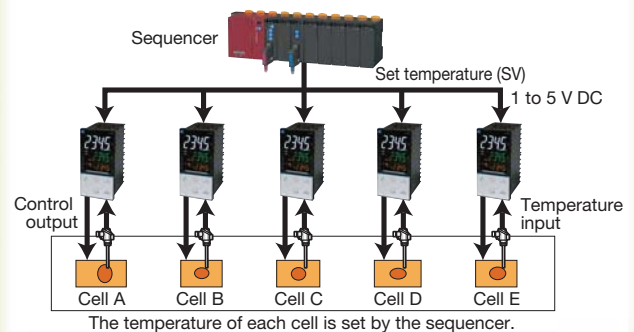
- Output signal (any one of the followings):
0 to 20 mA DC, 4 to 20 mA DC, 0 to 5 V DC, 1 to 5 V DC, 0 to 10 V DC, 4 to 10 V DC
- Output type:
process value (PV), set value (SV), control output (MV), or PV-SV (DV)



2 Remote SV input (option)

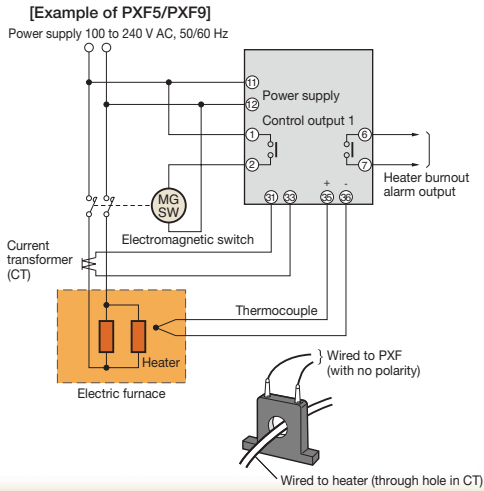
SV can be configured externally.

- Input signal (any one of the followings):
0 to 5 V DC, 1 to 5 V DC, 0 to 10 V DC, 0 to 20 mA DC, 4 to 20 mA DC
- Input impedance: About 1 MΩ



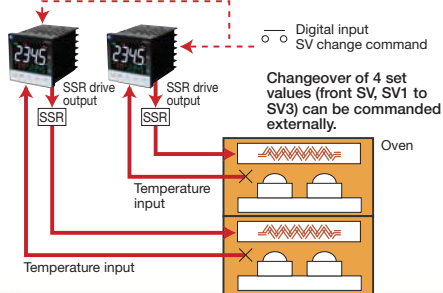
3 Heater burnout alarm (option)

- A current transformer (CT) is required. (See page 10, optional items).
- The power supply voltage and the alarm action point need to be configured beforehand.
- Available only for single-phase heater
- Not available when using thyristor phase angle control



5 Digital input (option)

For SV changeover, AT startup, timer startup, program selection, start/stop/reset, PID changeover, etc.



6 RS-485 Communication (option)

- High-speed communication (user address mapping function)
You can make a list of your most necessary parameters (max. 32 words) to quickly acquire those data at a time.
Communication speed: max. 115.2 kbps

Address	Parameter
30001	PV
30002	SV(Read)
30003	DV
30004	MV1
⋮	⋮
40003	SV(Write)
40004	STBY
40005	AT
40006	P
40007	I
40008	D
⋮	⋮
⋮	⋮

Max. 32 words

Address	Parameter
30001	PV
30002	SV(Read)
40003	SV(Write)
30004	MV1
40006	P
40007	I
40008	D
⋮	⋮
⋮	⋮
⋮	⋮

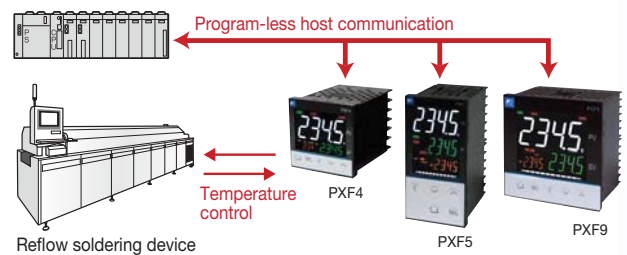
4 Alarm output (option)

Up to 3 points

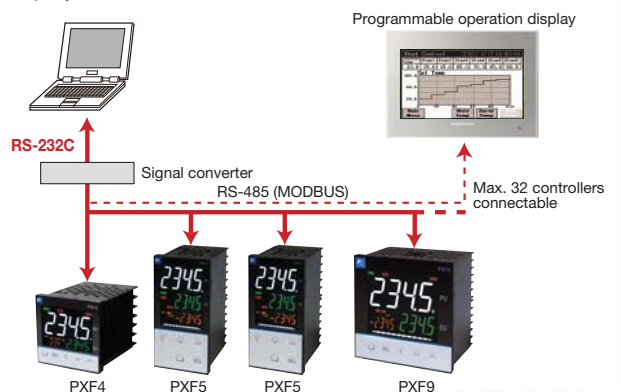
	Alarm type	Action diagram
Absolute value alarms	Upper limit absolute value	
	Lower limit absolute value	
	Upper limit absolute value (with hold)	
	Lower limit absolute value (with hold)	
Deviation alarms	Upper limit deviation	
	Lower limit deviation	
	Upper and lower limits deviation	
	Upper limit deviation (with hold)	
	Lower limit deviation (with hold)	
	Upper and lower limits deviation (with hold)	
	Range alarms	Range upper and lower limits deviation (ALM1/2 independent operation)
Range upper and lower limits absolute value		
Range upper and lower limits deviation		
Range upper limit absolute value and lower limit deviation		
Range upper limit deviation and lower limit absolute value		

- Programless communication

PXF can be connected with PLC without a program.



- PXFs can be connected with PC, programmable operation display, or PLC.



Specifications

General specifications

Power supply voltage	100 (-15%) V to 240 (+10%) V AC, 50/60Hz 24 V DC/AC (±10%)		
Power consumption	Type	100 to 240 V AC	24 V DC/AC
	PXF4	10 VA MAX.	3 VA MAX.
	PXF5 & 9	13 VA MAX.	8 VA MAX.
Insulation resistance	20 MΩ or more (at 500 V DC)		
Withstand voltage	Power source ⇔ all terminals: 1500 V AC for 1 min Relay contact output ⇔ all terminals: 1500 V AC for 1 min Between others: 500 V AC for 1 min		

Process value input

Number of input	1			
Input setting	Programmable scale			
Input signal	See Table 1 (Universal input: thermocouple/RTD/voltage/current)			
Standard measurement range and input type	See Table 1			
Indication accuracy (at Ta = 23°C)	<ul style="list-style-type: none"> Thermocouple input: either ±1°C ±1 digit or ±0.3% ±1 digit of indicated value, whichever is larger *except: Thermocouple B: 0 to 400°C: no accuracy assurance Thermocouple R: 0 to 500°C: ±3°C ±1 digit All thermocouples: -200 to -100°C: ±2°C ±1 digit RTD input: ±0.8°C ±1 digit or ±0.2% ±1 digit of indicated value, whichever is larger mV input, voltage input, current input: ±0.3%FS ±1 digit 			
Temperature effect on sensitivity	±0.3%FS/10°C			
Indication resolution	See Table 1			
Sampling rate	50 ms			
Input impedance	<ul style="list-style-type: none"> Thermocouple, mV input: 1 MΩ or more Current input: 150 Ω or less (built-in diode) Voltage input: About 1 MΩ 			
Variation by signal source resistance	<ul style="list-style-type: none"> Thermocouple, mV input: ±0.3%FS ±1 digit per 100 Ω Voltage input: ±0.3%FS ±1 digit per 500 Ω 			
Allowable wiring resistance	<ul style="list-style-type: none"> RTD: 10 Ω MAX. (per wire) 			
Allowable input voltage:	<ul style="list-style-type: none"> DC voltage input: within ±35 V Current input: within ±25 mA Thermocouple, RTD, mV input: within ±5 V 			
Noise reduction ratio	<ul style="list-style-type: none"> Normal mode: 40 dB (50/60 Hz) Common mode: 120 dB (50/60 Hz) Between input and power supply: ±1°C at 220 V AC, 50/60 Hz 			
Input correction:	<ul style="list-style-type: none"> (a) User adjustment: ±50%FS for each of zero and span point (b) Process value shift: ±10%FS (c) Input filter: 0.0 to 120.0 s (filter OFF if set at 0.0) (d) Square root extraction: -0.1 to 105% (OFF if set to -0.1%) 			
Overrange - underrange	Out of the range between -5 to 105% of FS (accuracy not guaranteed between -5 and 0, and between 100 and 105%FS) *except: <table style="display: inline-table; vertical-align: middle;"> <tr> <td> <ul style="list-style-type: none"> JPt (-199.9°C to 600.0°C) input: Pt (-200°C to 850°C) input: 0 to 10 V DC input: Thermocouple E: Out of the range between -5 to 102% of FS </td> <td style="font-size: 2em; vertical-align: middle;">}</td> <td>Out of the range between -2% to 105% of FS</td> </tr> </table>	<ul style="list-style-type: none"> JPt (-199.9°C to 600.0°C) input: Pt (-200°C to 850°C) input: 0 to 10 V DC input: Thermocouple E: Out of the range between -5 to 102% of FS 	}	Out of the range between -2% to 105% of FS
<ul style="list-style-type: none"> JPt (-199.9°C to 600.0°C) input: Pt (-200°C to 850°C) input: 0 to 10 V DC input: Thermocouple E: Out of the range between -5 to 102% of FS 	}	Out of the range between -2% to 105% of FS		

Remote SV input (option)

Number of input	1
Input signal	Voltage: 0 to 5 V DC/1 to 5 V DC/0 to 10 V DC Current: 0 to 20 mA DC/4 to 20 mA DC (an external 250-ohm resistor is required for current input)
Input impedance	Approx. 1 MΩ
Sampling rate	50 ms

Current transformer (CT) input (option)

Input type	Single phase CT, 1 point For 1 A to 30 A: CTL-6-S-H For 20 A to 100 A: CTL-12-S36-8
Range of detected current	1 A to 100A
Detected current accuracy	Setpoint ±5%FS
Detected current resolution	0.1 A
ON time necessary for detection	300 ms MIN.

Digital input (DI) (option)

Number of point	up to 5 (PXF4: up to 3)
Specification	No-voltage contact or transistor input
Contact capacity:	5 V DC, about 2 mA (per point)
Input judgment:	ON voltage: 2 V DC or lower OFF voltage: 3 V DC or higher
Sampling pulse width	50 ms MIN.
Function	Remote mode selection, SV changeover, control standby, AT startup, timer startup, alarm unlatch, program selection, start/stop/reset, PID switching (normal/reverse), etc.

Valve position feedback signal (Potentiometer) input (option)

Model	PXF5 and PXF9 (not available for PXF4)
Resistance range	100 Ω to 2.5 kΩ (three-wire)
Resolution	0.5%FS
Accuracy	±1.0%FS
Temperature effect on sensitivity	±0.5%FS/10°C
Burnout function	Not provided

Control output

Number of point	Up to 2 (2 points: Heating/cooling control)
Type	<ul style="list-style-type: none"> Relay contact output (SPST) Proportional cycle: 1 to 150 s Contact structure: 1 SPST contact *SPST: single pole single throw Contact capacity: 250 V AC/30 V DC, 3 A (resistive load) Minimum ON/OFF current: 10 mA (5 V DC) Mechanical life: 50 million operations MIN. (100 operations/min) Electrical life: 100,000 operations MIN. (rated load)
Select among	<ul style="list-style-type: none"> Relay contact output (SPDT) Proportional cycle: 1 to 150 s Contact structure: 1 SPDT contact *SPDT: single pole double throw Contact capacity: 250 V AC/30 V DC, 5A (resistive load) Mechanical life: 50 million operations MIN. (100 operations/min) Electrical life: 100,000 operations MIN. (rated load)
① to ⑥ below	<ul style="list-style-type: none"> SSR/SSC drive output Proportional cycle: 1 to 150 s ON voltage: 12 V DC (between 10.7 and 13.2 V DC) OFF voltage: 0.5 V DC or lower Maximum current: 20 mA DC Load resistance: 600 Ω MIN.
	<ul style="list-style-type: none"> Current output (0 to 20 mA DC/4 to 20 mA DC) Accuracy: ±5%FS Load resistance: 500 Ω MAX.
	<ul style="list-style-type: none"> Voltage output (0 to 5 V DC/1 to 5 V DC/0 to 10 V DC/2 to 10 V DC) Accuracy: ±5%FS Load resistance: 10 kΩ MIN.
	<ul style="list-style-type: none"> Motorized valve control output Contact structure: 2 SPST contacts without interlock circuit *SPST: Single Pole Single Throw Contact capacity: 250 V AC/30 V DC, 3 A (resistive load) Minimum ON/OFF current: 100 mA (24 V DC) Mechanical life: 20 million operations MIN. (100 operations/min) Electrical life: 100,000 operations MIN. (rated load)

Alarm output (DO) (option)

Number of outputs	Relay contact output: up to 5 (shared common) PXF4: up to 3 up to 3 (independent common) PXF4: up to 2
Output specifications	Relay contact output Contact structure: 1 SPST contact *SPST: single pole single throw Contact capacity: 250 V AC/30 V DC, 1A (resistive load) Minimum ON/OFF current: 10 mA (5 V DC) Mechanical life: 20 million operations MIN. (100 operations/min) Electrical life: 100,000 operations MIN. (rated load)
Output functions	Alarm output (see "Alarm function"), main unit control mode output, program status output, control output 1 and 2, etc.
Output cycle	100 ms

Re-transmission output (option)

Number of point	1
Type	Current/voltage output (0 to 20 mA DC/4 to 20 mA DC/0 to 5 V DC/1 to 5 V DC/0 to 10 V DC/2 to 10 V DC) <ul style="list-style-type: none"> Guaranteed output range: 0 to 21mA DC/0 to 10.5 V DC Accuracy: ±0.2%FS (±5%FS at 1 mA or smaller) Resolution: 10,000 MIN. Load resistance: 500 Ω MAX. (current), 10 kΩ MIN. (voltage)
Output cycle	100 ms
Output contents	PV, SV, DV, MV
Additional function	Scaling function

Display unit

Type	LCD (with backlight)
Indication contents	Process value indication: 11-segment, 4-digit [white] Setpoint indication: 11-segment, 4-digit [green] Screen No. indication: 7-segment, 4-digit [orange] Indication status: 42 indicator lamps
Luminance setting	possible (4 steps)

Setting section

Type and number of keys	Sheet type keys (with emboss), 5 keys
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Control functions

ON/OFF control	Refer to page 4.
PID control	<ul style="list-style-type: none"> Dual control (heating/cooling) PID parameters determination: Auto tuning
Fuzzy PID control	<ul style="list-style-type: none"> Dual control (heating/cooling) PID parameters determination: Auto tuning
Self tuning control	Refer to page 4.
PID2 control	<ul style="list-style-type: none"> Dual control (heating/cooling) PID parameters determination: Auto tuning
2-degrees-of-freedom PID	<ul style="list-style-type: none"> PID parameters determination: Auto tuning
Position proportional PID (servo) with position feedback	<ul style="list-style-type: none"> Full stroke time: 30 seconds MIN. (not available for PXF4)

Control parameters

Proportional band (P)	0.1% to 999.9%
Integration time (I)	0 to 3200 s (invalidated when I = 0)
Differential time (D)	0.0 to 999.9 s (invalidated when D = 0)
Control cycle	100 to 900 ms (in 100 ms), 1 to 99 s (in seconds)
Anti-reset windup	0 to 100% of measurement range
Hysteresis band	50% of measurement range (at 2-position control only)
Number of SV and PID patterns	8: Changed by any of parameter setting, digital input, communication, user function keying, zone change.

Control mode

Mode	Auto/Manual/Remote *During 2-position control in Manual mode, 2-position manual operation with MV = 100% or 0% is operated.
Mode changeover:	<ul style="list-style-type: none"> • Auto <=> Manual: Balanceless·bumpless • Auto/Manual→Remote: Balance·bumpless • Auto/Manual→Remote: Balance·bumpless

Alarm function

Number of alarm setting points	Up to 5 (depends on the number of DO)
Alarm type	Process value (upper limit/lower limit, absolute/deviation, range), main unit error, etc. (non-excitation, delay, latch, timer function option provided)
Heater current alarm function (optional)	*Current detector(CT) is to be prepared separately (see page 10.)
Detectable range	1 A to 100 A
Detected current resolution	0.1 A
Setting resolution	0.1 A
Hysteresis	0.0 to 100.0 A

RS-485 communication (option)

No. of points	1
Physical specifications	EIA-485
Protocol	Modbus-RTU
Communication method	Half-duplex bit serial, asynchronous communication
Code type	Data length: 8 data bits. Parity: Odd, even, none.
Baud rate	9600 bps, 19200 bps, 38.4 kbps, 115.2 kbps
Connection	Up to 32 units connectable including multidrop master function
Communication distance	Up to 500 m (total connection length)
Additional functions	<ul style="list-style-type: none"> • Cooperative operation The function in which slave devices can be operated via master device by connecting several temperature controllers. • Programless communication The function in which a temperature controller can be connected to a PLC without program. Supported PLCs: Mitsubishi PLC Q series Siemens PLC S7 series

Operation and storage conditions

Operating temperature	-10°C to 50°C
Storage temperature	-20°C to 60°C
Operating/storage humidity	90%RH or less (Non condensation)
Warm-up time	30 min MIN.
Vibration	during transportation: 9.8 m/s ² (1 G) or less
Impact	during transportation: 294m/s ² (30 G) or less

Structure

Mounting method	Panel mount
External terminals	Screw terminals, M3
Case	<ul style="list-style-type: none"> • Material: ABS, PPO • Non-combustibility grade: UL94V-0 equivalent • Color: Black
Protection structure	<ul style="list-style-type: none"> • Panel front side: IP66, NEMA-4X equivalent (When the panel is mounted using our genuine packing. Not water-proof if mounted closely together.) • Body: IP20 equivalent (slits on top and bottom) • Terminals: IP00 equivalent. Terminal cover can be provided optionally.
Dimensions	Refer to page 14.
Weight	PXF4: approx. 100 g, PXF5: approx. 170 g, PXF9: approx. 220 g

User customize function and Program (ramp/soak) function

Number of program steps	64 steps x 1 patterns, 32 steps x 2 pattern, 16 steps x 4 pattern, or 8 steps x 8 patterns (1 step = 2 segments)
Control option:	Control by digital input Status output by digital output
Basic functions	[1] Segment time can be set in "Hour, Minutes" or "Minutes, Seconds" ② Guarantee soak ③ Repeat action ④ PV start ⑤ Delay start ⑥ Power restoring function
Memory backup	EEPROM

User functions

User key assignment	Auto/Manual change, Standby ON/OFF change, remote SV change.
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Password function

3-level password

Simple power-monitoring function and operating days alarm

Simple power-monitoring function	<ul style="list-style-type: none"> • By connecting a current transformer (to be prepared separately), electric power consumption of the heater can be displayed. (Electric power is calculated based on the fixed voltage value you set.) • Current detector(CT) is to be prepared separately (see page 10.) • Current detection range: 1 A to 100 A
Operating days alarm	<ul style="list-style-type: none"> • Indicates the number of days the controller has been operated and activates alarm output (optional) when it exceeds the setpoint. • Useful for preventive maintenance because it let you know the appropriate time for maintenance work.

Processing at power failure

Memory protection	Protect by non-volatile memory
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Self-diagnosis

Method: Program error supervision by watchdog timer

Table 1 input type and range

Input type	Code (PvT)	Measurement range [°C]	Minimum input increment [°C]
Pt 100	PT1	0.0 to 150.0	0.1
	PT2	0.0 to 300.0	0.1
	PT3	0.0 to 500.0	0.1
	PT4	0.0 to 600.0	0.1
	PT5	-50.0 to 100.0	0.1
	PT6	-100.0 to 200.0	0.1
	PT7	-199.9 to 600.0	0.1
	PT8	-200 to 850	1
DC voltage	0 to 5 V DC	0-5V	-1999 to 9999 (Range where scaling is allowed)
	1 to 5 V DC	1-5V	
	0 to 10V DC	0-10	
	2 to 10V DC	2-10	
	0 to 100mV DC	MV	
DC current	0 to 20mA DC	0-20	-
	4 to 20mA DC	4-20	-

Input type	Code (PvT)	Measurement range [°C]	Minimum input increment [°C]	
Thermocouple	J	J1	0.0 to 400.0	0.1
		J2	-20.0 to 400.0	0.1
		J3	0.0 to 800.0	0.1
		J4	-100 to 1000	1
	K	K1	0 to 400	0.1
		K2	-20.0 to 500.0	0.1
		K3	0.0 to 800.0	0.1
		K4	-200 to 1300	1
	R	R	0 to 1700	1
	B	B	0 to 1800	1
	S	S	0 to 1700	1
	T	T1	-199.9 to 200.0	0.1
		T2	-199.9 to 400.0	0.1
	E	E1	0.0 to 800.0	0.1
		E2	-150.0 to 800.0	0.1
		E3	-200 to 800	1
	L	L	-100 to 850	1
	U	U1	-199.9 to 400.0	0.1
		U2	-200 to 400	1
	N	N	-200 to 1300	1
W	W	0 to 2300	1	
PL-II	PL-2	0 to 1300	1	

ORDERING CODE

<48 x 48 mm size>

Motorized valve control type (base model: PXF4)



Digit	Specifications	Code
1-4	<Front panel size W x H> 48 × 48 mm	PXF4
5	-	A
6	<Control output 1> Relay contact (SPST) Note 1 Relay contact (SPDT) Note 1 SSR drive output Current output Voltage output	A B C E P
7	<Control output 2> None Relay contact (SPST) SSR drive output Current output Voltage output Re-transmission output (current) Re-transmission output (voltage)	Y A C E P R S
8	<Revision code>	2
9	<Alarm output> None 1 point 2 points 3 points 2 points (independent common)	0 1 F M J
10	<Power supply voltage/instruction manual> 100 to 240 V AC, Japanese & English instruction manual 100 to 240 V AC, English instruction manual 100 to 240 V AC, Chinese & English instruction manual 24 V AC/DC, Japanese & English instruction manual 24 V AC/DC, English instruction manual 24 V AC/DC, Chinese & English instruction manual	Y V W A B D
11	<Option> None RS-485 Communication Digital input (DI1) RS-485 communication + Digital input (DI1) RS-485 communication + Remote SV input Note 2 RS-485 Communication + CT input Note 3	Y M S V K J
12	-	00
13	-	

Note 1: Not available for the 7th code "C", "E", "P", "R", "S".
 Note 2: When using current for the remote SV input, add a 250-ohm resistor to the input terminal.
 Note 3: When using the CT input for heater burnout alarm, add one alarm output for it in the 9th code.

<48 x 48 mm size>

Motorized valve control type (base model: PXF4)

Digit	Specifications	Code
1-4	<Front panel size W x H> 48 × 48 mm	PXF4
5	-	A
6	<Control output 1> Motorized valve control output (with PFB input)	T
7	<Control output 2> None	Y
8	<Revision code>	2
9	<Alarm output> None 1 point 2 points 2 points (independent common)	0 1 F J
10	<Power supply voltage/instruction manual> 100 to 240 V AC, Japanese & English instruction manual 100 to 240 V AC, English instruction manual 100 to 240 V AC, Chinese & English instruction manual 24 V AC/DC, Japanese & English instruction manual 24 V AC/DC, English instruction manual 24 V AC/DC, Chinese & English instruction manual	Y V W A B D
11	<Option> None Digital input (DI 1, 2, 3) RS-485 communication + Digital input (DI1)	Y D V
12	-	00
13	-	

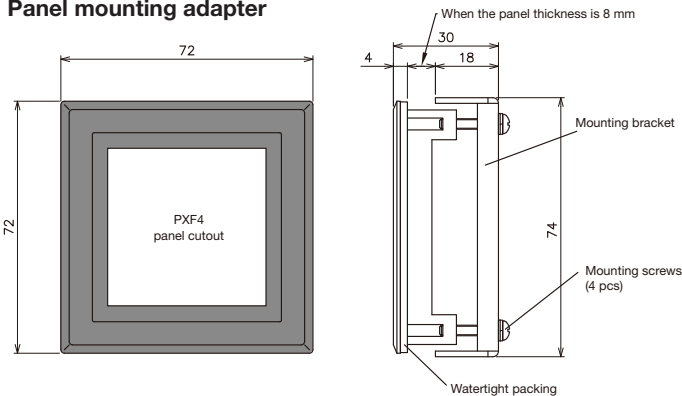
Optional Items

Name	Model
Current detector (CT) 1 A to 30 A	ZOZ+CCTL-6-S-H
20 A to 100A	ZOZ+CCTL-12-S36-8
Terminal cover	ZZPPXR1-A230
Parameter loader interface cable	ZZP*TQ501923C3
Shunt resistor (250 Ω±0.1%)	ZZPPXR1-A190
Panel mounting adapter for replacement from PXR7 to PXF4	ZZP*TQ502732C1

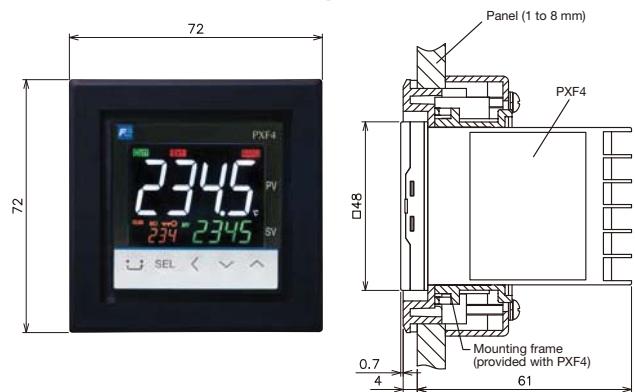
Outline diagram of optional items

Panel mounting adapter for replacement from PXR7 to PXF4 (ZZP*TQ502732C1)

Panel mounting adapter

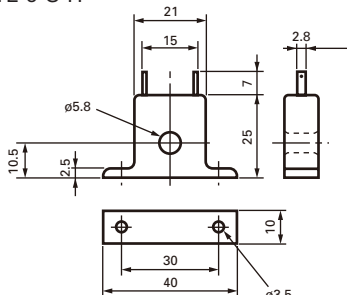


How to install PXF4 with the adapter

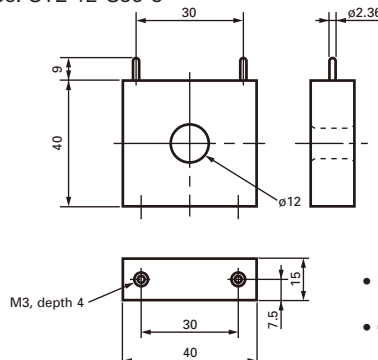


Current detector (CT)

- Specification: 1 A to 30 A
- Type: CTL-6-S-H



- Specification: 20 A to 100 A
- Type: CTL-12-S36-8



- Detection is available only for single-phase heater
- Cannot be used when the heater is controlled using thyristor phase angle control.



<48 x 96 mm size> <96 x 96 mm size>
Motorized valve control type (base model: PXF5 or PXF9)

Digit	Specifications	Code
1-4	<Front panel size W x H> 48 × 96 mm 96 × 96 mm	PXF5 PXF9
5	-	A
6	<Control output 1> Relay contact (SPST) Relay contact (SPDT) SSR drive output Current output Voltage output	A B C E P
7	<Control output 2> None Relay contact (SPST) SSR drive output Current output Voltage output Re-transmission output (current) Re-transmission output (voltage)	Y A C E P R S
8	<Revision code>	2
9	<Alarm output> None 1 point 2 points 3 points 2 points (independent common)	0 1 F M J
10	<Power supply voltage/instruction manual> 100 to 240 V AC, Japanese & English instruction manual 100 to 240 V AC, English instruction manual 100 to 240 V AC, Chinese & English instruction manual 24 V AC/DC, Japanese & English instruction manual 24 V AC/DC, English instruction manual 24 V AC/DC, Chinese & English instruction manual	Y V W A B D
11	<Option> None RS-485 Communication Digital input (DI1, DI2) Remote SV input + Digital input (DI3) Note 1 CT input + Digital input (DI1) Note 2 RS-485 communication + Digital input (DI1) RS-485 communication + Digital input (DI3, DI4, DI5) + Auxiliary alarm output (AL4, AL5)	Y M T H G V C
12	-	00
13	-	

Note 1: When using current for the remote SV input, add a 250-ohm resistor to the input terminal.
 Note 2: When using the CT input for heater burnout alarm, add one alarm output for it in the 9th code.

Motorized valve control type

Digit	Specifications	Code
1-4	<Front panel size W x H> 48 × 96 mm 96 × 96 mm	PXF5 PXF9
5	-	A
6	<Control output 1> Motorized valve control output (with PFB input) Motorized valve control output (without PFB input)	S V
7	<Control output 2> None	Y
8	<Revision code>	2
9	<Alarm output> None 1 point 2 points 3 points 2 points (independent common)	0 1 F M J
10	<Power supply voltage/instruction manual> 100 to 240 V AC, Japanese & English instruction manual 100 to 240 V AC, English instruction manual 100 to 240 V AC, Chinese & English instruction manual 24 V AC/DC, Japanese & English instruction manual 24 V AC/DC, English instruction manual 24 V AC/DC, Chinese & English instruction manual	Y V W A B D
11	<Option> None RS-485 communication + Digital input (DI1, DI2, DI3)	Y U
12	-	00
13	-	

Optional Items

Name	Model
Current detector (CT) 1 A to 30 A 20 to 100A	ZOZ#CCTL-6-S-H ZOZ#CCTL-12-S36-8
Terminal cover (note)	ZZPPXF1-B100
Parameter loader interface cable	ZZP#TQ501923C3
Shunt resistor (250 Ω±0.1%)	ZZPPXR1-A190

Note: For PXF9, two covers are necessary for one unit.

Scope of delivery

- Controller x 1
- Panel mounting adapter x 2
- Instruction manual x 1
- Water-proof packing x 1

INSULATION BLOCK DIAGRAM

● PXF4

Power supply		Internal circuit
Control output 1 (relay contact) or Motorized valve OPEN output		Process value input
		Remote SV input
		CT input
Control output 2 (relay contact) or Motorized valve CLOSE output		Control output 1 (SSR drive, current, voltage)
		Control output 2 (SSR drive, current, voltage)
Alarm output 1 (relay contact)	Alarm output 1 to 3 (relay contact)	Digital input 1 to 3
Alarm output 2 (relay contact)		Communication (RS-485)

When the 9th code is "J" (AL1 and AL2: independent common)
 When the 9th code is other than "J" (AL1 to AL3: shared common)

————— : basic insulation
 ———— : functional insulation
 - - - - - : no insulation

● PXF5, PXF9

Power supply		Internal circuit
Control output 1 (relay contact) or Motorized valve OPEN output		Process value input
		Remote SV input
		Current transformer (CT) input
Control output 2 (relay contact) or Motorized valve CLOSE output		Valve position feedback (PFB) input
		Control output 2 (SSR drive, current, voltage)
Alarm output 4 and 5 (relay contact)		Control output 2 (SSR drive, current, voltage) or re-transmission output
Alarm output 1 (relay contact)	Alarm output 1 to 3 (Relay contact)	Digital input 1 to 3
Alarm output 2 (relay contact)		Communication (RS-485)

· When the 9th code is "J" (AL1 and AL2: independent common)
 · When the 9th code is other than "J" (AL1 to AL3: shared common)

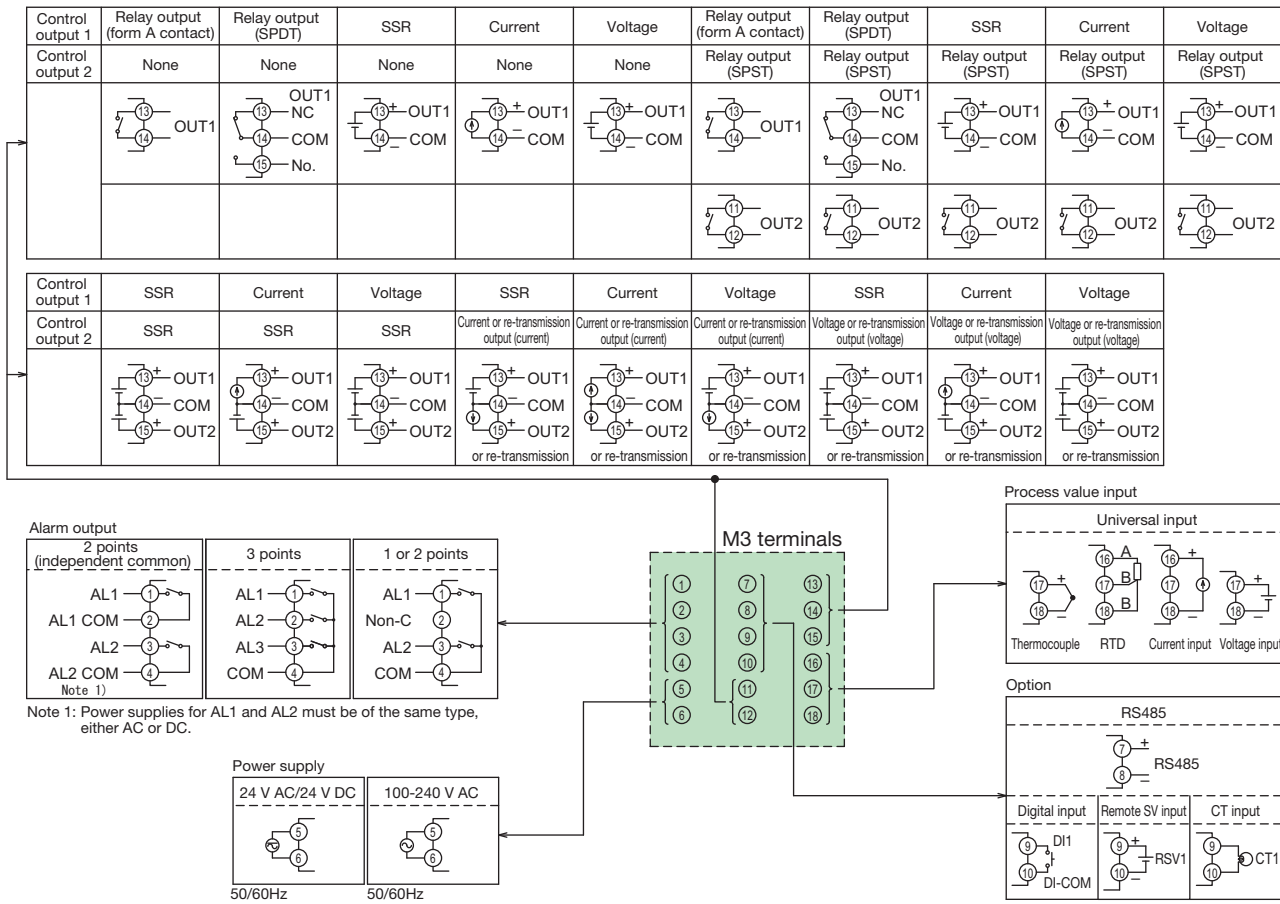
————— : basic insulation
 ———— : functional insulation
 - - - - - : no insulation

CONNECTION DIAGRAM

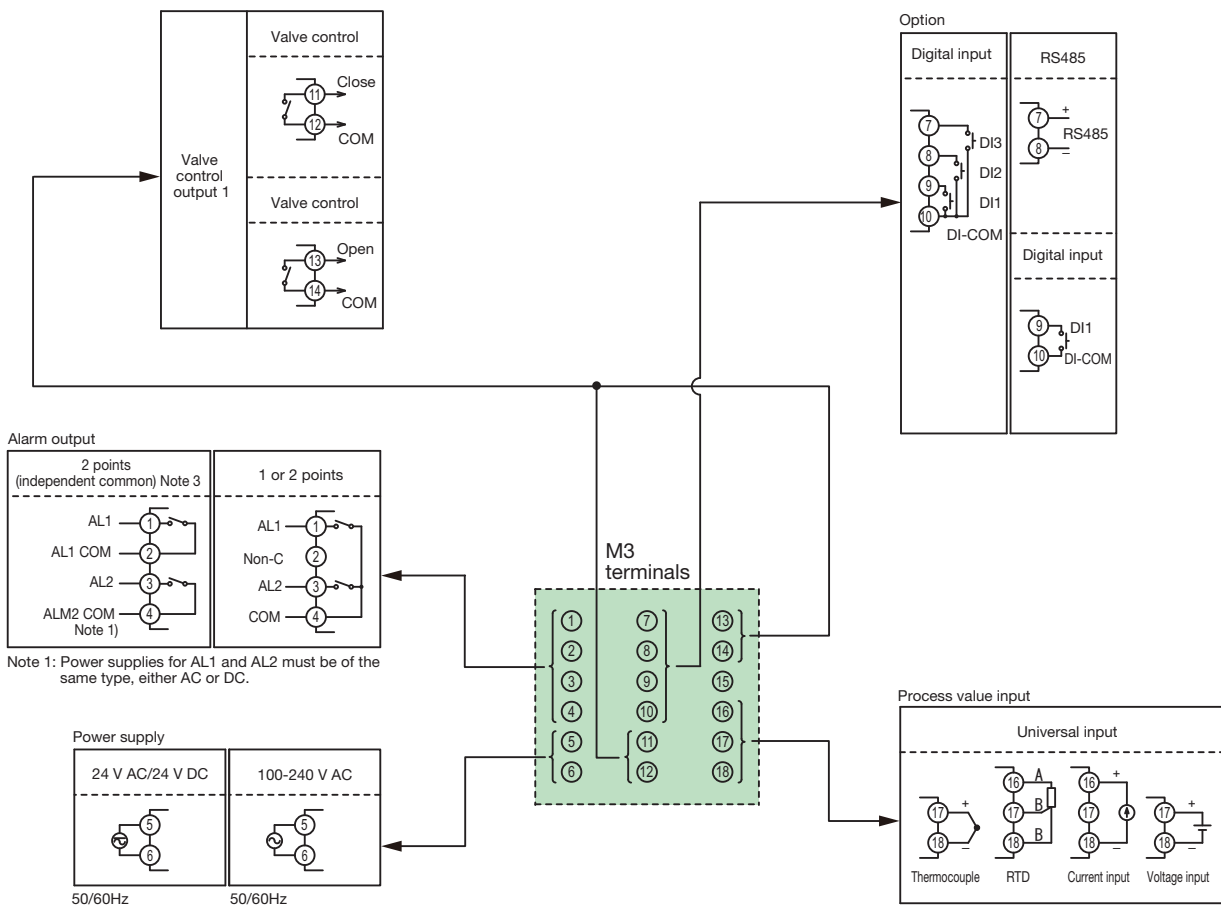


48 x 48 mm <PXF4>

Standard type



Motorized valve control type



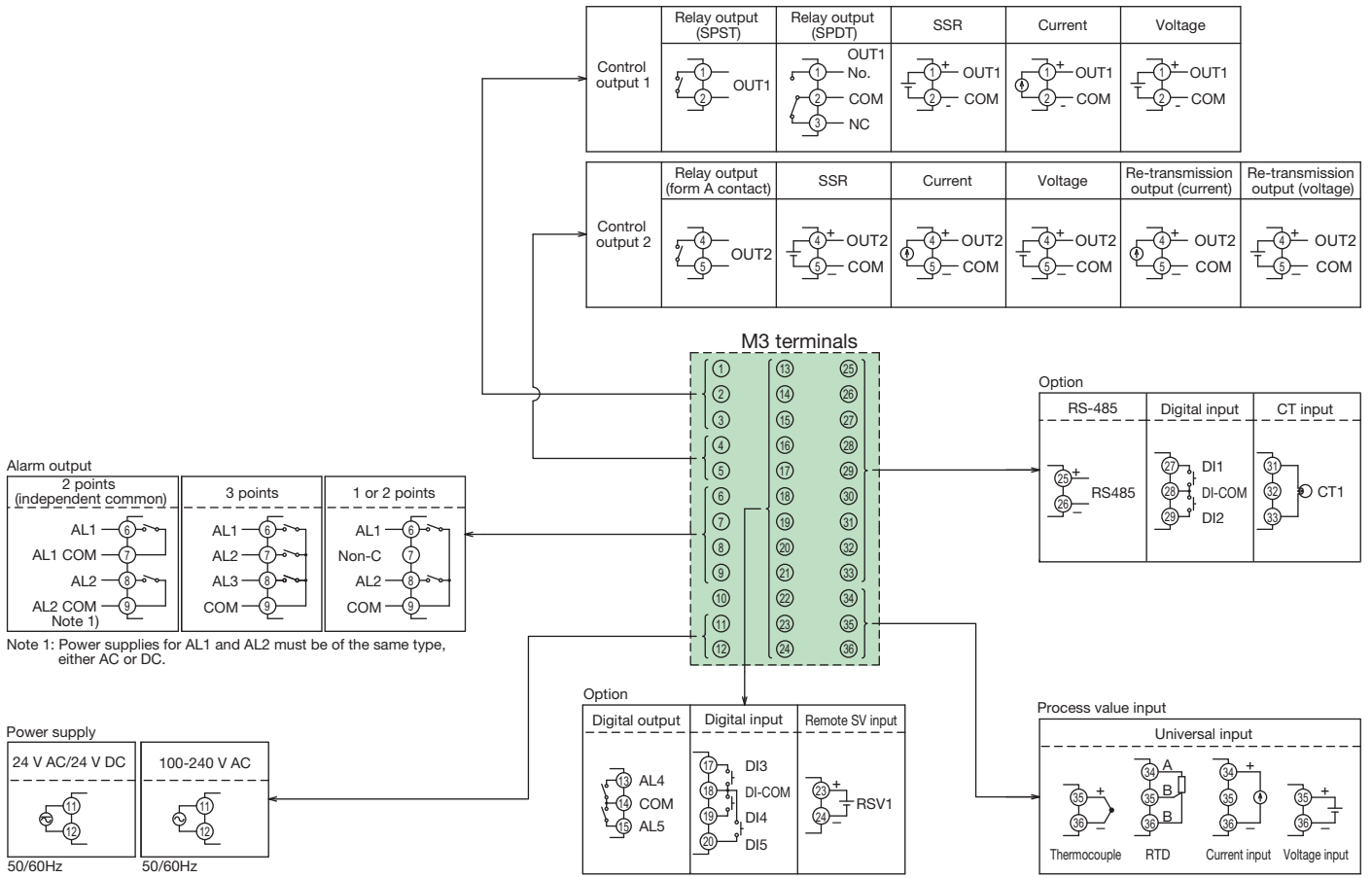
Standard type



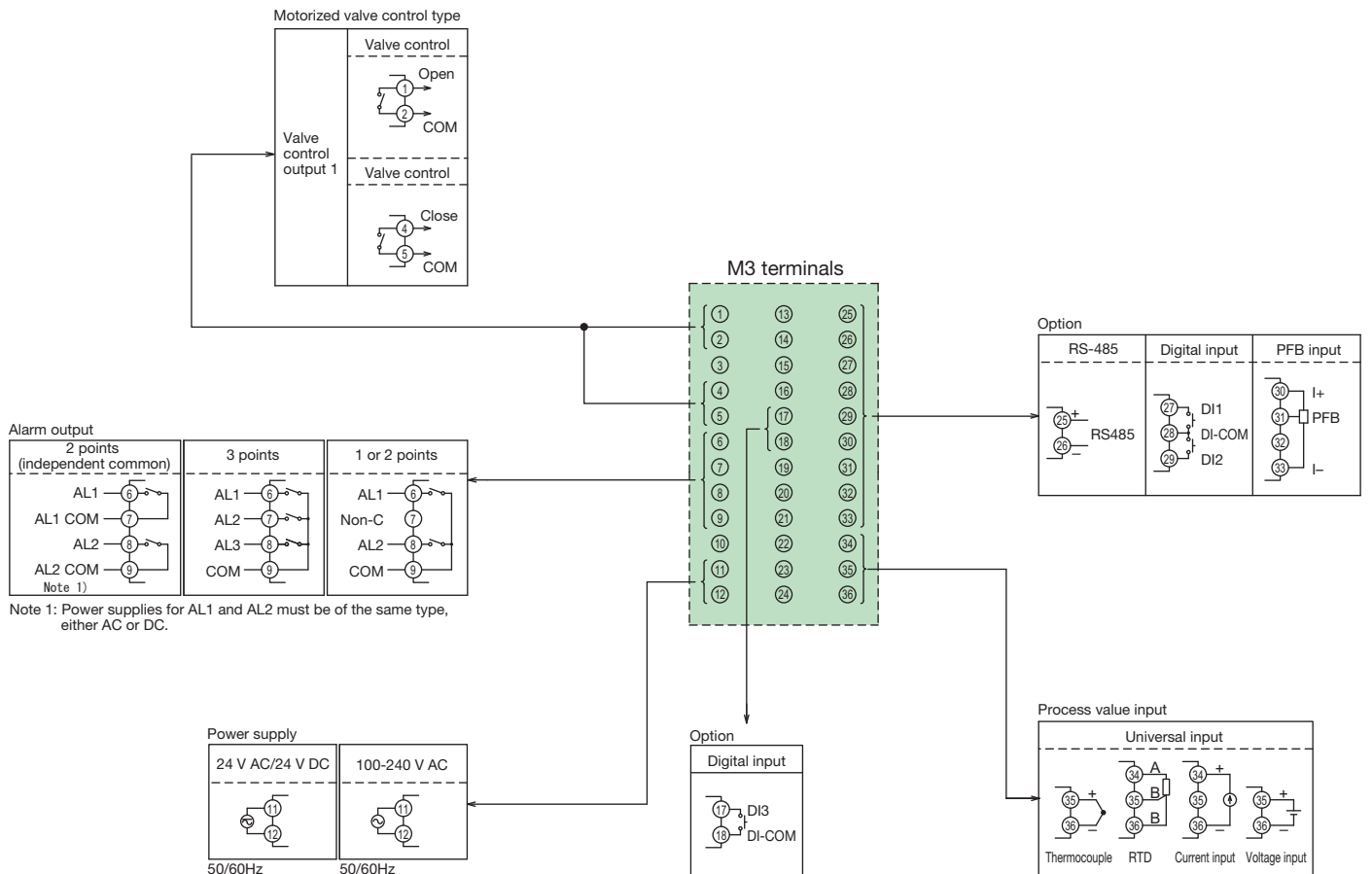
48 x 96 mm <PXF5>



96 x 96 mm <PXF9>

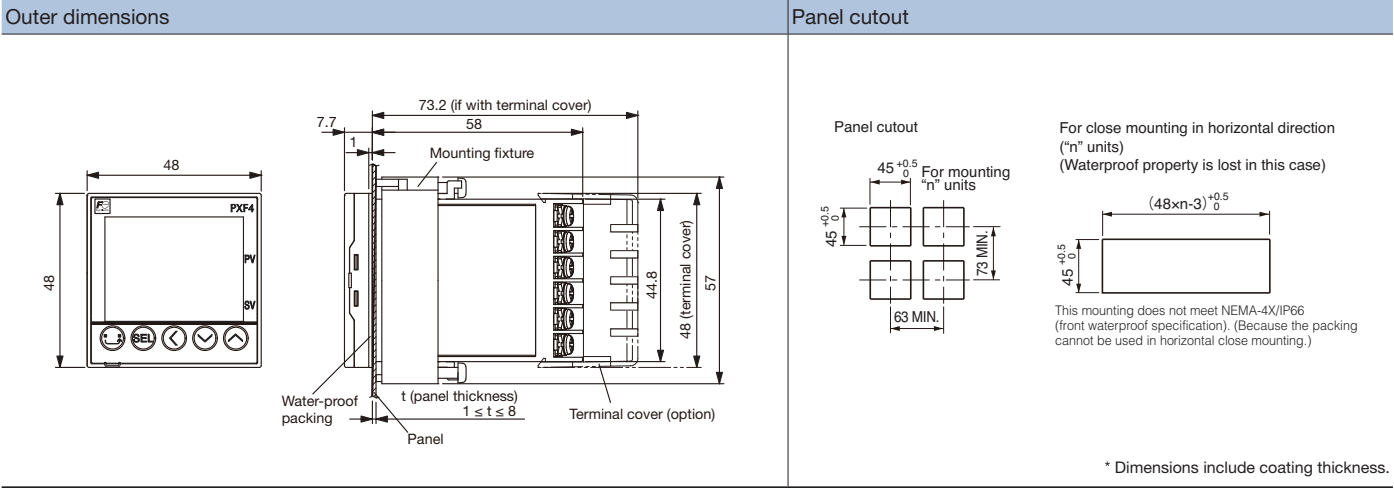


Motorized valve control type

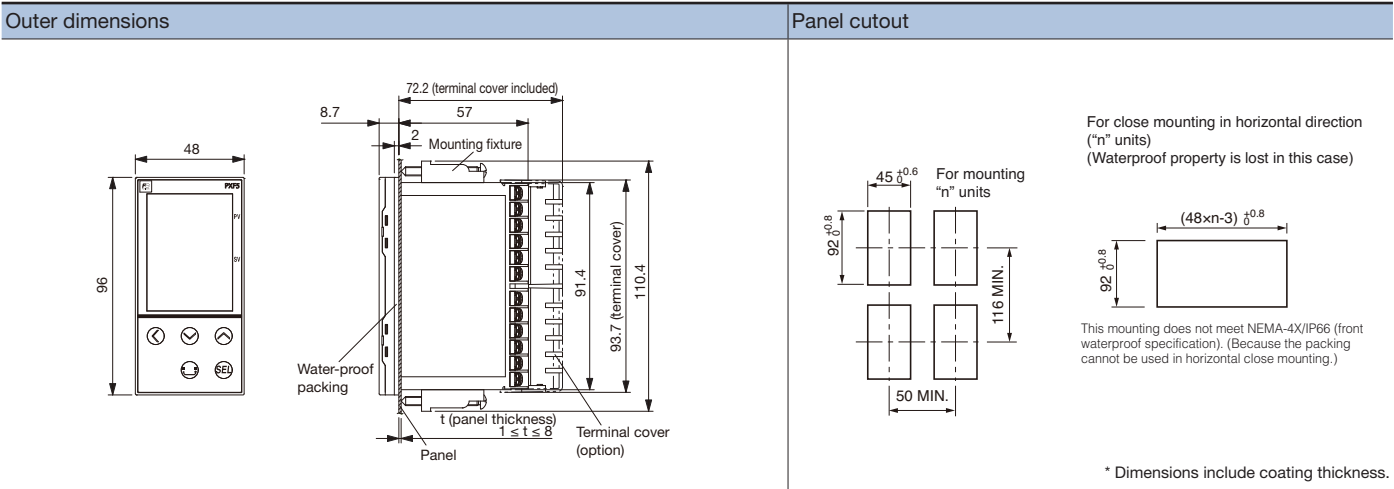


OUTLINE DIAGRAM

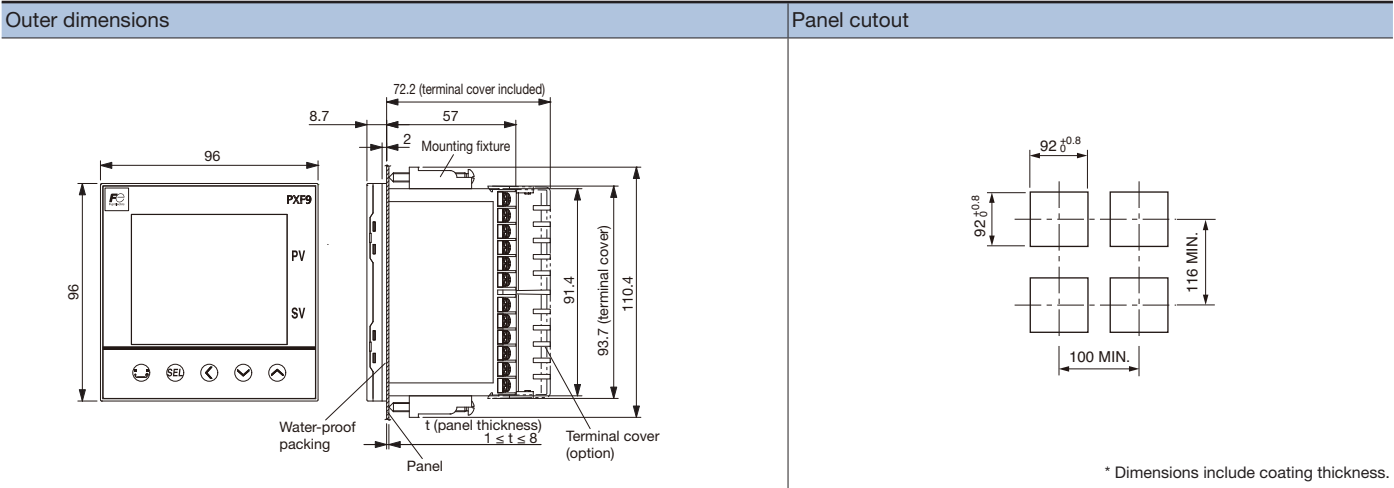
PXF4



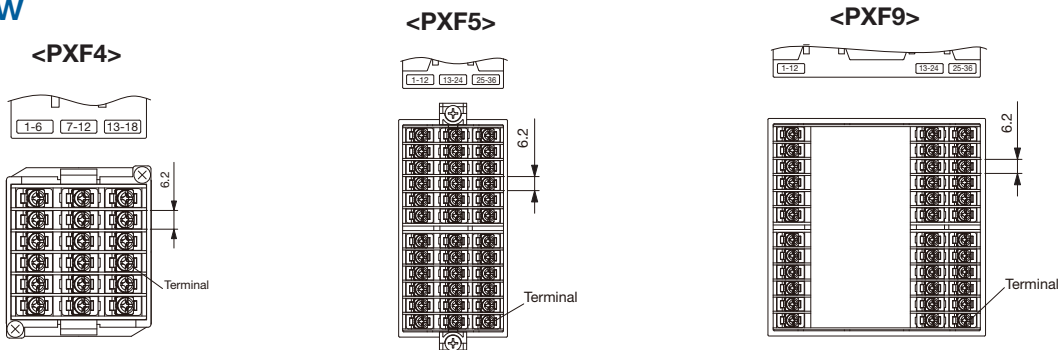
PXF5



PXF9



Rear view



Related products

Module type temperature controllers (PUM)

Efficient solution that meets your expectations

Smart

- Up to 64 control loops
- Heater break alarm
CT (8 points) per module

Sweet

- Detachable terminal
- Bilingual loader
- Simple loader operation

Speedy

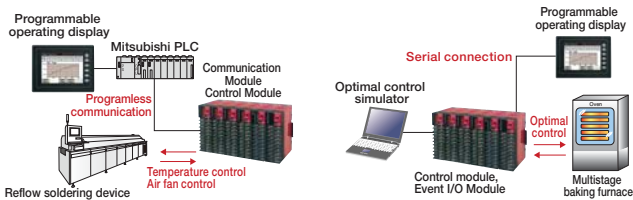
- High-speed data communication (RS485/230.4 kbps)
- High-speed data sampling (200 m/s)

Wide selection of modules



- Control Module
- Event input/output
- Analog input/output
- Analog input
- Analog output
- CC-LINK communication
- Mitsubishi PLC communication
- PROFIBUS
- Ethernet

Application examples



24 x 48 mm sized Temperature Controller (PXR3)

Various functions in compact body



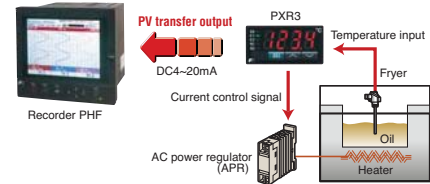
DIN rail mounting



- Front dimension 24x48 mm
- Multiple input: RTD, thermocouple, voltage/current
- Heating/cooling control
- Optional functions: Alarm output, 8-step ramp doak, re-transmission output, RS-485 communication, digital input

Optional DIN rail mounting adapter allows you to mount PXR3 to DIN rail or wall.

Re-transmission output in 4 to 20 mA DC



Socket type Temperature Controller PXR4

Easy maintenance

Just fitting into a socket



Easy wiring and installation!



Detachable structure of socket and controller enables you to:

- Perform wiring on new socket previously
- Replace controllers without wiring work

- 48 x 48 mm sized front panel with large display
- DIN rail mounting available
- PID auto tuning, self tuning, fuzzy control provided as standard
- Three type of control output: relay contact, SSR/SSC, current
- Two alarm outputs (optional), 8-step ramp soak (optional)

Digital Temperature Controller (PXE4)

Slim! Easy operation! Compact



(Size:48x48mm)

Input signal 1point

Capable of changing over temperature type (resistance-bulb, 9 types of thermocouples) with front key.

Control output 1point

Relay contact output, SSR/SSC drive output, ON/OFF control and Fuzzy control (with auto-tuning)

- Designed for simplicity and ease-of-use
- Thin panel: 1.6 mm
- Short depth: 62 mm
- Alarm output up to 2 points
- Standby and soft-start functions
- Front water proof structure (IP66)

SPECIAL ATTENTION NEEDED for all Digital Temperature Controllers

(Please read carefully the following instructions.)

Over-temperature Protection

Any control system design should take into account that any part of the system has the potential to fail.

For temperature control systems, continued heating should be considered the most dangerous condition, and the machine should be designed to automatically stop heating if unregulated due to the failure of the control unit or for any other reason.

The following are the most likely causes of unwanted continued heating:

- 1) Controller failure with heating output constantly on
- 2) Disengagement of the temperature sensor from the system
- 3) A short circuit in the thermocouple wiring
- 4) A valve or switch contact point outside the system is locked to keep the heat switched on.

In any application where physical injury or destruction of equipment might occur, we recommend the installation of independent safety equipment, with a separate temperature sensor, to disable the heating circuit in case of overheating.

The controller alarm signal is not designed to function as a protective measure in case of controller failure.

Caution on Safety

* Before using products in this catalog, be sure to read their instruction manuals in advance.

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