ZSeries Digital Temperature Controller
Micro Controller **PXR** Series

PXR-9

PXR-5

PXR-4

Micro Controller PXR

［1］ Features

Large LED
Compact
Multi functions

PXR9
[96✗96mm]

PXR5
[48✗96mm]

PXR4
[48✗48mm]

PXR3
[24✗48mm]

option	RS485 communication	Digital input	Alarm 2 points	Heater burnout	Heating/cooling control function	Ramp/soak function	Re-Transmission

Large LED display

Further enlarged

Visibility excellent
even at a distance!

PXW4 (Existing model)

PXR4

Character height			
	PXR3	PXR4 PXR5	PXR9
PV display	11mm	13mm	20mm
SV display		11mm	12mm

Short depth

More compact

Helpful for designing of small and thin panels and equipments.

PXW4 (Existing model)

14.2mm

PXR4

PXW5 (Existing model)

22mm

PXR5
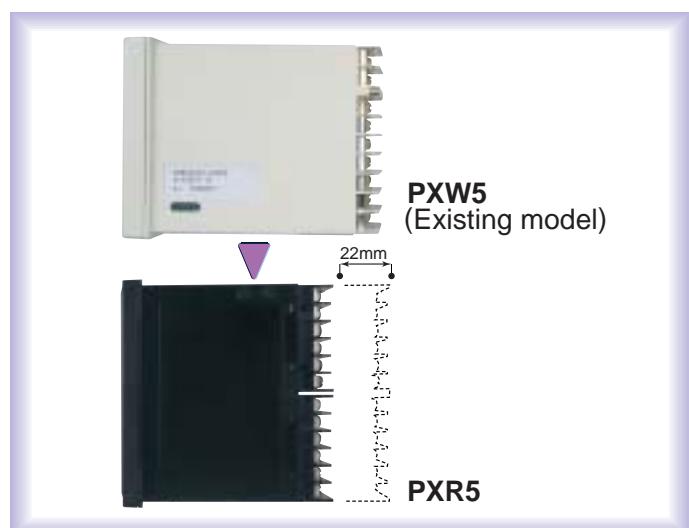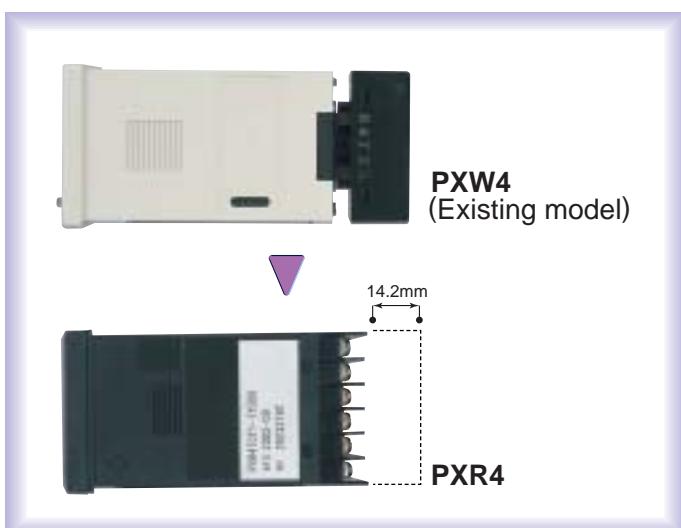
Front waterproof structure (standard)

The front display and operation section is waterproof in conformity with NEMA-4X:IP66. So the front panel is washable with water. (Use of the attached packing for waterproof is required.)

DIN rail mounting (PXR3)

Mountable to a DIN rail using the DIN rail mounting adapter available at option.
With this adapter, also mountable to a wall.

Terminal block protecting cover (PXR4)

Terminal cover

The terminal block can be protected with the terminal cover available at option.

Diversified control and tuning functions (standard)

Simple ON/OFF control, PID with auto tuning, fuzzy PID with auto tuning and PID with self-tuning are standard with PXR.

● **Self-tuning**
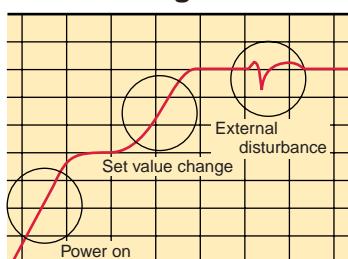
External disturbance

Set value change

Power on

At power on, changing a set value or during external disturbance, tuning is made automatically so that the PID parameters are reoptimized

Note: For some objects to control, PID values could not be optimized.

● **Fuzzy control**

Overshoot   External disturbnce
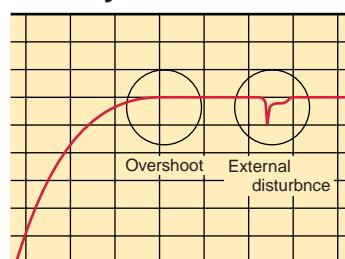
Suppresses the overshoot without wasting start up time. Also, quickly reverts to set points at the event of external disturbances

contents ▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶

Micro Controller PXR

［1］ Features

Various functions and abundant options *More functions*

Standard equipment

1 **Diverse control and tuning functions** ⋯ Capable of covering various controls within a wide range from simple ON/OFF control to fuzzy PID control.

2 **Front waterproof structure (conforming with NEMA-4X:IP66)** ⋯ The front panel is washable with water.

Optional functions

1 **Re-transmission output in 4 to 20 mA DC** ⋯ PV (process value), SV (set value) and MV (manipulated output value) can be transferred to other measuring instrument.

2 **8-step ramp/soak function** ⋯ Allows use as a simple programmable controller with a set value program.

3 **RS-485 communication** ⋯ Selectable between MODBUS protocol and Z-ASCII (Fuji's original).

4 **Digital input** ⋯ SV (set value) is selectable and various events are executable by external switches, etc.

5 **Heating and cooling control** ⋯ Applicable to even a self-heating process.

6 **Heater burnout alarm** ⋯ Equipment damage can be prevented.

7 **Various alarm function** ⋯ Delay action, excitation/non-excitation selection or latch function can be combined with alarm.

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1 **Re-transmission output in 4 to 20 mA DC**

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

- Output signal：4 to 20 mA DC
- Kinds of output：Any one of process value (PV), set value (SV), control output (MV) and PV-SV (DV)

PV transfer output
PXR3
Temperature input
DC4~20mA
Current control signal
Recorder PHR
Fryer
Oil
AC power regulator (APR)
Heater

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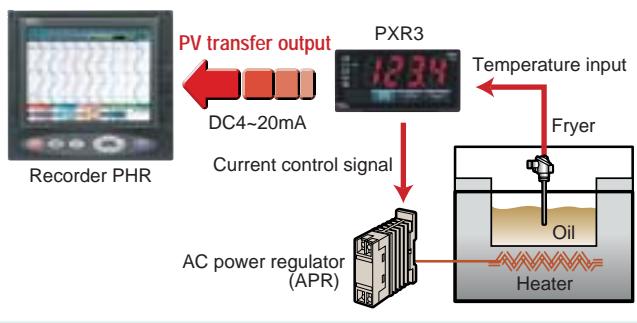
2 **8-step ramp/soak function**

Temperature gradient control of furnace ▶ ▶ ▶ For control in a heat pattern

Digital input
Ramp soak action command
ON: Start
OFF: Reset
Temperature input
Thermocouple
Furnace
SSR drive output
SSR
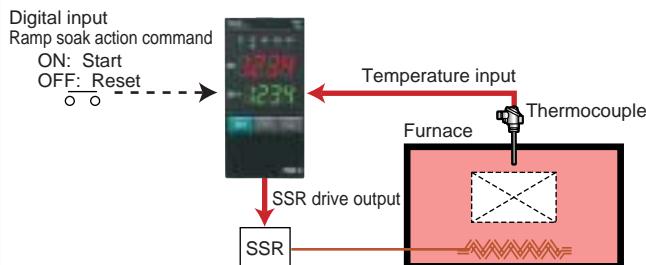
[Ramp soak function]
Temperature rise/fall pattern is controlled by setting a heat pattern having a gradient. Action start/resetting can be commanded externally.

Set value
SV-1 SV-2 SV-3 SV-4 SV-5 SV-6 SV-7 SV-8
Time

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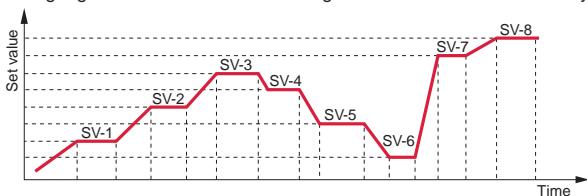
3 **RS-485 communication**

Via the RS-485 interface, PXR is connectable with a computer, programmable operation display and PLC.

Compute
SCADA software
Citect™ 5 usable
Programmable operation display
Fuji's UG series
RS232C
Signal converter
Max. 30 controllers connectable
RS485
PXR3   PXR4   PXR5   PXR9

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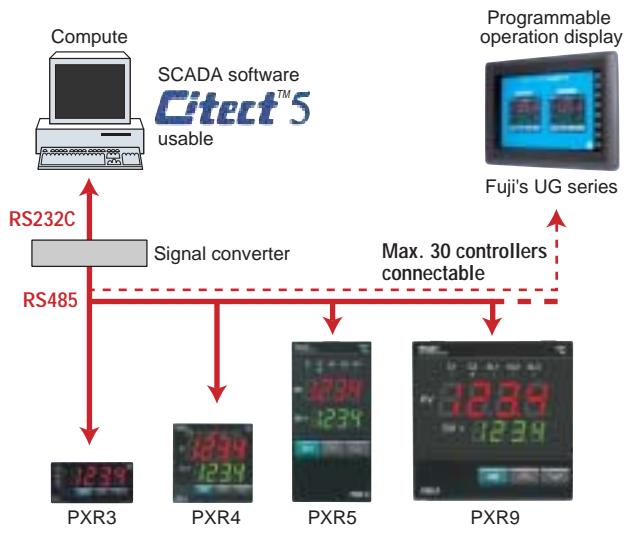
4 **Digital input**

Temperature control of oven ▶ ▶ ▶ For changing set value readily

Digital input
Set value change command
SSR drive output
SSR drive output
SSR   SSR
Changeover of 4 set values (front SV, SV1 to 3) can be commanded externally.
Oven
Temperature input
Temperature input
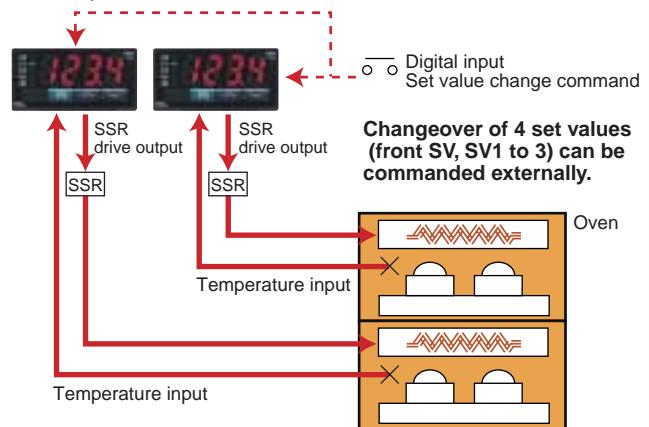
5 Heating and cooling control

For control of both heating and cooling with a single controller

Heating and cooling outputs can be overlapped with each other or a dead band can be provided.

Temperature input

Output

Heating | Cooling

Heat /cool dual output

Sterilizer

Water

Steam
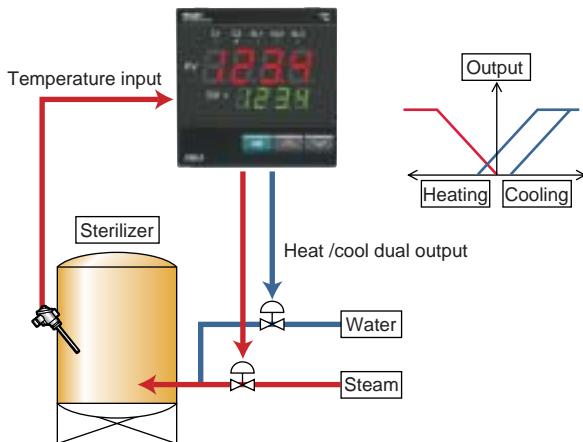
[Energy saving in cattle shed]

- 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.

Temperature input signal

Room temperature

Motor of cooling fan

M

Current output

Inverter

Current output

To heater in shed

Heater power supply

Cattle shed

APR
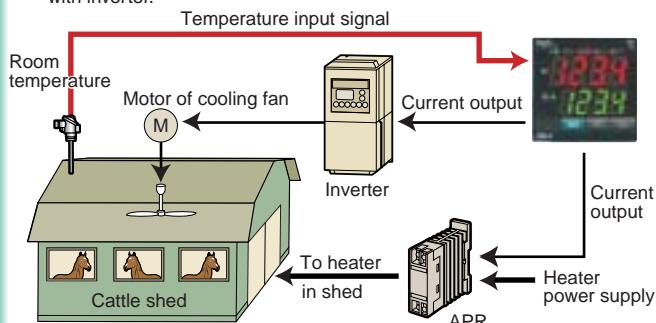
6 Heater burnout alarm

Alarm output will be issued when heater burnout is detected.

Power supply
100 to 240V AC, 50/60Hz

11 12 Power supply

Control output 1

32
33

7
10

Heater burnout alarm output

MG SW

3 4

35 36

Electromagnetic switch

Current transformer (CT)

Thermocouple

Heater

Electric furnace

} Wired to PXR (with no polarities)

Wired to heater (through hole in CT)
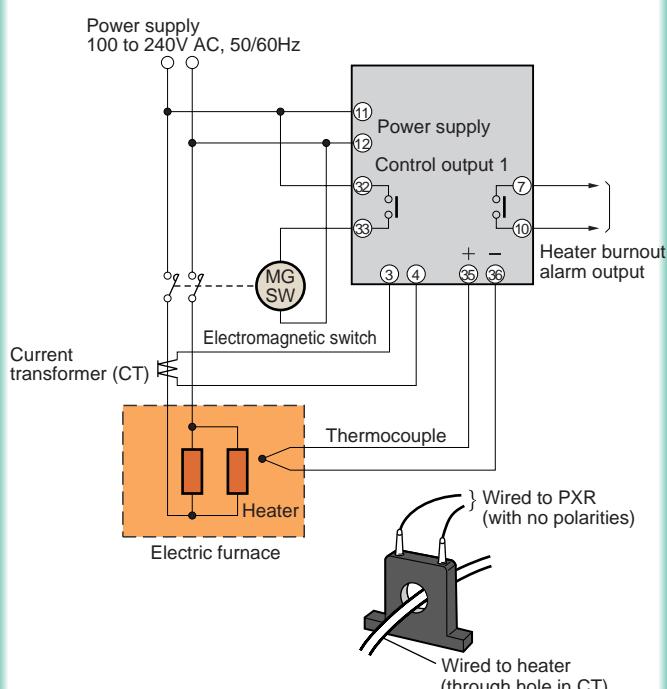
7 Various alarm function

Max. 2 points are settable.

	Kind of alarm	Action diagram
Absolute value alarms	Upper-limit absolute alarm	AL1 AL2 → PV
	Lower-limit absolute alarm	AL1 AL2 → PV
	Upper-limit absolute alarm (with hold)	AL1 AL2 → PV
	Lower-limit absolute alarm (with hold)	AL1 AL2 → PV
Deviation value alarms	Upper-limit deviation alarm	AL1 AL2 SV → PV
	Lower-limit deviation alarm	AL1 AL2 SV → PV
	Upper and Lower limits deviation alarm	AL1 AL1 AL2 AL2 SV → PV
	Upper-limit deviation alarm (with hold)	AL1 AL2 SV → PV
	Lower-limit deviation alarm (with hold)	AL1 AL2 SV → PV
	Upper and Lower limits deviation alarm (with hold)	AL1 AL1 AL2 AL2 SV → PV
Range alarms	Range upper and lower limits deviation (ALM1/2 independent operation)	AL1 AL1 AL2 AL2 SV → PV
	Range upper and lower limits absolate value	AL2 AL1 → PV
	Range upper and lower limits deviation	AL2 AL1 SV → PV
	Rnge upper limit absolute value and lower limit deviation	AL2 SV AL1 → PV
	Range upper limit deviation and lower limit absolute value	AL1 AL2 SV → PV

8 Temperature control of plastic molding machine

For stable temperature. Fuzzy + PID control applicable

Start/stop of auto tuning can be commanded externally.

Digital input
Auto tuning command
ON: Start
OFF: Stop

Temperature alarm

PV | Tuning action
SV
ON | ON

Temperature input

SSR | SSR

Plastic molding machine

Raw material

Temperature input

Heater

Micro Controller PXR
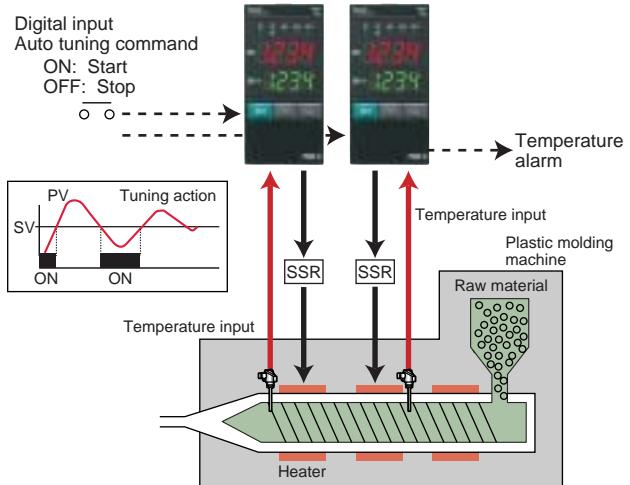
[2] Products range

Type			PXR3	PXR4	PXR5	PXR9
External dimensions	Front size		24✕48mm	48✕48mm	48✕96mm	96✕96mm
	Panel depth (with watertight packing)		97mm	78.8mm	78mm	79.5mm
Control method	ON/OFF		●	●	●	●
	PID with auto tuning		●	●	●	●
	Fuzzy PID with auto tuning		●	●	●	●
	PID with self-tuning		●	●	●	●
	Heating and cooling (PID,fuzzy PID)		●	●	●	●
Input signal	Resistance bulb	Pt100	●	●	●	●
	Thermocouple	J,K,R,B,S,T,E,N,PLⅡ	●	●	●	●
	Voltage/current	DC1~5V, DC4~20mA	●	●	●	●
Output signal	Control output1 (heating)	Relay contact	●	●	●	●
		SSR/SSC drive	●	●	●	●
		DC4~20mA	●	●	●	●
	Control output 2 (cooling)	Relay contact	●	●	●	●
		SSR/SSC drive	●	—	●	●
		DC4~20mA	●	—	●	●
Alarm output (option)			●(Max. 2 points)	●(Max. 3 points)	●(Max. 3 points)	●(Max. 3 points)
Heater burnout alarm (option)			—	●	●	●
8-step ramp soak (option)			●	●	●	●
RS-485 communication (option)			●	●	●	●
Digital input (option)			●(Max. 2 points)	●(Max. 2 points)	●(Max. 2 points)	●(Max. 2 points)
Re-transmission (4 to 20mA DC)			●	●	●	●
Remort-Setpoint			—	●	●	●
Power supply voltage	AC100~240V 50/60Hz		●	●	●	●
	DC24V, AC24V 50/60Hz		●	●	●	●
Front waterproof structure			●	●	●	●
External terminal structure			Plug-in terminal	M3 screw terminal	M3 screw terminal	M3 screw terminal
DIN rail mounting			●	—	—	—
Terminal cover			—	●	●	●
Applicable standards	UL, C-UL		●	●	●	●
	CSA		●	●	●	●
	CE mark		●	●	●	●

■Others

DIN rail mounting type (48✕48mm)	72✕72mm size
See PXW4, PXZ4 and PXV4 on page 22.	See PXW7, PXZ7 on page 22.

[3] PXR Ordering code

24×48mm Size

Digit	Specification	Note	4 5 6 7 8 - 9 10 11 12 13 - 14
4	**<Size of front H x W>**		
	24 × 48 mm		3
5	**<Input signal>**		
	Thermocouple °C		T
	Thermocouple °F		R
	RTD Pt100Ω 3-wire type °C		N
	RTD Pt100Ω 3-wire type °F		S
	1 to 5V DC		A
	4 to 20mA DC		B
6	**<Control output 1>**		
	Relay contact output		Y
	SSR/SSC driving output		A
	4 to 20mA DC output		C
			E
7	**<Control output 2>**		
	None		Y
	Relay contact output	Note 1	A
	SSR/SSC driving output	Note 1	C
	4 to 20mA DC output	Note 1	E
8	**<Revision code>**		1
9	**<Optional specifications 1>**		
	None		0
	Alarm 1 point		1
	8 ramp/soak		4
	Alarm 1 point + 8 ramp/soak		5
	Alarm 2 point	Note 2	F
	Alarm 2 point + 8 ramp/soak	Note 2	G
10	**<Instruction Manual> <Power supply voltage>**		
	None 100 to 240V AC		N
	Japanese 100 to 240V AC		Y
	English 100 to 240V AC		V
	None 24V AC/24V DC		C
	Japanese 24V AC/24V DC		A
	English 24V AC/24V DC		B
11 12 13	**<Optional specifications 2>**		
	None		0 0 0
	RS-485 Modbus interface		M 0 0
	RS-485 Z-ASCLL interface		N 0 0
	Re-transmission + Digital input 1 point	Note 3	Q 0 0
	Re-transmission	Note 3	R 0 0
	Digital input 2 points		T 0 0
	RS-485 Modbus interface + Digital input 1 point		V 0 0
	RS-485 Z-ASCLL interface + Digital input 1 point		W 0 0
14	**<Non-standard specification>**		
	Non-standard parameter setting		F

Note 1: Process alarm (2 points) (the codes " F and G " in the 9th digit) cannot be specified.
Note 2: Control output 2 (the codes " A, C, and E " in the 7th digit) cannot be specified.
Note 3: Control output 2, communication digital input (2 points), alarm (2 points), and 24V power supply (the codes " A, C and E " in the 7th digit, " F and G " in the 9th digit, and " A, B, and C " in the 10th digit) cannot be specified.

48×48mm Size

Digit	Specification	Note	4 5 6 7 8 - 9 10 11 12 13
4	**<Front dimensions>**		
	48 × 48 mm Screw-terminal type		4
5	**<Input signal>**		
	Thermocouple °C		T
	Thermocouple °F		R
	Resistance bulb Pt100 3-wire type °C		N
	Resistance bulb Pt100 3-wire type °F		S
	1 to 5V DC		A
	4 to 20mA DC		B
6	**<Control output 1>**		
	Relay contact output		A
	SSR/SSC driving output		C
	4 to 20mA DC output	Note 1	E
7	**<Control output 2>**		
	None		Y
	Relay contact output	Note 2	A
	SSR/SSC driving output		C
	4 to 20mA DC output		E
	Re-transmission (4 to 20mA DC)		R
8	**<Revision code>**		1
9	**<Optional specifications 1>**		
	None		0
	Alarm 1 point		1
	Alarm for heater break	Note 3	2
	Alarm 1 point + Alarm for heater break	Note 3	3
	8 ramp/soak		4
	Alarm 1 point + 8 ramp/soak		5
	Alarm for heater break + 8 ramp/soak	Note 3	6
	Alarm 1 point + Alarm for heater break + 8 ramp/soak	Note 3	7
	Alarm 2 point		F
	Alarm 2 point + 8 ramp/soak		G
	Alarm 2 point + Alarm for heater break + 8 ramp/soak	Note 3	H
	Alarm 3 point		M
	R-SP	Note 3	D
	R-SP + Alarm 2 point	Note 3	P
10	**<Instruction Manual for><Power>**		
	None 100 to 240V AC		N
	Japanese 100 to 240V AC		Y
	English 100 to 240V AC		V
	None 24V AC/24V DC		C
	Japanese 24V AC/24V DC		A
	English 24V AC/24V DC		B
11 12 13	**<Optional specifications 2>**		
	None		0 0 0
	RS 485 (Modbus)		M 0 0
	RS 485 (Z-ASCII)		N 0 0
	Digital input (1 point)		S 0 0
	Digital input (2 point)	Note 4	T 0 0
	RS 485 (Modbus) + Digital input (1 point)		V 0 0
	RS 485 (Z-ASCII) + Digital input (1 point)		W 0 0

48×96mm Size 96×96mm Size

Digit	Specification	Note	4 5 6 7 8 - 9 10 11 12 13
4	**<Front dimensions>**		
	48 X 96mm Screw terminal type		5
	96 X 96mm Screw terminal type		9
5	**<Input signal>**		
	Thermocouple °C		T
	Thermocouple °F		R
	Resistance bulb Pt100 3-wire type °C		N
	Resistance bulb Pt100 3-wire type °F		S
	1 to 5V DC		A
	4 to 20mA DC	Note 1	B
6	**<Control output 1>**		
	Relay contact output		A
	SSR/SSC driving output		C
	4 to 20mA DC output		E
7	**<Control output 2>**		
	None		Y
	Relay contact output		A
	SSR/SSC driving output		C
	4 to 20mA DC output		E
	Re-transmission (4 to 20mA DC)		R
8	**<Revision code>**		1
9	**<Optional specifications 1>**		
	None		0
	Alarm 1 point		1
	Alarm for heater break	Note 2	2
	Alarm 1 point + Alarm for heater break	Note 2	3
	8 ramp/soak		4
	Alarm 1 point + 8 ramp/soak		5
	Alarm for heater break + 8 ramp/soak	Note 2	6
	Alarm 1 point + Alarm for heater break + 8 ramp/soak	Note 2	7
	Alarm 2 point		F
	Alarm 2 point + 8 ramp/soak		G
	Alarm 2 point + Alarm for heater break + 8 ramp/soak	Note 2	H
	Alarm 3 point		M
	R-SP	Note 2	D
	R-SP + Alarm 2 point	Note 2	P
10	**<Instruction manual> <Power supply voltage>**		
	None 100 to 240V AC		N
	Japanese 100 to 240V AC		Y
	English 100 to 240V AC		V
	None 24V AC/24V DC		C
	Japanese 24V AC/24V DC		A
	English 24V AC/24V DC		B
11 12 13	**<Optional specifications 2>**		
	None		0 0 0
	RS485 (Modbus) communication		M 0 0
	RS485 (Z-ASCII) communication		N 0 0
	Digital input 1 point		S 0 0
	Digital input 2 points	Note 3	T 0 0
	RS485 (Modbus) communication + Digital input 1 point		V 0 0
	RS485 (Z-ASCII) communication + Digital input 1 point		W 0 0

Note 1: Cannot be combined with heater break alarm.
(Nos. 2, 3, 6, 7 and H on the 9th digit cannot be specified.)
Note 2: Cannot be combined with RS485 + 1-point digital input.
(V00 and W00 on the 11, 12, and the 13th digits cannot be specified.)
Note 3: In the case of 2-point digital input, either of control output 2 or heater break alarm can be selected.
(2-point digital input, control output 2 + heater break alarm cannot be specified at the same time.)

The default settings of input signals, measured ranges, and setting values are shown below.

Thermocouple specified : Thermocouple K, Measured range: 0 to 400°C, Setting value: 0°C
Resistance bulb specified : Pt, Measured range: 0 to 150°C, Setting value: 0°C
Voltage, Current specified : Scaling: 0 to 100%, Setting value: 0%

In any case other than the description above, specify input signals and measured range.
The input signals for the thermocouple and the resistance bulb can be switched with the front panel keys.

The default settings of control action is reverse for control output 1 and direct for control output 2.
The reverse and direct actions can be switched with keys on the face panel.

Optional items

Contents	Model
Adaptor for Din rail	ZZP∗CTK368715P1
Terminal Cover	ZZP PXR1-A230
CT for heater bunout alarm	1~30A: ZOZ∗CCTL-6-S-H
	20~50A: ZOZ∗CCTL-12-S36-8F

Note 1: Cannot be specified with the alarm for heater break.
("2, 3, 6, or 7" cannot be specified for 9th digit.)
Note 2: Cannot be specified with the Alarm (1 pc.) + Alarm for heater break or Alarm (2 pcs.).
("3, 7, F, or G" cannot be specified for 9th digit.)
Note 3: Cannot be specified with the RS 485 + Digital input (1 pc.).
("V00" cannot be specified for 11th, 12th, or 13th digit.)
Note 4: In the case of 2-point digital input, either of control output 2 or heater break alarm can be selected.

Micro Controller PXR

［4］ Specifications

■General specifications

Power supply voltage	100 V (-15%) to 240 V (+10%) AC, 50/60 Hz or 24 V (±10%) AC 50/60 Hz, 24 V (±10%) DC
Power consumption	When using 100 V AC: 6 VA (PXR3),8 VA (PXR4),10 VA (PXR5,9) When using 220 V AC: 8 VA (PXR3),10 VA (PXR4),12 VA (PXR5,9) When using 24 V AC/DC: 8 VA (PXR3), 12VA (PXR4, 5, 9)
Insulation resistance	20 MΩ or more (500 V DC)
Dielectric strength	Power supply-ground ... 1500 V AC for 1 min Power supply-others ... 1500 V AC for 1 min Ground-relay output ... 1500 V AC for 1 min Ground-alarm output ... 1500 V AC for 1 min Others ... 500 V AC for 1 min
Input impedance	Thermocouple: 1 MΩ or more Voltage: 450 kΩ or more Current: 250 Ω (external resistor)
Allowable signal source resistance	Thermocouple: 100Ω or less Voltage: 1 kΩ or less
Allowable wiring resistance	Resistance bulb: 10Ω or less per wire
Reference junction compensation accuracy	±1°C (at 23°C)
Input value correction	±10% of measuring range
Set value correction	±50% of measuring range
Input filter	0 to 900.0 sec settable in 0.5 sec steps (first order lag filter)
Noise reduction ratio	Normal mode noise (50/60 Hz): 50 dB or more Common mode noise (50/60 Hz): 140 dB or more
Applicable standards	UL (UL873) CSA (C22.2 No.24-93) CE mark (LVD : EN61010-1, EMC : EN61326-1)

■Control function of standard type

Control action	PID control (with auto tuning, self-tuning) Fuzzy control (with auto tuning)
Proportional band (P)	0 to 999.9% of measuring range settable in 0.1% steps
Integral time (I)	0 to 3200 sec settable in 1 sec steps
Differential time (D)	0 to 999.9 sec settable in 0.1 sec steps
On/off action if P = 0. Proportional action when I, D = 0.	
Proportional cycle	1 to 150 sec settable in 1 sec steps Only for relay contact output or SSR/SSC drive output
Hysteresis width	0 to 50% of measuring range For On/off action only
Anti-reset windup	0 to 100% of measuring range Automatically validated at auto tuning
Input sampling cycle	0.5 sec
Control cycle	0.5 sec

■Input section

Input signal	Thermocouple : J, K, R, B, S, T, E, N, PLⅡ Resistance bulb : Pt100 Voltage, current: 1 to 5 V DC, 4 to 20 mA DC (Apply current input after connecting the furnished 250 Ω resistor to input terminal.)
Measuring range	See measuring range table
Burnout	For thermocouple or resistance bulb input Control output upper/lower are selectable

■Output section of standard type (control output 1)

Control output 1	Select one as follows Relay contact: SPDT contact: 220V AC/30V DC, 3A (resistive load) For PXR3, SPST contact Mechanical life 10 million operations (no load) Electrical life 100,000 operations (rated load) Minimum switching current 100mA (24V DC) For PXR3, 10 mA (5 V DC) SSR / SSC drive (Voltage pulse): ON: 17 to 25 V DC, For PXR3, 12 to 16 V DC OFF: 0.5V DC or less Max. current: 20mA or less 4 to 20mA DC: Allowable load resistance 600Ω or less For PXR3, 100 to 500 Ω

■Control functions of heating/cooling control type (option)

Control action	PID control (with auto tuning)
Heating side proportional band (P)	0 to 999.9 % of measuring range
Cooling side proportional band (P)	Heating side "P" × cooling side coefficient (Automatically set in auto tuning) Cooling side proportional band coefficient: 0 to 100.0 On/off action if P=0
Integral time (I)	0 to 3200 sec (common to heating and cooling sides)
Differential time (D)	0 to 999.9 sec (common to heating and cooling sides)
P,I,D=0:ON/OFF action (without dead band) for heating and cooling I,D=0:Proportional action	
Proportional cycle	1 to 150 sec For relay contact output or SSR/SSC drive output only
Hysteresis width	0.5% of measuring range common to heating and cooling sides, For On/off action only
Anti-reset windup	0 to 100% of measuring range Automatically validated at auto tuning
Overlap, dead band	± 50% of heating side proportional band
Input sampling cycle	0.5 sec
Control cycle	0.5 sec

■Output section of heating/cooling control type (control output 2) (option)

Control output 2	Select one as follows However, only relay contact is selectable for PXR4. Relay contact: SPST contact: 220V AC/30V DC, 3A (resistive load) Mechanical life 10 million operations (no load) Electrical life 100,000 operations (rated load) Minimum switching current 100mA (24V DC) For PXR3, 10 mA (5 V DC) SSR/SSC drive (Voltage pulse): ON: 17 to 25 V DC, For PXR3, 12 to 16 V DC OFF: 0.5V DC or less Max. current: 20mA or less 4 to 20mA DC: Allowable load resistance 600Ω or less For PXR3, 100 to 500 Ω

■Operation and display section

Parameter setting method	Digital setting by 3 keys With key lock function
Display	Process value/set value Selective display 4 digits, 7-segment LED
Status display LED	Control output, process alarm output (unavailable for PXR3)
Setting accuracy	0.1% or less of measuring range
Indication accuracy (at 23°C)	Thermocouple: ± (0.5% of measuring range) ± 1 digit ± 1°C For thermocouple R at 0 to 500°C ... ± (1% of measuring range) ±1 digit ±1°C For thermocouple B at 0 to 400°C ... ± (5% of measuring range) ±1 digit ±1°C Resistance bulb, voltage/current: ± (0.5% of measuring range) ±1 digit

■Alarm (option)

Alarm kind	Absolute alarm, deviation alarm, zone alarm with upper and lower limits for each Hold function available (see page 15) Alarm latch, Excitation/non-excitation selecting function provided
Alarm ON-delay	Delay setting 0 to 9999 sec settable in 1 sec steps
Process alarm output	Relay contact: SPST contact: 220 V AC/30 V DC, 1 A (resistive load) Mechanical life 10 million operations (no load) Electrical life 100,000 operations (rated load) Minimum switching current 100 mA (5 V DC) For PXR3, 10 mA (5 V DC). MAX 2 points (PXR3), MAX 3 points (PXR4, 5, 9) output cycle 0.5 sec

■ Heater burnout alarm (option, unavailable for PXR3)

Heater current detection (option), unavailable for PXR3	Current detector: CTL-6-S-H for 1 to 30 A / CTL-12-S36-8F for 20 to 50 A Current detection accuracy: ±10% of measuring range Alarm settable range: 1 to 50 A Available only when control output is relay contact or SSR/SSC drive. However, detection is possible when control output ON lasts 500 ms or longer.

Heater burnout alarm output unavailable for PXR3	Relay contact: SPST contact:
	220 V AC/30 V DC, 1 A (resistive load)
	  Mechanical life 10 million operations (no load)
	  Electrical life 100,000 operations (rated load)
	  Minimum switching current 100 mA (24 V DC)
	1 output, output updating cycle 0.5 sec

■ Digital input (option)

Points	1 or 2
Electrical specifications	5 V DC, approx. 2 mA (OFF judgment for 3 V DC or more, ON judgment for 2 V DC or less)
Input pulse width	Min. 0.5 sec
Function (any one settable)	Set value (front SV, SV1 to 3) changeover Control action start/stop Ramp/soak action start / reset Auto tuning start / stop Alarm latch cancel and built-in timer start

■ Timer function (option)

Start	By digital input
Setting	0 to 9999 sec settable in 1 sec steps
Action	Event ON-delay or OFF-delay
Signal output	Alarm output relay used. Up to 2 points available.

■ Communication function (option)

Physical specifications	EIA RS485
Communication protocol	Modbus™ RTU mode or PXR protocol (Z-ASCII)
Communication method	2 wire method. Half duplex bit serial, start-stop sync type.
Data type	8 bits. Parity: odd/even/none.
Communication rate	9600bps
Connection aspect	multi-drop/up to 32 controllers connectable including master station
Communication distance	Total extension 500 m or less.

RS232C / RS485 Signal converter (recommendation)	Isolated type
	  Manufacturer: RA Systems Corp. (Japan) Model: RC-77
	  http://www.ras.co.jp
	  Manufacturer: Line Eye Co., Ltd. (Japan) Model: SI-30A
	  http://www.lineeye.co.jp
	Non-isolated type
	  Manufacturer: System Sakom Co., Ltd. (Japan) Model: KS-485
	  http://www.sacom.co.jp

■ Re-transmission output function (option)

Output signal	DC 4-20mA
Load resistance	500Ω or less (PXR3), 600Ω or less (PXR4, 5, 9)
Output updating	500ms
Output accuracy	±0.3% FS (at 23°C)
Resolution	2000 or more
Kind of output signal	Any one among PV, SV, DV and MV (selectable by parameter)

■ Remote setpoint (option)

Input signal	1 to 5 V DC, 1 point
Accurcy	±0.5% ±1 digit (at 23°C)
Input sampling cycle	0.5 sec
Input scaling	Allowed
Display of remote mode	LED on Front panel
Input impedance	1MΩ or more
Allowable signal source resistance	1KΩ or less

■ Other functions

Parameter mask function	Parameter display is disabled by software.
Ramp/soak function (option)	Totally 8 ramps/8 soaks. 1 or 2 program patterns. Digital input allows to start/reset the action.

■ Power failure processing

Memory protection	Held by non-volatile memory

■ Self-check

Method	Program error supervision by watchdog timer

■ Operation and storage conditions

Ambient operating temperature	-10°C to 50°C
Ambient operating humidity	Less than 90% RH (no condensation)
Storage temperature	-20°C to 60°C

■ Optional items

Current detector (CT) (unavailable for PXR3)	For 1 to 30 A: CTL-6-S-H For 20 to 50 A: CTL-12-S36-8F (see page 17)
DIN rail mounting adapter (for PXR3)	ZZP*CTK368715P1 (for outline diagram, see page 11)
Terminal cover (for PXR4)	ZZPPXR1-A230 (for outline diagram, see page 11)
Instruction manual	For communication function (see list of related documents on page 10)

■ Structure

Mounting method	Panel flush mounting PXR3 can be mounted to rail/wall by using the DIN rail mounting adapter available at option.
External terminal	Plug-in terminal (PXR3) or M3 screw terminal (PXR4, 5, 9)
Case material	Plastic (non-combustible grade UL94V-0 equivalent)
Dimensions	See the outline diagram on page 11.
Weight	Approx. 150 g (PXR3), 200 g (PXR4), 300 g (PXR5), 300 g (PXR9)
Protective structure	Front waterproof structure: NEMA4X (IEC standard IP66 equivalent)(when mounted on panel with our genuine packing. Waterproof feature unavailable in close mounting of multiple units) Rear case: EC IP20
Outer casing	Black (front frame, case)

■ Scope of delivery

Scope of delivery	Controller, panel mounting bracket, front watertight packing, instruction manual, 250Ω resistor (for current input)

■ Measuring range table

input signal		measuring range(°C)	measuring range(°F)
resistance bulb	Pt100	-150 to 850	-238 to 1562
Thermocouple	J	0 to 800	32 to 1472
	K	0 to 1200	32 to 2192
	R	0 to 1600	32 to 2912
	B	0 to 1800	32 to 3272
	S	0 to 1600	32 to 2912
	T	-150 to 400	-238 to 752
	E	-150 to 800	-238 to 1472
	N	0 to 1300	32 to 2372
	PL II	0 to 1300	32 to 2372
DC voltage	1 to 5V	scaling range	-1999 to 9999
DC current	4 to 20mA		

Note 1: For current input connect the supplied 250Ω resister at the input terminal.

Note 2: When the measuring range exceeds 1000°C (1832°F), decimal point cannot be used.

Micro Controller PXR

［4］ Specifications

■ Insulation block diagram (PXR3, PXR5, PXR9)

Power supply	Process value input Heater current detector input Internal circuit
Relay contact control output 1	Voltage pulse, 4 to 20mA DC control output 1
Relay contact control output 2	Voltage pulse, 4 to 20mA DC control output 2 Re-Transmission Digital input (model with Re-Transmission)
Process alarm relay output 1	
Process alarm relay output 2	Communication (RS-485) Digital input (When transfer output is unused)
Heater burnout alarm output (excluding PXR3)	

(PXR4)

Power supply	Process value input Heater current detector input Internal circuit Voltage pulse, 4 to 20mA DC control output 1
Relay contact control output 1	
Relay contact control output 2	
Process alarm relay output 1	
Process alarm relay output 2	Communication (RS-485) Digital input
Heater burnout alarm output	

Note: Basic insulation (dielectric strength 1500 V AC) between blocks delimited by line ——— .
Functional insulation (dielectric strength 500 V AC) between blocks delimited by line - - - - .
Non isolated between blocks which are not delimited from each other.

■ Caution in use
Control output

Model	Voltage puls (for SSR drive)		DC 4 to 20 mA
	Voltage	Max. Current	Allowable load resistance
PXR3	15V DC	20mA	100 to 500Ω
PXR4, 5, 9	24V DC	20mA	600Ω or less
PXV3	5.5V DC	20mA	600Ω or less
PXV	24V DC	60mA	600Ω or less
PXW	24V DC	60mA	600Ω or less
PXZ	24V DC	60mA	600Ω or less

Differences from other models are listed at left. For replacement,
check is required to see if the specifications of control end are satisfied.

Mounting to DIN rail (PXR3 only)

Mountable to a DIN rail using the DIN rail mounting adapter
available at option. With this adapter, also mountable to a wall.

① Hook the top side.
② Push in the bottom side.

④ Mount PXR3
③ Connect wires to PXR3
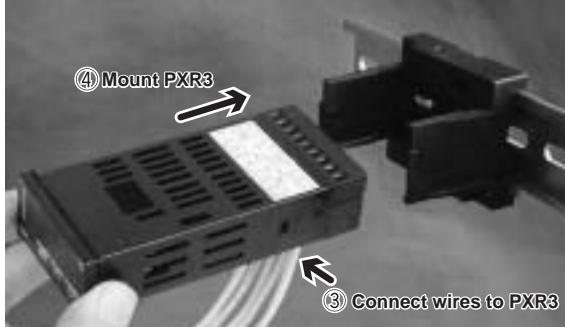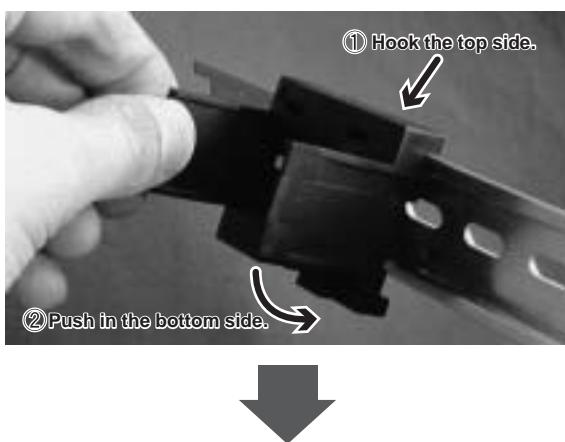
Terminal cover (PXR4)

The terminal block can be protected by the terminal cover
available at option.

Terminal cover
ZZPPXR1-A230
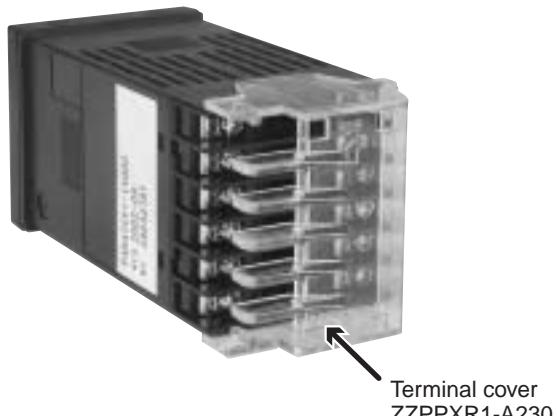
■ List of related documents

	PXR3	PXR4	PXR5	PXR9
Instruction manual	TN1PXR3-E	TN1PXR-E	TN1PXR5/9-E	
Operation manual	ECNO:409	ECNO:406		
Communication function manual	MODBUS	TN512642		
	Z-ASCⅡ	TN512644		

＊The above documents can be downloaded from our Internet home page.
http://www.fic-net.co.jp

［5］ Outline and Panel Cutout Dimensions

(unit: mm)

Type	Outline	Panel cut
PXR3		

Waterproof packing Mounting bracket

48 24 34.2 22 1 97 98 4

Panel thickness ($1 \leqq t \leqq 8$)

Panel cut

$45.0_{0}^{+0.5}$ $22.2_{0}^{+0.3}$ 50 MIN. 57 MIN.

For mounting close together (n controllers)

$(48 \times n\text{-}3)_{0}^{+0.5}$ $22.2_{0}^{+0.3}$

Note: Waterproof feature is unavailable if mounted close together.

Type	Outline	Panel cut

PXR4

Panel Mounting bracket (With terminal cover)

93.8 78.8 48 48 9 1 44.8 48

Waterproof packing t (Panel thickness) ($1 \leqq t \leqq 8$) Terminal cover (option)

$45_{0}^{+0.5}$ $45.0_{0}^{+0.5}$ 73MIN. $45.0_{0}^{+0.5}$ 63MIN.

For mounting close together (n controllers)

$(48 \times 5n\text{-}3)_{0}^{+0.5}$

Note: Waterproof feature is unavailable if mounted close together.

Note: If mounting close together is required at power supply voltage of 240 V AC, arrange the specifications so that more than 3 relay contact outputs will not be used.(Relay contact outputs include control outputs 1 and 2, process alarm outputs 1 and 2 and heater burnout alarm output.)

Type	Outline	Panel cut

PXR5

48 96 10 2 78 91.5 115.5 MAX.

Mounting bracket

Waterproof packing Panel t ($1 \leqq t \leqq 8$)

$45.0_{0}^{+0.6}$ $92_{0}^{+0.8}$ 116 MIN. 50 MIN.

For mounting close together (n controllers)

$(48 \times n\text{-}3)_{0}^{+0.8}$ $92_{0}^{+0.8}$

Note: Waterproof feature is unavailable if mounted close together.

Type	Outline	Panel cut

PXR9

96 96 10 2 79.5 91.5 115.5 MAX.

Mounting bracket

Waterproof packing Panel t ($1 \leqq t \leqq 8$)

$92_{0}^{+0.8}$ $92_{0}^{+0.8}$ 116 MIN. 100 MIN.

With PXR3 DIN rail mounting adapter (available at option)

52.4 45.4 2-ϕ4.3

DIN rail

DIN rail mounting adapter (option)

For mounting on wall

43.8 36.8 M4

109.2 105.5 9

PXR3... MFD. No.

Tightening torque 0.49 Nm or less
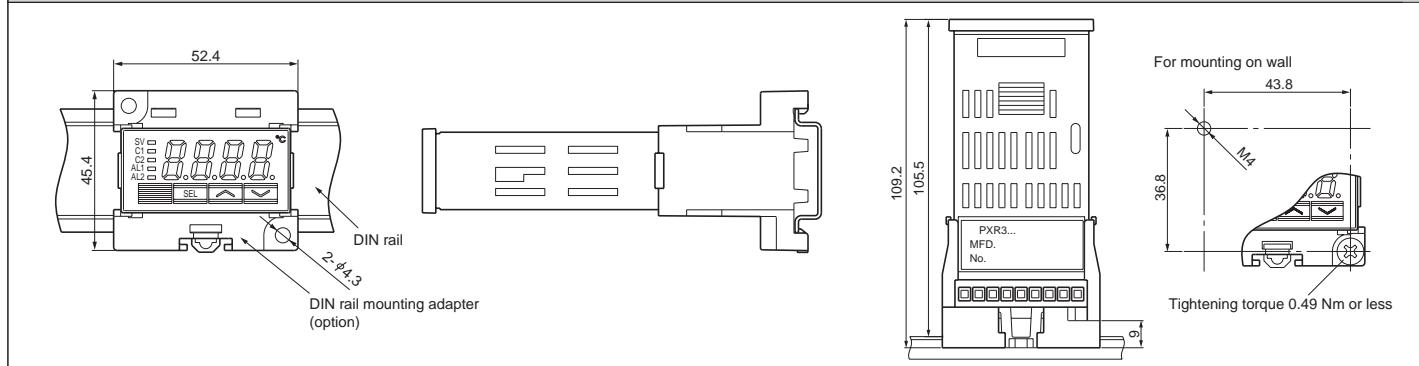
Caution on drilling in panel: In case of coating, etc. after drilling, the above dimensions must be followed in the finished status.

11

Micro Controller PXR

[6] External connection diagram

PXR3

Re-Transmission output

<Process alarm output 2 or Control output 2>

Relay contact output
4 to 20 mA DC output
SSR/SSC drive output

Digital input 2

Digital input 1

Communication RS-485

Usable wiring material

- Wire
  Type: Single Wire
  Gauge: AWG28 (0.1 mm^2) to AWG16 (1.25 mm^2)
  Strip-off length: 5 to 6 mm

AWG28 to AWG16

5 to 6mm

Resistance bulb input   Relay contact output   Process alarm output 1   Power supply 100 to 240V AC 50/60Hz

- Bar terminal
  Dimension of strip-off conductor section: 2 x 1.5 mm or smaller
  Length of strip-off conductor section: 5 to 6 mm

250Ω

4 to 20 mA DC input
Mount resistor to terminals between ② and ③

Thermocouple input

4 to 20 mA DC output

24V DC
24V AC 50/60Hz 8VA

1.5MAX.

2MAX.   5 to 6mm

1 to 5 V DC input

SSR/SSC drive output

<Control output 1>

PXR4

● **Without communication function**

Digital input

Common

Process alarm output 1

Process alarm output 2

Heater burnout alarm output or process alarm output 3

24V DC
24V AC 50/60Hz 12VA

Power supply 100~240V AC 50/60Hz

Relay contact output

<Control output 1>

4 to 20 mA DC output

SSR/SSC drive output

Note 1: SSR/SSC drive output and 4 to 20 mA DC output are not electrically insulated from internal circuit. Use a non-grounded sensor.

Resistance bulb input   <Process variable input>

1 to 5 V DC input

250Ω

4 to 20 mA DC input

Mount resistor to terminals between ⑰ and ⑱

Thermocouple input

Re-transmission output   4 to 20mA output   SSR/SSC drive output   Relay contact output   <Control output 2>   Heater current detector input   R-SP input

<Digital input (2 point)>

Digital input 1

Digital input 2

Relay contact output   <Control output 2>   Heater current detector input   R-SP input

● **With communication function**

Communication RS-485

Common

Process alarm output 1

Process alarm output 2

Heater burnout alarm output or process alarm output 3

24V DC
24V AC 50/60Hz 12VA

Power supply 100~240V AC 50/60Hz

Relay contact output

<Control output 1>

4 to 20 mA DC output

SSR/SSC drive output

Note 1: SSR/SSC drive output and 4 to 20 mA DC output are not electrically insulated from internal circuit. Use a non-grounded sensor.

Resistance bulb input   <Process variable input>

1 to 5 V DC input

250Ω

4 to 20 mA DC input

Mount resistor to terminals between ⑰ and ⑱

Thermocouple input

Re-transmission output   4 to 20mA output   SSR/SSC drive output   Relay contact output   <Control output 2>   Digital input   Heater current detector input   R-SP input

< use M3 screw >

● **Without communication function**
< Non digital input or with digital input (1 point) >

Digital input 1

① ②

R-SP input ③ ④ CT input

<Control output 2>

Re-trans-mission output + ⑤ − ⑥

4~20mA DC output + ⑤ − ⑥ SSR/SSC drive output

+ ⑤ − ⑥ Relay contact output

Process alarm output Common ⑦
Process alarm output 1 ⑧
Process alarm output 2 ⑨
Heater burnout alarm output 3 or process alarm output 3 ⑩

24V DC 24V AC 50/60Hz + ⑪ − ⑫ Power supply 100~240V AC 50/60Hz

③① ③② ③③ ③④ ③⑤ ③⑥ Relay contact output

Resistance bulb input Ā B B Thermocouple input

Note 1: Mount supplied resistor to terminals between ③⑤ and ③⑥

<Control output 1>

③① + ③② − 4~20mA DC output

③① + ③② − SSR/SSC drive output

+ − 1~5V DC (Note 1) 250Ω + − 4~20mA DC

<Process variable input>

● **Without communication function**
< With digital input (2 point) >

Digital input 1 ① ②
Digital input 2 ③ ④

<Control output 2>

Re-trans-mission output + ⑤ − ⑥

4~20mA DC output + ⑤ − ⑥ SSR/SSC drive output + ⑤ − ⑥ Relay contact output + ⑤ − ⑥

R-SP input + ⑤ − ⑥ CT input ⑤ ⑥

Process alarm output Common ⑦
Process alarm output 1 ⑧
Process alarm output 2 ⑨
Heater burnout alarm output 3 or process alarm output 3 ⑩

24V DC 24V AC 50/60Hz + ⑪ − ⑫ Power supply 100~240V AC 50/60Hz

③① ③② ③③ ③④ ③⑤ ③⑥ Relay contact output

Resistance bulb input Ā B B Thermocouple input

Note 1: Mount supplied resistor to terminals between ③⑤ and ③⑥

<Control output 1>

③① + ③② − 4~20mA DC output

③① + ③② − SSR/SSC drive output

+ − 1~5V DC (Note 1) 250Ω + − 4~20mA DC

<Process variable input>

● **With communication function**

Communication RS-485 + ① − ②

R-SP input + ③ − ④ CT input ③ ④ Digital input

<Control output 2>

Re-trans-mission output + ⑤ − ⑥

4~20mA DC output + ⑤ − ⑥ SSR/SSC drive output + ⑤ − ⑥ Relay contact output + ⑤ − ⑥

Process alarm output Common ⑦
Process alarm output 1 ⑧
Process alarm output 2 ⑨
Heater burnout alarm output 3 or process alarm output ⑩

24V DC 24V AC 50/60Hz + ⑪ − ⑫ Power supply 100~240V AC 50/60Hz

③① ③② ③③ ③④ ③⑤ ③⑥ Relay contact output

Resistance bulb input Ā B B Thermocouple input

Note 1: Mount supplied resistor to terminals between ③⑤ and ③⑥

<Control output 1>

③① + ③② − 4~20mA DC output

③① + ③② − SSR/SSC drive output

+ − 1~5V DC (Note 1) 250Ω + − 4~20mA DC

<Process variable input>

< use M3 screw>

PXR5 PXR9

PXR5
1 2 3 4 5 6 7 8 9 10 11 12
31 32 33 34 35 36
6.2
M3 screw terminal

PXR9
1 2 3 4 5 6 ▲TOP 7 8 9 10 11 12 ▲TOP
31 32 33 34 35 36
6.2
M3 screw terminal

PXR4
1 2 3 4 5 6 / 7 8 9 10 11 12 13 14 15 16 17 18
6.2
M3 screw terminal

PXR3
10 11 12 13 14 15 16 17 18
1 2 3 4 5 6 7 8 9

Micro Controller PXR

［7］ Functions

■ Fuzzy control function

Fuzzy operation is used to suppress overshoot so that the response to external disturbances is improved. By monitoring process value, overshoot is suppressed with the startup
time remaining unchanged. At the same time, response to external disturbances is also improved.

● Comparison between fuzzy control and conventional control

Fuzzy control | With conventional control Overshoot

Overshoot Response to disturbnces | Overshoot Response to disturbnces
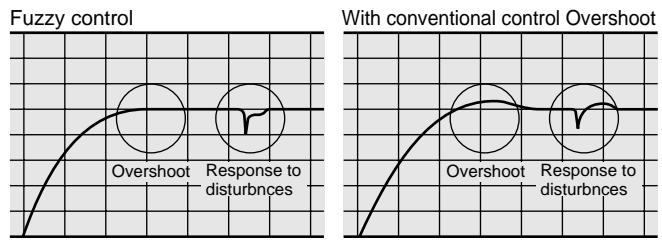
■ On/off action (2-position action)

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.

Control characteristic of on/off action

Hysteresis
Set value
Time
ON
Heater
OFF
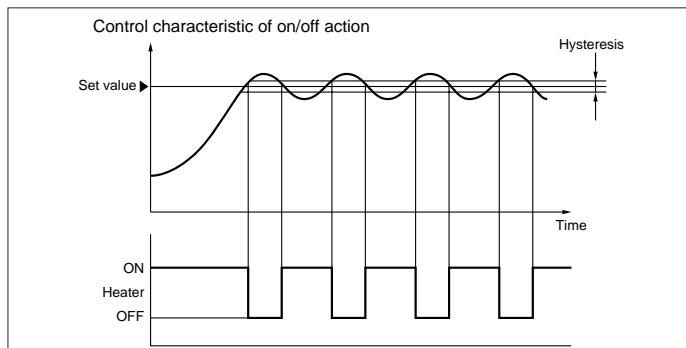
▶Point On/off action hysteresis setting

In on/off control, output turns on/off with respect to the set value. Therefore, output would change frequently in response to a slight change in the temperature. This might shorten the service life of the output relay and adversely affect the equipment connected with the temperature controller. To prevent this, a gap (hysteresis) is provided in the on/off action. This action gap is usually called "hysteresis."

Hysteresis (HYS)
Control output
ON
OFF
35°C 40°C 45°C Temperature
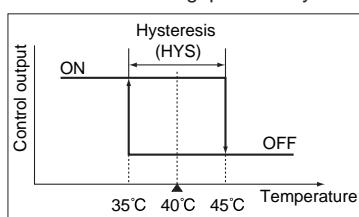
Example 1) Suppose that the temperature controller has a measuring range of 0 to 150°C and a hysteresis (HYS) of 10. When the set value is adjusted to 40°C, the heater turns off at 45°C and turns on at 35°C.

Example 2) For turning off the heater at 45°C in the figure at left, parameter [SVOF] should be set at "-5." Then, the heater turns off at 45°C and turns on at 35°C. (The above action is effective when the ONOFF parameter is set at OFF.)

▶Point Changeover of output action

Direct action or reverse action is settable by parameter [P-n1].

Control input (%)
100
0
Low Set value (SV) High

• Reverse action
When process value (PV) decreases below the set value (SV), output changes so that control input increases.

Control input (%)
100
0
Low Set value (SV) High

• Direct action
When process value (PV) increases above the set value (SV), output changes so that control input increases.
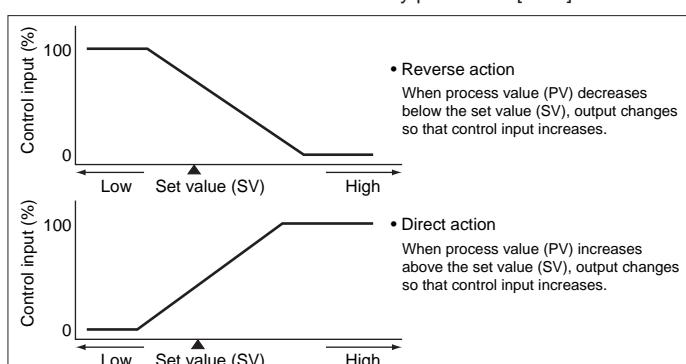
■ Heating / cooling control (option)

By a single controller both heating and cooling control output are obtained. (Both control outputs 1 and 2 are used.)

Output
Heating side   Cooling side
Coefficient 0.5
Coefficient 1.0
Coefficient 2.0
Deviation(-)   Set value (SV)   Deviation(+)
Heating side proportional band | Cooling side proportional band
Proportional band (P)

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

Output
Heating side   Cooling side
Deviation(-)   Deviation(+)
Overlap band   Dead band
Set value (SV)

Note 1: During heating/cooling control, the PID auto tuning cannot be used.
Note 2: "I" and "D" settings are common to heating and cooling, and cannot be selected individually.


■ Auto-tuning (AT)

PID parameters are autometically 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

AT start   AT end (PID setup)
AT computation
Set value (SV)
PV (process value)
ON 100%   ON   ON
(Control output)
OFF 0%   OFF   OFF
ON-OFF action   PID control

(b) Low PV type

AT start   AT end (PID setup)
AT computation
Set value (SV)
SV–10%
PV (process value)
ON 100%   ON   ON
(Control output)
OFF 0%   OFF   OFF
ON-OFF action   PID control
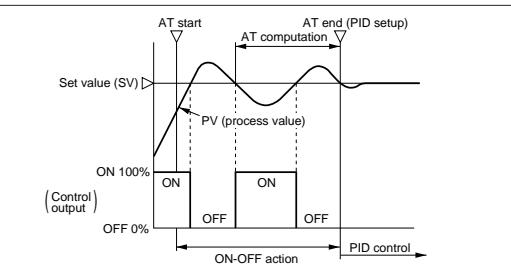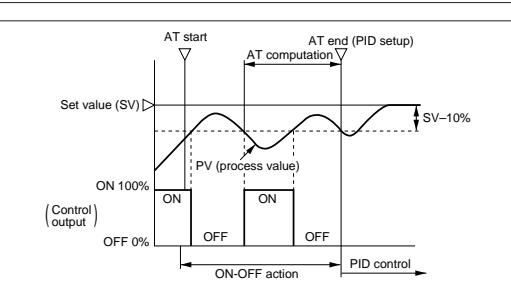
■ Self-tuning function

At power on, changing a set value or during external disturbance, tuning is made automatically so that the PID parameters are reoptimized.

External disturbance
Set value change
Power on
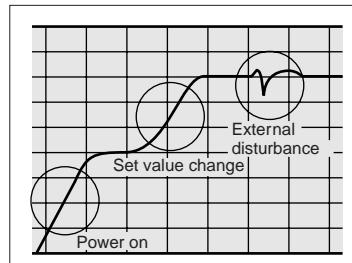
Note: For some objects to control, PID values could not be optimized.

Function3 ▷ Alarm (option)

• Kind of alarm and alarm type code

|	ALM1	ALM2	Alarm type	Operation figure
	0	0	No alarm	
Absolute value alarm	1	1	Upper-limit absolute value	
	2	2	Lower-limit absolute value	
	3	3	Upper-limit absolute value (with hold)	
	4	4	Lower-limit absolute value (with hold)	
Deviation value alarm	5	5	Upper-limit deviation	
	6	6	Lower-limit deviation	
	7	7	Upper and lower limits deviation	
	8	8	Upper-limit deviation (with hold)	
	9	9	Lower-limit deviation (with hold)	
	10	10	Upper and lower limits deviation (with hold)	
Range alarm	11	11	Range upper and lower limits deviation (ALM1/2 indepen-dent operation)	
	—	12	Range upper and lower limits absolute value	
	—	13	Range upper and lower limits deviation	
	—	14	Range upper limit absolute value and lower limit deviation	
	—	15	Range upper limit deviation and lower limit absolute value	

• Timer code

	ALM1	ALM2	Alarm type	Operation figure
Timer	32	32	ON-delay timer	
	33	33	OFF-delay timer	
	34	34	ON/OFF-delay timer	

If change the kinds of parameter, please power ON/OFF PXR.

Note : (1) Alarm output is ON in the alarm band marked ▨
      (2) What is alarm with hold?
          The alarm is not turned ON immediately even when the measured
          value is in the alarm band.It turns ON when it goes out the alarm
   band and enters again.
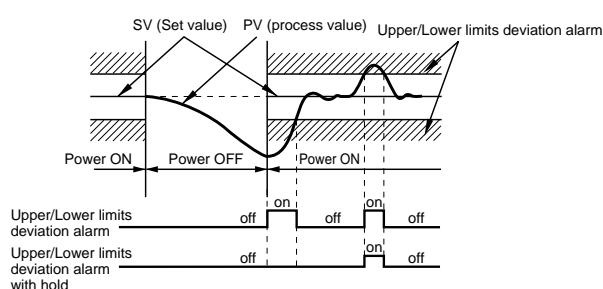
• Alarm code for setting value 2 points

	ALM1	ALM2	Alarm type	Operation figure
Upper and lower limits alarm	16	16	Upper and lower limits absolute value	
	17	17	Upper and lower limits deviation	
	18	18	Upper limit absolute value and lower limit deviation	
	19	19	Upper limit deviation and lower limit absolute value	
	20	20	Upper and lower limits absolute value (with hold)	
	21	21	Upper and lower limit deviation (with hold)	
	22	22	Upper limit absolute value and lower limit deviation (with hold)	
	23	23	Upper limit deviation and lower limit absolute value (with hold)	
Range alarm	24	24	Range upper and lower limits absolute value	
	25	25	Range upper and lower limits deviation	
	26	26	Range upper limit absolute value and lower limit deviation	
	27	27	Range upper limit deviation and lower limit absolute value	
	28	28	Range upper and lower limits absolute value (with hold)	
	29	29	Range upper and lower limits deviation (with hold)	
	30	30	Range upper limit absolute value and lower limit deviation (with hold)	
	31	31	Range upper limit deviation and lower limit absolute value (with hold)	

Function4 ▷ Heater burnout alarm (option)

• Heater burnout is detected then the alarm is emitted immediately.
• Separate type current trasformer(CT)specified by Fuji should be used.
• Alarm action point can be set by front panel keys.
• Detection is made only on a single-phase heater.
• This function cannot be used when controlling a heater with thyrister phase angle control system.

● Example of the connection of the heater burnout alarm (type PXR5, PXR9)

＊Rerer to 17page for CT

Micro Controller PXR
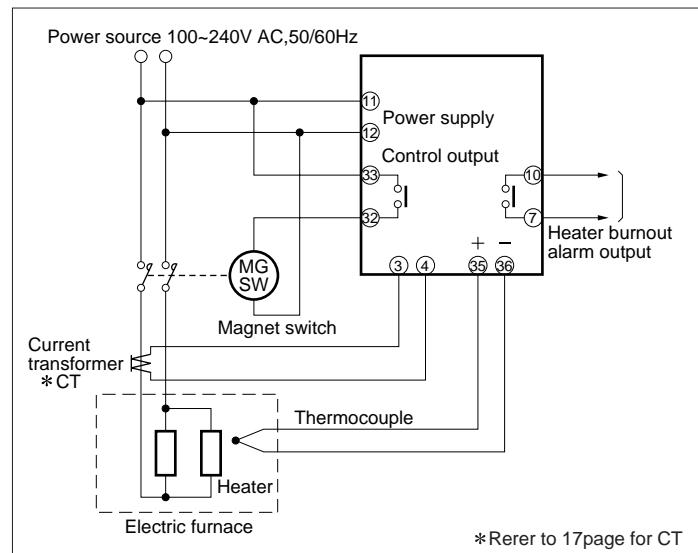
[7] Functions

Function5 | Parameter mask function

This instrument provides a function (parameter mask function) to mask (conceal) the display of individual parameters.
To effect parameter mask(non-display)or non- mask (display),appropriate values should be set to DSP1-13.

Example of setting to (DSP1-13)

(a) To mask parameter P
1) Check DSP value for Preferring to parameter table
2) Add 2 to the value set to DSP3.

| Parameter	DSP
P	DSP3-2
I	DSP3-4
D	DSP3-8

(b) To mask parametaer P,I,D
1) Check DSP value for P,I,D referring to parameter table.
2) Add 2+4+8=14 to the value set to DSP3.

For allocation of DSP of each parameter, refer to the parameter table on Page18. DSP1-13 cannot be masked.

Function6 | Ramp soak function (option)

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 a maximum of 4 ramp soaks.
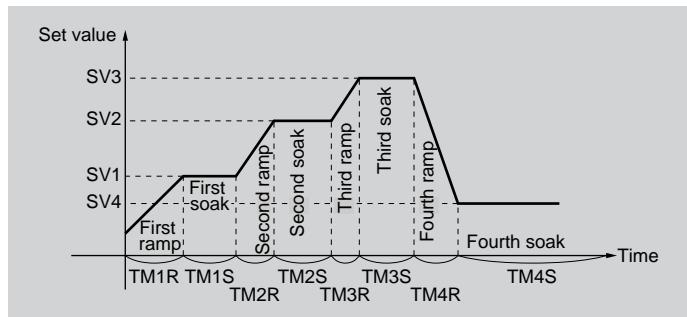
Function7 | RS-485 Communication function (option)

With RS-485 (Modbus™ protocol) interface, a connection with computer, touch panel or PLC is allowed.
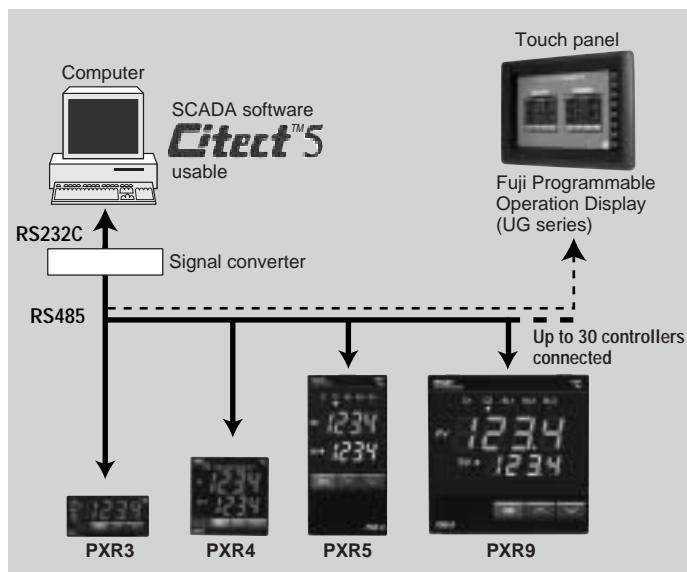
Either communication protocol below is selectable. Selection should be made according to system configuration.

1) ModbusTM RTU mode:
An open protocol generally used in particular outside Japan. In case the host side supports this protocol, connection is allowed without a program.

2) Z-ASCII (Fuji's original)
Because transmission code is ASCII, programming with PLC, etc. is simple.

Function8 | Digital input (option)

External digital input allows one of the following functions.

● Change the set value (Front SV, SV1-3)
● Start/stop the control action
● Start/reset the ramp/soak
● Start/stop the auto tuning
● Cancel the alarm latch
● Start the incorporated timer

* The above functions can be combined when two digital inputs are used.

Function9 | Timer function (option)

By Digital input, ON-delay or OFF delay timer can be started.
That is, relay output is turned on/off after certain period of time preset in parameter dLY1/dLY2. As for relay output, alarm output relays are used. Up to 2 timer outputs can be obtained.
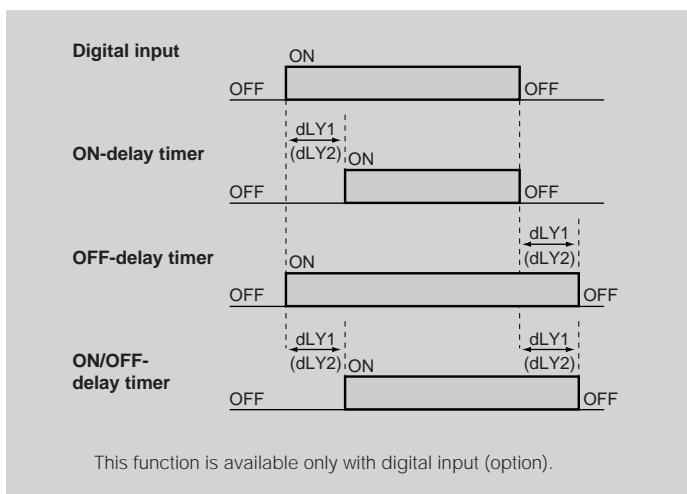
This function is available only with digital input (option).

Function10 | Analog Re-transmission (option)

● Output signal : 4 to 20 mA DC
● Kind of output : Any one of process value (PV), set value (SV), manipulated output value (MV) and process variable - set value (DV) (setting by front keys)

A cost corresponding to one temperature sensor can be reduced just by connecting a PV transfer signal to a recorder.
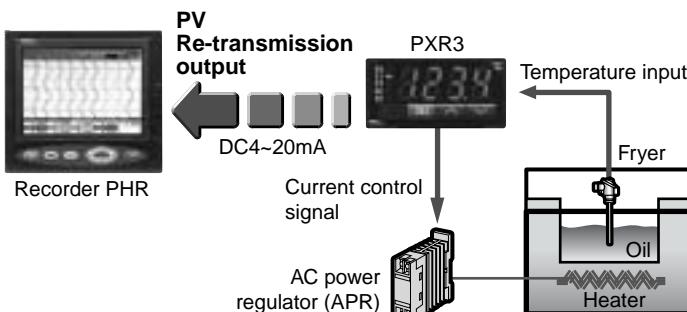
［8］ Sensor fault operation

● **Thermocouple**

Condition		Display	Control output	
Break		*U U U U*	ON or more than 20mA OFF or less than 4mA	(Note)
Short circuit		short-circuit point Temperature display	Input is controlled as short-circuit point temperature.	(Note)

● **Resistance bulb input**

| Condition		Display	Control output	
Break		*U U U U*	ON or more than 20mA OFF or less than 4mA	(Note)
		L L L L	OFF or less than 4mA ON or more than 20mA	(Note)
	  2-wire or 3-wire break	*L L L L*	ON or more than 20mA OFF or less than 4mA	(Note)
Short circuit		*L L L L*	OFF or less than 4mA ON or more than 20mA	(Note)

● **1-5V DC**

Break		*L L L L*	OFF or less than 4mA ON or more than 20mA	(Note)
Short circuit				

● **4-20mA DC**

Over-range	*U U U U*	OFF or less than 4mA	(Note)
Under-range	*L L L L*	ON or more than 20mA	

(Note) Control output changes in operation according to the designation of burnout direction (parameter, "P-n1").

Heater burnout alarm current detector (CT)

・Specification : For 20-50A
・Type : CTL-12-S36-8F

・Specification : For 1-30A
・Type : CTL-6-S-H

Micro Controller PXR

[9] Parameter table

Parameter table PXR (1/4)

Parameters for the PXR are classified under three blocks according to the frequency of use. The parameters of the second and third blocks are used at initialization or when they are of absolute necessity.

● **Parameters of the first block**

| Parameter display symbol	Parameter name		Description		Setting range	Value prior to delivery	User's set value	Parameter mask DSP
5Γ bУ	Stby	Standby setting	Switches between RUN and Standby for control.		on: Control standby (Output: OFF, Alarm: OFF) oFF: Control RUN	OFF		dSP1-1
ProG	ProG	Ramp-soak control	Switches between Start, Stop, and Hold for ramp-soak control.		oFF: Stop rUn: Start HLd: Hold	OFF		dSP1-2
LACH	LACH	Alarm latch cancel	Cancels the alarm latch.		0: Keeps the alarm latch. 1: Opens up the alarm latch.	0		dSP1-4
AΓ	AT	Auto-tuning	Used for setting the constants for P, i, and d by auto-tuning.		0: OFF (Resets the auto-tuning or does not use it.) 1: ON (Performs the auto-tuning in the SV standard type.) 2: ON (Performs the auto-tuning in low PV type (SV value-10%FS).)	0		dSP1-8
ΓΠ- 1	TM-1	Timer 1 display	Displays the remaining time of timer 1.		- (Unit: seconds)	—		dSP1-16
ΓΠ-2	TM-2	Timer 2 display	Displays the remaining time of timer 2.		- (Unit: seconds)	—		dSP1-32
AL 1	AL1	Set value of alarm 1	Sets the value at which alarm 1 is detected.	AL 1 is displayed when alarm type 1 is 0 to 15, or 32 to 34, and A 1-H or A 1-L is displayed when alarm type 1 is 16 to 31.	When the alarm type is absolute value: 0 to 100%FS	10		dSP1-128
A 1-L	A1-L	Lower limit value of alarm 1	Sets the lower limit value at which alarm 1 is detected.			10		dSP2-1
A 1-H	A1-H	Upper limit value of alarm 1	Sets the upper limit value at which alarm 1 is detected.		When the alarm type is deviation: -100 to 100%FS	10		dSP2-2
AL2	AL2	Set value of alarm 2	Sets the value during which alarm 2 is detected.	AL 2 is displayed when alarm type 2 is 0 to 15 or 32 to 34, and A2-H or A2-L is displayed when alarm type 2 is 16 to 31	When the alarm type is absolute value: 0 to 100%FS	10		dSP2-4
A2-L	A2-L	Lower limit value of alarm 2	Sets the lower limit value at which alarm 2 is detected.			10		dSP2-8
A2-H	A2-H	Upper limit value of alarm 2	Sets the upper limit value at which alarm 2 is detected.		When the alarm type is deviation: -100 to 100%FS	10		dSP2-16
LoC	LoC	Key lock	Specifies whether or not to allow the change of parameters.		0: All settings are changeable both from the front panel and via communication. 1: All settings are unchangeable from the front panel, but changeable via communication. 2: Only the SV is changeable from the front panel, and all settings are changeable via communication. 3: All settings are changeable from the front panel, but unchangeable via communication. 4: All settings are unchangeable from the front panel or via communication. 5: Only the SV is changeable from the front panel, but all settings are unchangeable via communication.	0		dSP3-1

Operration/Standby mode display

SEL
Press for about 1 sec.

SEL
Press for about 3 sec.

SEL
Press for about 5 sec.

5Γ bУ	P	P-n1
LoC	Ποd	dP13
1st block parameter	2nd block parameter	3rd block parameter

• Parameters of the second block

Parameter display symbol	Parameter name		Description	Setting range	Value prior to delivery	User's set value	Parameter mask DSP
P	P	Proportional band	Set P to 0.0 to select the ON/OFF control (Two-position control).	0.0 to 999.9%	5.0		dSP3-2
I	I	Integral time	Integration OFF at 0	0 to 3200 seconds	240		dSP3-4
d	D	Differentional time	Differentiation OFF at 0	0.0 to 999.9 seconds	60.0		dSP3-8
HYS	HYS	Hysteresis range for ON/OFF control	Sets the hysteresis for ON/OFF control.	0 to 50%FS	1		dSP3-16
CooL	CooL	Cooling-side proportional band coefficient	Coolling-side proportional band coefficient.	0.0 to 100.0	1.0		dSP3-32
db	db	Dead band	Dead band	-50.0 to +50.0	0.0		dSP3-64
bAL	bAL	Manual reset value	Single 0.0/Dual 50.0 prior to delivery	-100 to 100%	0.0/50.0		dSP3-128
Ar	Ar	Anti-reset windup	Anti-reset windup	0 to 100%FS	100%FS		dSP4-1
CTrL	CTrL	Control algorithm	Selects the control algorithm.	PID: Runs normal PID control. FUZY: Runs PID control with fuzzy logic. SELF: Runs PID control with self-running.	PID		dSP4-2
SLFb	SLFb	PV (Measured value) stable range	Sets the PV stable range for the self-tuning operation.	0 to 100%FS	2		dSP4-4
onoF	onoF	Setting HYS (Hysteresis) mode	Selects the hysteresis operation at ON/OFF control.	oFF: Starts the two-position control at the values of SV+HYS/2 and SV-HYS/2. on: Starts the two-position control at the values of SV and SV+HYS, or SV and SV-HYS.	OFF		dSP4-8
TC	TC	Cycle time of control output 1	Not shown at 4-20mA DC output	RY, SSR: 1 to 150 seconds (Contact output = 30,SSR/SSC-drive output=2)	30/2		dSP4-16
TC2	TC2	Cycle time of control output 2 (cooling-side)	Not shown at 4-20mA DC output	1 to 150 seconds (Contact output = 30,SSR/SSC-drive output=2)	30/2		dSP4-32
P-n2	P-n2	Input signal code	Set this parameter when changing the types of temperature sensors.	1 to 16	Note 1		dSP4-64
P-SL	P-SL	Lower limit of measuring range		-1999 to 9999	Note 1		dSP4-128
P-SU	P-SU	Upper limit of measuring range		-1999 to 9999	Note 1		dSP5-1
P-dP	P-dP	Setting the decimal point position		0 to 2	Note 1		dSP5-2
PVOF	PVOF	PV (process value) offset	Shift the display of the PV.	-10 to 10%FS	0		dSP5-8
SVOF	SVOF	SV (Setting value) offset	Shift the SV. But the SV display is not changed.	-50 to 50%FS	0		dSP5-16
P-dF	P-dF	Time constant of input filter		0.0 to 900.0 seconds	5.0		dSP5-32
ALM1	ALM1	Alarm type 1	Sets the types of alarm operations.	0 to 34	0/5		dSP5-64
ALM2	ALM2	Alarm type 2	Sets the types of alarm operations.	0 to 34	0/9		dSP5-128
STAT	STAT	Status display of ramp-soak		-	OFF		dSP6-2
PTn	PTn	Selecting ramp-soak execute type	Selects ramp-soak patterns.	1: Performs 1st to 4th segments. 2: Performs 5th to 8th segments. 3: Performs 1st to 8th segments.	1		dSP6-4
SV-1	SV-1	1st target value/ Switching-SV value	Sets the 1st target SV of ramp-soak operation. / Selected at switching-SV function for DI1	Within the SV limit.	0%FS		dSP6-8
TM1r	TM1r	First ramp segment time	Sets the first ramp segment time.	0 to 99h59m	0.00		dSP6-16
TM1S	TM1S	1st soak segment time	Sets the 1st soak segment time.	0 to 99h59m	0.00		dSP6-32

Note 1: When a customer does not specify the settings while ordering, the following settings are selected as factory defaults.
Thermocouple input : Thermocouple K Measured range: 0 to 400°C
Resistance bulb input :   Measured range: 0 to 150°C
Voltage/Current input :   Scaling: 0 to 100%

Micro Controller PXR

[9] **Parameter table**

Parameter table PXR ⑶⁄₄

• **Parameters of the second block**

Parameter display symbol	Parameter name		Description	Setting range	Value prior to delivery	User's set value	Parameter mask DSP
5ū-2	Sv-2	2nd target SV	Sets the 2nd target SV of ramp-soak operation.	Within the SV limit.	0%FS		dSP6-64
rñ2r	TM2r	2nd ramp segment time	Sets the 2nd ramp segment time.	0 to 99h59m	0.00		dSP6-128
rñ25	TM2S	2nd soak segment time	Sets the 2nd soak segment time.	0 to 99h59m	0.00		dSP7-1
5ū-3	Sv-3	3rd target SV	Sets the 3rd target SV of ramp-soak operation.	Within the SV limit.	0%FS		dSP7-2
rñ3r	TM3r	3rd ramp segment time	Sets the 3rd ramp segment time.	0 to 99h59m	0.00		dSP7-4
rñ35	TM3S	3rd soak segment time	Sets the 3rd soak segment time.	0 to 99h59m	0.00		dSP7-8
5ū-4	Sv-4	4th target SV	Sets the 4th target SV of ramp-soak operation.	Within the SV limit.	0%FS		dSP7-16
rñ4r	TM4r	4th ramp segment time	Sets the 4th ramp segment time.	0 to 99h59m	0.00		dSP7-32
rñ45	TM4S	4th soak segment time	Sets the 4th soak segment time.	0 to 99h59m	0.00		dSP7-64
5ū-5	Sv-5	5th target SV	Sets the 5th target SV of ramp-soak operation.	Within the SV limit.	0%FS		dSP7-128
rñ5r	TM5r	5th ramp segment time	Sets the 5th ramp segment time.	0 to 99h59m	0.00		dSP8-1
rñ55	TM5S	5th soak segment time	Sets the 5th soak segment time.	0 to 99h59m	0.00		dSP8-2
5ū-6	Sv-6	6th target SV	Sets the 6th target SV of ramp-soak operation.	Within the SV limit.	0%FS		dSP8-4
rñ6r	TM6r	6th ramp segment time	Sets the 6th ramp segment time.	0 to 99h59m	0.00		dSP8-8
rñ65	TM6S	6th soak segment time	Sets the 6th soak segment time.	0 to 99h59m	0.00		dSP8-16
5ū-7	Sv-7	7th target SV	Sets the 7th target SV of ramp-soak operation.	Within the SV limit.	0%FS		dSP8-32
rñ7r	TM7r	7th ramp segment time	Sets the 7th ramp segment time.	0 to 99h59m	0.00		dSP8-64
rñ75	TM7S	7th soak segment time	Sets the 7th soak segment time.	0 to 99h59m	0.00		dSP8-128
5ū-8	Sv-8	8th target SV	Sets the 8th target SV of ramp-soak operation.	Within the SV limit.	0%FS		dSP9-1
rñ8r	TM8r	8th ramp segment time	Sets the 8th ramp segment time.	0 to 99h59m	0.00		dSP9-2
rñ85	TM8S	8th soak segment time	Sets the 8th soak segment time.	0 to 99h59m	0.00		dSP9-4
ñod	Mod	Ramp-soak mode	Selects the power-on start, repeat, and standby functions for ramp-soak operations.	0 to 15	0		dSP9-8

• Parameters of the third block

Parameter display symbol		Parameter name	Description	Setting range	Value prior to delivery	User's set value	Parameter mask DSP
P-n1	P-n1	Control action	Specifies control action and output at the input burn-out.	0 to 19	0/4		dSP9-16
Sv-L	Sv-L	SV (Setting value) lower limiter	Sets the lower limit of the SV.	0 to 100%FS	0%FS		dSP9-32
Sv-H	Sv-H	SV (Setting value) upper limiter	Sets the upper limit of the SV.	0 to 100%FS	100%FS		dSP9-64
dLY1	dLY1	Delay time 1	Delay time or timer value for alarm 1 relay.	0 to 9999 seconds	0		dSP9-128
dLY2	dLY2	Delay time 2	Delay time or timer value for alarm 2 relay.	0 to 9999 seconds	0		dSP10-1
CT	CT	Current transe display	Displays the current detector input value for HB alarm.	-	-		dSP10-4
Hb	Hb	HB (Set value of heater break alarm) setting	Sets the operation value that detects the heater break.	0 to 50.0A (Setting to 0.0A turns off the HB alarm.)	0.0		dSP10-8
A1hy	A1hy	Alarm 1 hysteresis	Sets the hysteresis range of ON and OFF of alarm 1.	0 to 50%FS	1		dSP10-16
A2hy	A2hy	Alarm 2 hysteresis	Sets the hysteresis range of ON and OFF of alarm 2.	0 to 50%FS	1		dSP10-32
A1oP	A1oP	Alarm 1 options	Sets the optional functions of alarms 1 and 2. $\boxed{8888}$ └ Alarm latch (1: use, 0: not use) └─ Alarm of error status (1: use, 0: not use) └── De-energized output (1: use, 0: not use)	000 to 111	000		dSP10-128
A2oP	A2oP	Alarm 2 options		000 to 111	000		dSP11-1
PLC1	PLC1	Lower limit for output 1	Sets the lower limit for output 1.	-3.0 to 103.0%	-3.0		dSP11-4
PHC1	PHC1	Upper limit for output 1	Sets the upper limit for output 1.	-3.0 to 103.0%	103.0		dSP11-6
PLC2	PLC2	Lower limit for output 2	Sets the lower limit for output 2.	-3.0 to 103.0%	-3.0		dSP11-8
PHC2	PHC2	Upper limit for output 2	Sets the upper limit for output 2.	-3.0 to 103.0%	103.0		dSP11-32
PCUT	PCUT	Output limit types	Sets the limit types of outputs 1 and 2 (breaking the limit, or maintained within the limit).	0 to 15	0		dSP11-64
oUT1	oUT1	Output value (MV) display	Displays the value of output 1.	-	-		dSP11-128
oUT2	oUT2	Output value (MV) display	Displays the value of output 2.	-	-		dSP12-1
rCJ	rCJ	RCJ (Cold junction compensation) setting	Sets the cold junction compensation function to ON/OFF.	ON: Performs the RCJ (Cold junction compensation). OFF: Does not perform the RCJ (Cold junction compensation).	on		dSP12-2
GAin	GAin	PV gradient		0.001 to 2.000	1.000		dSP12-4
AdJ0	AdJ0	User-definable zero adjustment	Shifts the zero point of input value.	-50 to 50%FS	0		dSP12-8
AdJS	AdJS	User-definable span adjustment	Shifts the span of input value.	-50 to 50%FS	0		dSP12-16
di-1	di-1	DI1 (Digital input 1) operation	Sets the DI1 operations.	0 to 12	0		dSP12-32
di-2	di-2	DI2 (Digital input 2) operation	Sets the DI2 operations.	0 to 12	0		dSP12-64
STno	STno	Station No.	Sets the station No. for communication.	0 to 255	1		dSP12-128
CoM	CoM	Parity setting	Sets the parity for communication. (The baud rate is fixed at 9600bps.)	0: Odd parity 1: Even parity 2: No parity	0		dSP13-1
Ao-T	Ao-T	Re-transmission output type	Selecting re-transmission output type.	0: PV / 1: SV / 2: MV / 3: DV	0		dSP13-4
Ao-L	Ao-L	Re-transmission base scale	Setting re-transmission base scale.	-100.0 to 100.0%	0.0		dSP13-4
Ao-H	Ao-H	Re-transmission span scale	Setting re-transmission span scale.	-100.0 to 100.0%	100.0		dSP13-4
dSP1 ~ dSP9 dP10 ~ dP13	dSP1 ~ dSP9 dP10 ~ dP13	Parameter mask	Sets whether or not to display each parameter.	0 to 255	Ordering specification		-

Micro Controller PXW, PXZ, PXV

PXW of 3-key type

● **Standard type**

48X48mm
72X72mm
48X96mm
96X96mm

PXW4   PXW7   PXW5   PXW9

● **Front waterproof type**

PXW4   PXW7   PXW5   PXW9

Rail mounting types (PXW4, PXZ4, PXV4)

48X48mm   48X48mm   48X48mm

PXW4   PXZ4   PXV4

PXZ of 8-key type

● **Standard type**

48X48mm
72X72mm
48X96mm
96X96mm

PXZ4   PXZ7   PXZ5   PXZ9

● **Front waterproof type**

PXZ4   PXZ7   PXZ5   PXZ9

PXV of 1-stage display and 3-key type

● **Standard type**   ● **Front waterproof type**

48X48mm   48X48mm

PXV4   PXV4

Features

● **Fuzzy control**

Excellent controllability is ensured unaffected by overshoot and external disturbance.

Fuzzy control   With conventional control Overshoot

Overshoot   External to disturbnces   Overshoot   External to disturbnces

● **Heater burnout alarm (option)**

Power supply : 100 to 240 V AC, 50/60 Hz (type PXW5, PXZ5, PXW9, PXZ9)

Controller

⑧ Power
⑨ Control output
⑤
⑦
⑮
⑯
⑰ ⑱   + −   ① ②

Heater burnout alarm output

MG SW

Electromagnetic switch

Current detector (CT)

Thermocouple

Heater

Electric furnace

● **Ramp/soak function (option)**

Control follows the predetermined SV.

Set value

SV3
SV2
SV1
SV4

1st ramp 1st soak 2nd ramp 2nd soak 3rd ramp 3rd soak 4th ramp 4th soak   Time

TM1R TM1S   TM2S   TM3S   TM4S
TM2R   TM3R   TM4R
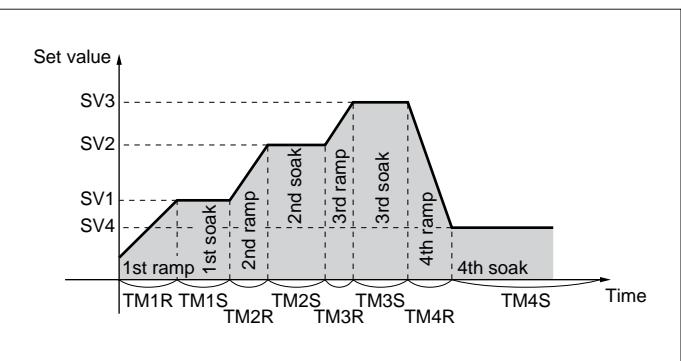
● **Free line voltage**

100 to 240 V AC or 24 V DC/AC line has been prepared.

● **Heating and cooling control (option)**

A single controller can issue both control outputs for heating and cooling.

● **PID with auto tuning**

Standard-provided with auto tuning function for calculation of optimum PID parameters.

[1] Ordering code

PXV

Model name: | Digital temperature controller (Micro controller X) 3-key type |

			4 5 6 7 8	9 10 11 12 13	14
		PXV	☐ ☐ Y 2	☐ – ☐ ☐ ☐ ☐	☐

Digit	Specification	Note			
4	**\<Front panel size\>**				
	48 × 48 mm		4		
5	**\<Input signal\>**				
	Thermocouple (°C)		T		
	Thermocouple (°F)		R		
	Resistance bulb Pt 100,3-wire (°C)		N		
	Resistance bulb Pt 100,3-wire (°F)		S		
	4-20mA DC		B		
	1-5V DC		A		
6 7	**\<Control output\>**				
	Contact reverse action output		A Y		
	Contact direct action output		B Y		
	SSR/SSC drive reverse action output		C Y		
	SSR/SSC drive direct action output		D Y		
	4-20mA DC reverse action output		E Y		
	4-20mA DC direct action output		F Y		
8	**\<Version No.\>**		2		
9	**\<Additional specifications\>**				
	None			0	
	With process alarm (1point)			1	
	With 4 ramp/soak			4	
	With process alarm (1point) + 4 ramp/soak			5	
	With process alarm (2points)			F	
	With process alarm (2points) + 4ramp/soak			G	
10	**\<Instruction manual and power supply voltage\>**				
	Japanese,100 to 240V AC			Y	
	English,100 to 240V AC			V	
	Japanese, 24V AC/24V DC			A	
	English, 24V AC/24V DC			B	
11 12 13	**\<Socket\>**				
	None			0 0 0	
	For rail mounting (8-pin screw terminal)	Note 1		1 0 0	
	For panel mounting (8-pin screw terminal)	Note 2		2 0 0	
	For panel mounting (8-pin soldered terminal)	Note 3		3 0 0	
	For rail mounting (11-pin screw terminal)	Note 4		4 0 0	
	For panel mounting (11-pin screw terminal)	Note 5		5 0 0	
14	**\<Optional specification\>**				
	Front panel water-proof structure (NEMA-4X), black case				D

PXW

Model name: | Digital temperature controller (Micro controller X) 3-key type |

			4 5 6 7 8	9 10 11 12 13	14
		PXW	☐ ☐ ☐ 2	– ☐ ☐ ☐ ☐ ☐	☐

Digit	Specification	Note			
4	**\<Front panel size\>**				
	48 × 48 mm		4		
	48 × 96 mm		5		
	72 × 72 mm		7		
	96 × 96 mm		9		
5	**\<Input signal\>**				
	Thermocouple (°C)		T		
	Thermocouple (°F)		R		
	Resistance bulb Pt 100,3-wire (°C)		N		
	Resistance bulb Pt 100,3-wire (°F)		S		
	4-20mA DC		B		
	1-5V DC		A		
6	**\<Control output 1\>**				
	Contact reverse action output		A		
	Contact direct action output		B		
	SSR/SSC drive reverse action output		C		
	SSR/SSC drive direct action output		D		
	4-20mA DC reverse action output		E		
	4-20mA DC direct action output		F		
7	**\<Control output 2\>**				
	None		Y		
	Contact reverse action output	Note 6	A		
	Contact direct action output	Note 6	B		
	SSR/SSC drive reverse action output	Note 6	C		
	SSR/SSC drive direct action output	Note 6	D		
	4-20mA DC reverse action output	Note 6	E		
	4-20mA DC direct action output	Note 6	F		
8	**\<Version No.\>**		2		
9	**\<Additional specifications\>**				
	None			0	
	With process alarm	Note 8		1	
	With heater burnout alarm	Note 6		2	
	With process alarm + heater burnout alarm	Note 6		3	
	With 4 ramp/soak			4	
	With process alarm + 4 ramp/soak	Note 8		5	
	With heater burnout alarm + 4 ramp/soak	Note 6		6	
	With process alarm + heater burnout alarm + 4 ramp/soak	Note 6		7	
	With process alarm (2points)	Note 9		F	
	With process alarm (2points) + 4ramp/soak	Note 9		G	
10	**\<Instruction manual and power supply voltage\>**				
	Japanese,100 to 240V AC			Y	
	English,100 to 240V AC			V	
	Japanese, 24V AC/24V DC	Note 7		A	
	English, 24V AC/24V DC	Note 7		B	
11 12 13	**\<Socket\>**				
	None			0 0 0	
	For rail mounting (8-pin screw terminal)	Note 1		1 0 0	
	For panel mounting (8-pin screw terminal)	Note 2		2 0 0	
	For panel mounting (8-pin soldered terminal)	Note 3		3 0 0	
	For rail mounting (11-pin screw terminal)	Note 4		4 0 0	
	For panel mounting (11-pin screw terminal)	Note 5		5 0 0	
14	**\<Optional specification\>**				
	Front panel water-proof structure (NEMA-4X), black case				D

PXZ

Model name: | Digital temperature controller (Micro controller X) 8-key type |

			4 5 6 7 8	9 10 11 12 13	14
		PXZ	☐ ☐ ☐ 2	– ☐ ☐ ☐ ☐ ☐	☐

Digit	Specification	Note			
4	**\<Front panel size\>**				
	48 × 48 mm		4		
	48 × 96 mm		5		
	72 × 72 mm		7		
	96 × 96 mm		9		
5	**\<Input signal\>**				
	Thermocouple (°C)		T		
	Thermocouple (°F)		R		
	Resistance bulb Pt 100,3-wire (°C)		N		
	Resistance bulb Pt 100,3-wire (°F)		S		
	4-20mA DC		B		
	1-5V DC		A		
6	**\<Control output 1\>**				
	Contact reverse action output		A		
	Contact direct action output		B		
	SSR/SSC drive reverse action output		C		
	SSR/SSC drive direct action output		D		
	4-20mA DC reverse action output		E		
	4-20mA DC direct action output		F		
7	**\<Control output 2\>**				
	None		Y		
	Contact reverse action output	Note 6	A		
	Contact direct action output	Note 6	B		
	SSR/SSC drive reverse action output	Note 6	C		
	SSR/SSC drive direct action output	Note 6	D		
	4-20mA DC reverse action output	Note 6	E		
	4-20mA DC direct action output	Note 6	F		
8	**\<Version No.\>**		2		
9	**\<Additional specifications\>**				
	None			0	
	With process alarm	Note 8		1	
	With heater burnout alarm	Note 6		2	
	With process alarm + heater burnout alarm	Note 6		3	
	With 4 ramp/soak			4	
	With process alarm + 4 ramp/soak	Note 8		5	
	With heater burnout alarm + 4 ramp/soak	Note 6		6	
	With process alarm + heater burnout alarm + 4 ramp/soak	Note 6		7	
	With process alarm (2points)	Note 9		F	
	With process alarm (2points) + 4ramp/soak	Note 9		G	
10	**\<Instruction manual and power supply voltage\>**				
	Japanese,100 to 240V AC			Y	
	English,100 to 240V AC			V	
	Japanese, 24V AC/24V DC	Note 7		A	
	English, 24V AC/24V DC	Note 7		B	
11 12 13	**\<Socket\>**				
	None			0 0 0	
	For rail mounting (8-pin screw terminal)	Note 1		1 0 0	
	For panel mounting (8-pin screw terminal)	Note 2		2 0 0	
	For panel mounting (8-pin soldered terminal)	Note 3		3 0 0	
	For rail mounting (11-pin screw terminal)	Note 4		4 0 0	
	For panel mounting (11-pin screw terminal)	Note 5		5 0 0	
14	**\<Optional specification\>**				
	Front panel water-proof structure (NEMA-4X), black case				D

Note) If not otherwise specified when ordering, the input signal and range are as follows :
   Thermocouple input : K thermocouple, 0 to 400℃ (SV at 0℃)
   Resistance bulb input : 0 to 150℃(SV at 0℃)
   Voltage input : Scaling 0 to 100% (SV at 0%)
   Kind of the input range should be filled in the code except for the above specifications.
   Use the front key to change the king of the thermocouple input or resistance bulb input.

Note) Item of 48 X 48mm size requires socket which needs to be specified in the space of 11,12 and 13 digits.
   This socket is not required for items of other sizes.

Note1) Type: TP48X

Note2) Type: TP48SB

Note3) Type: ATX1NS

Note4) Type: TP411X

Note5) Type: TP411SBA

Note6) Not available on 48 X 48mm size
   Heater burnout alarm unit cannot be mounted on current output type.
   Set the parameter "TC" more than 20sec,or hearter burnout function doesn't work correctly.

Note7) Not available on 72 X 72mm size

Note8) Alarm output (s) : 1point (48 X 48mm type), 2points (other types)

Note9) Avairable only on 48 X 48mm type.

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Micro Controller PXW,PXZ,PXV

[2] Specifications PXW/PXZ/PXV

■ Control function — Standard type

Control action	PID control with auto-tuning / auto-tuning with Fuzzy control
Proportional band(P)	0 to 999.9% of measuring range,setting in 0.1% steps
Integral time(I)	0 to 3200sec,setting in 1sec step
Differential time(D)	0 to 999.9%,setting in 0.1% steps
P＝0:2-position action I,D＝0:Proportional action	
Proportional cycle	1 to 150sec,setting in 1sec step,relay contact output, SSR/SSC drive output only
Hysteresis width	1 to 50% of measuring range,2-position action only
Anti-reset wind up tuning	0 to 100% of measuring range,auto setting with auto-tuning
Input sampling cycle	0.5sec
Control cycle	0.5sec

■ Control function — Heating/cooling type (option)

Heating proportional band(P)	0 to 999.9% of measuring range
Cooling proportional band(P)	Heating proportional band ✕ cooling proportional band coefficient Cooling proportional band coefficient=0 to 100.0 0:ON/OFF action
Integral time(I)	0 to 3200sec for heating and cooling
Differential time(D)	0 to 999.9sec for heating and cooling
P,I,D=0:ON/OFF action (without dead band) for heating and cooling I,D=0:Proportional action	
Proportional cycle	1 to 150sec,relay contact output,SSR/SSC drive only
Hysteresis width	ON/OFF action for heating and cooling:0.5% of measuring range
Anti-reset wind up	0 to 100% of measuring range,auto setting with auto-tuning
Overlap/dead band	±50% of heating proportional band
Input sampling cycle	0.5sec
Control cycle	0.5sec

■ Input

Input signal	Thermocouple : J K R B S T E N PLⅡ Resistance bulb : Pt100 Voltage/current : 1 to 5V DC 4 to 20mA DC (Current input is used with supplied 250Ω external resistor)
Measuring range	See Measuring range table.
Burnout	For thermocouple/resistance bulb input,control outputover scale direction is serectable upper side or lower side

■ Output — Standard type

Control output	1 of the following 3 types is selected. Relay contact (SPDT contact): 220V AC/30V DC, 3A (resistive load) Mechanical life:10 million cycles or more (no load) Electrical life:100 thousand cycles or more (rated load) Minimum switching current:100mA (24V DC) SSR/SSC drive (voltage pulse): 15 to 30V DC at ON/ 0.5V DC or less at OFF, Max. current: 60mA or less 25mA(With alarm 2points on 48X48mm size) 30mA(at 24V DC/24V AC supply voltage) 4 to 20mA DC:Allowable load resistance; 600Ω or less

■ Output — Heating/cooling type (option)

Control output	For dual output type, 1 of the following 3 types is selected on both heating and cooling types. 48 ✕ 48mm type is not acceptable. Relay contact (SPDT contact): 220V AC/30V DC, 3A (resistive load) Mechanical life:10 million cycles or more (no load) Electrical life:100 thousand cycles or more (rated load) Minimum switching current:100mA (24V DC) SSR/SSC drive (voltage pulse): 15 to 30V DC at ON/ 0.5V DC or less at OFF, Max. current is 60mA or less. 4 to 20mA DC:Allowable load resistance; 600Ω or less (Note) When SSR/SSC drive output of heating/cooling side is selected,the total current should be less than 60mA.

■ Setting and indication

Parameter setting method	PXV/PXW;digital setting with 3 keys PXZ:digital setting with 8 keys
PV/SV display method	PXV4,PXZ4;PV/SV select display LED;4 digits,red PXW,PXZ5,7,9;PV/SV individual display LED,4 digits each,PV;red SV;green
Status display	Control output,alarm output heater burnout alarm output,LED lamp (red)
Setting accuracy	0.1% of measuring range or less
Indication accuracy (at 23℃):	Thermocouple;±(0.5% of measuring range)±1digit±1℃ R thermocouple 0 to 500℃;±(1% of measuring range) ±1digit±1℃ B thermocouple 0 to 400℃;±(5% of measuring range) ±1digit±1℃ Resistance bulb,voltage,current;±(0.5% of measuring range)±1digit

■ Alarm (Option)

Kind of alarm	See table "Kind of alarm".
Alarm output	Relay contact (SPST contact), 220V AC /30V DC, 1A (resisitive load), Mechanical life:10 million cycles or more (no load) Electrical life:100 thousand cycles or more (rated load) Minimum switching current:100mA (24V DC) 48X48mm type;output..1point or 2points Other types;output..2points
Heater burnout alarm output	Relay contact (SPST contact), 220V AC/30V DC,1A (resistive load) Mechanical life:10 million cycles or more (no load) Electrical life:100 thousand cycles or more (rated load) Minimum switching current:100mA (24V DC) 48X48mm type;not available, output;1 point

■ Power failure processing

Memory protection	Non-volatile memory hold After the recovery of power from failure, control is started at the value before power failure.

■ Self-check

Method	Monitoring of program error with watchdog timer

■ Operation and storage condition

Operating temperature	−10 to 50℃
Operating humidity	90%RH or less (Non condensing)
Storage temperature	−20 to 60℃

■ General specifications

Rated voltage	100 (−15%) to 240 (+10%) V AC 50/60Hz, 24V AC (±10%) 50/60Hz, 24V DC (±10%)
Power consumption	10VA or less (100V AC) 15VA or less (240V AC, 24V AC, 24V DC)
Insulation resistance	20MΩ or more (500V DC)
Withstand voltage	Power source-Earth,1500V AC,1min Power source-Other,1500V AC,1min Earth-Relay output,1500V AC,1min Earth-Alarm output,1500V AC,1min Other,500V AC,1min
Input impedance	Thermocouple;1MΩ or more Voltage;400kΩ or more Current;250Ω (external resistor)
Allowable signal source resistance	Thermocouple;100Ω or less Voltage;1kΩ or less
Allowable wiring resistance	Resistance bulb;10Ω or less per wire
Reference junction compensation accuracy	±1℃:(at 23℃)
PV offset	±10% of measuring range
SV offset	±50% of measuring range
Input filter	0 to 900.0sec,setting in 0.1sec steps (primary lagging filter)
Noise reduction ratio	Normal mode noise (50/60Hz) ;50dB or more Common mode noise (50/60Hz) ;140dB or more

■ Other functions

Paramater mask function	Parameter display is disabled by software.
Ramp soak function(option)	4 ramp/4 soak
Heater burnout alarm output (option) unavailable for 48 X 48 size	Current detector: CTL-6-S-H for 1 to 30A CTL-12-S36-8F for 20 to 50A Alarm settable range: 1 to 50A Set the parameter "TC" more than 20 sec, or heater burnout function doesn't work correctly.
Applicable standards	UL, C-UL, CE mark

■ Structure

Mounting method	Panel flush mounting or surface mounting Surface mounting;48X48mm type only
External terminal	48X48mm type;8-pin or 11-pin socket Other types;screw terminal (M3.5 screw)
Case material	Plastic
External dimensions	See outline diagrdam.
Mass	48X48mm;approx 150g 48X96mm;approx 300g 72X72mm;approx 300g 96X96mm;approx 400g
Protective structure	Front panel water-proof structure; NEMA4X (equivalent to IEC standards IP66)(option) Rear case;IEC IP20
Enclosure color	Standard type;ivory (front panel,case) Water-proof type;black (front panel,case)

■ Scope of delivery

Standard type	48X48mm type;controller,panel mounting bracket, socket (when specified),instruction manual 1volume Other types;controller,panel mounting bracket, instruction manual 1volume
Water-proof type	48X48mm type;contoroller,panel mounting bracket, socket (when specified), water-proof packing, instruction manual 1volume Other types;controller,panel mounting bracket,water-proof packing,instruction manual 1volume

■ Measuring range table

| Input signal	Input range(℃)	Input range(℉)
Resistance bulb		
Pt100Ω	0 to 150	32 to 302
Pt100Ω	0 to 300	32 to 572
Pt100Ω	0 to 500	32 to 932
Pt100Ω	0 to 600	32 to 1112
Pt100Ω	−50 to 100	−58 to 212
Pt100Ω	−100 to 200	−148 to 392
Pt100Ω	−150 to 600	−238 to 1112
Pt100Ω	−150 to 850	−238 to 1562
Thermocouple		
J	0 to 400	32 to 752
J	0 to 800	32 to 1472
K	0 to 400	32 to 752
K	0 to 800	32 to 1472
K	0 to 1200	32 to 2192
R	0 to 1600	32 to 2912
B	0 to 1800	32 to 3272
S	0 to 1600	32 to 2912
T	−199 to 200	−328 to 392
T	−150 to 400	−238 to 752
E	0 to 800	32 to 1472
E	−199 to 800	−328 to 1472
N	0 to 1300	32 to 2372
PLⅡ	0 to 1300	32 to 2372
DC voltage 1 to 5V DC	Scaling range;−1999 to 9999	
DC current 4 to 20mA DC	For current input,use a 250 resistor to obtain 1 to 5V DC input.	

Note) Input signals can be selected within the same type.
     It is impossible to select input signals of a different type.

Micro Controller PXW,PXZ,PXV

## 〔3〕 Outline diagram/panel cut 〔Standard type〕

1) 48 × 48mm type

(unit: mm)

Type	Outline	Panel cut
PXV4 PXW4 PXZ4	PXW4 48 48 / PXV4 48 48 / PXZ4 48 48 — 85.7 71.5 7 1 Panel 44.8 57 9.5 1 ≦ t ≦ 8 Mounting bracket Packing (Used for water-proof type)	Side stick mounting (n controllers) (Not used for water-proof type) 45 +0.5 0 / 45 +0.5 0 63 Min. 63 Min. (48×N-3) +0.5 -0 45 +0.5 -0

Note) PXV4, PXW4 and PXZ4 are common to standard types and water-proof types.

2) 48 × 96mm type

(unit: mm)

Type	Outline	Panel cut
PXW5 PXZ5	PXW5 48 96 / PXZ5 48 96 — Mounting bracket 12 100 90.5 114.5 14.5 Panel t 1 ≦ t ≦ 8	45 +0.6 0 92 +0.8 0 116 Min. 50 Min. Side stick mounting (n controllers) (Not used for water-proof type) (48 x n-3) +0.8 -0 92 +0.8 0

3) 72 × 72mm type

(unit: mm)

Type	Outline	Panel cut
PXW7 PXZ7	PXW7 72 72 / PXZ7 72 72 — Mounting bracket 12 100 67 91 14.5 Panel t 1 ≦ t ≦ 8	68 +0.7 0 68 +0.7 0 92 Min. 82 Min.

4) 96 × 96mm type

(unit: mm)

Type	Outline	Panel cut
PXW9 PXZ9	PXW9 96 96 / PXZ9 96 96 — Mounting bracket 12 100 90.5 114.5 14.5 Panel t 1 ≦ t ≦ 8	92 +0.8 0 92 +0.8 0 116 Min. 100 Min.

［3］ Outline diagram/panel cut ［Water-proof type］

1) 48 × 96mm type

(unit: mm)

Type	Outline	Panel cut
PXW5 PXZ5	PXW5 52.5 / PXZ5 52.5 / 100.5 / 16.2 95.8 Packing Mounting bracket 90.5 114.5 / 18.7 t Panel 1 ≦ t ≦ 8	45 +0.6 0 / 92 +0.8 0 / 120 Min. / 92 Min.

2) 72 × 72mm type

(unit: mm)

Type	Outline	Panel cut
PXW7 PXZ7	PXW7 76.5 / PXZ7 76.5 / 76.5 / Packing Mounting bracket 16.2 95.8 / 67 91 / 18.7 t Panel 1 ≦ t ≦ 8	68 +0.7 0 / 68 +0.7 0 / 96 Min. / 116 Min.

3) 96 × 96mm type

(unit: mm)

Type	Outline	Panel cut
PXW9 PXZ9	PXW9 100.5 / PXZ9 100.5 / 100.5 / Packing Mounting bracket 16.2 95.8 / 90.5 114.5 / 18.7 t Panel 1 ≦ t ≦ 8	92 +0.8 0 / 92 +0.8 0 / 120 Min. / 140 Min.

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Micro Controller PXW,PXZ,PXV

［4］ Connection diagram ［for 100 to 240V AC power supply］

1) PXW4 · PXZ4 · PXV4 type
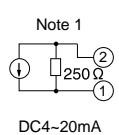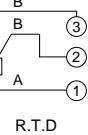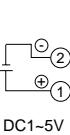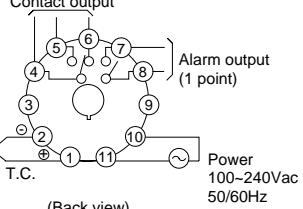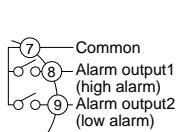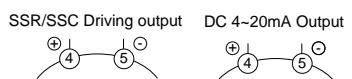
Connection diagram (with alarm)

Socket type (11Pin)

<Inputs>

Note 1

250Ω
DC4~20mA

DC1~5V

R.T.D

<Control output>
Contact output

Alarm output (1 point)

T.C.
Power 100~240Vac 50/60Hz
(Back view)

<Alarm output>

Common
Alarm output1 (high alarm)
Alarm output2 (low alarm)

<Control output>

SSR/SSC Driving output   DC 4~20mA Output

Connection diagram (without alarm)

Socket type (8 Pin)

<Inputs>

Note 1

250Ω
DC4~20mA

DC1~5V

R.T.D

Contact output

Power 100~240Vac 50/60Hz

T.C.
(Back view)

<Control output>

SSR/SSC Driving output   DC 4~20mA Output
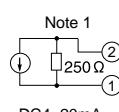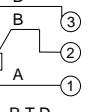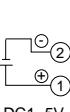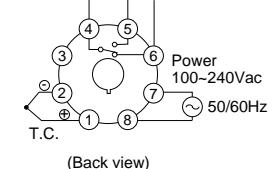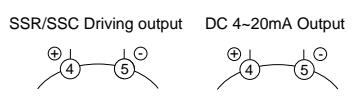
Note1: Use the 250Ω resistance(accessory).
Note2: SSR/SSC drive output and DC4~20mA output are not electrically insulated from inner circuits.
So,non-grounding type sensor must be used.

2) PXW7 · PXZ7 type

Standard type
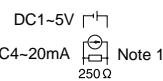
<Inputs>

DC1~5V
DC4~20mA   Note 1
250Ω
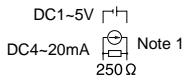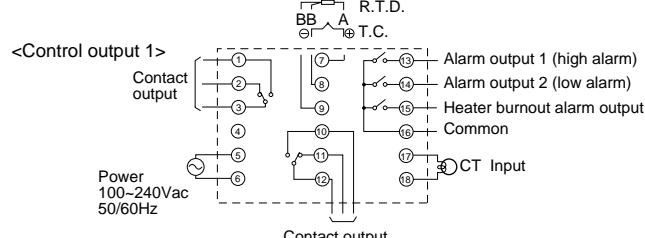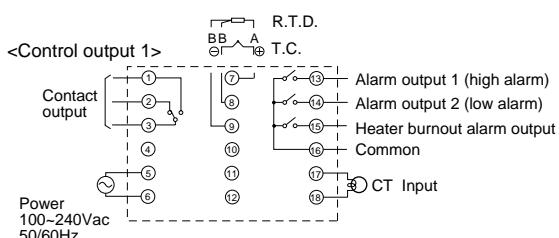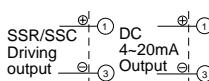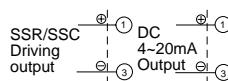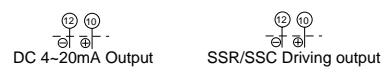
R.T.D.
T.C.

<Control output 1>

Contact output

Power 100~240Vac 50/60Hz

Alarm output 1 (high alarm)
Alarm output 2 (low alarm)
Heater burnout alarm output
Common
CT Input

Dual type

<Inputs>

DC1~5V
DC4~20mA   Note 1
250Ω

R.T.D.
T.C.

<Control output 1>

Contact output

Power 100~240Vac 50/60Hz

Contact output

Alarm output 1 (high alarm)
Alarm output 2 (low alarm)
Heater burnout alarm output
Common
CT Input

<Control output 1>

SSR/SSC Driving output   DC 4~20mA Output

<Control output 1>

SSR/SSC Driving output   DC 4~20mA Output

<Control output 2>

DC 4~20mA Output   SSR/SSC Driving output

<use M3.5 screw>

Note1: Use the 250Ω resistance(accessory).
Note2: SSR/SSC drive output and DC4~20mA output are not electrically insulated from inner circuits.
So,non-grounding type sensor must be used.

3) PXW5 · 9 · PXZ5 · 9 type

Standard type
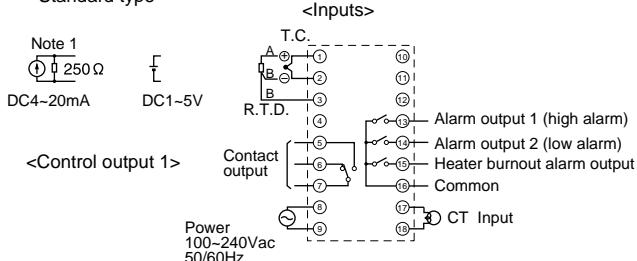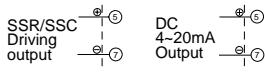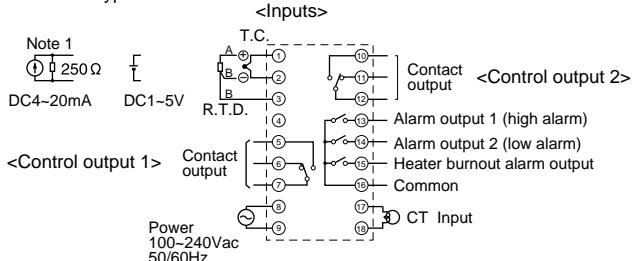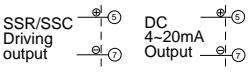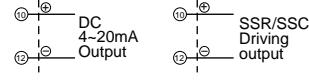
Note 1
250Ω
DC4~20mA   DC1~5V

<Inputs>
T.C.

R.T.D.

<Control output 1>

Contact output

Power 100~240Vac 50/60Hz

Alarm output 1 (high alarm)
Alarm output 2 (low alarm)
Heater burnout alarm output
Common
CT Input

Dual type

Note 1
250Ω
DC4~20mA   DC1~5V

<Inputs>
T.C.

R.T.D.

<Control output 1>

Contact output

Contact output   <Control output 2>

Power 100~240Vac 50/60Hz

Alarm output 1 (high alarm)
Alarm output 2 (low alarm)
Heater burnout alarm output
Common
CT Input

<Control output 1>

SSR/SSC Driving output   DC 4~20mA Output

<Control output 1>

SSR/SSC Driving output   DC 4~20mA Output

<Control output 2>

DC 4~20mA Output   SSR/SSC Driving output

<use M3.5 screw>

Note1: Use the 250Ω resistance(accessory).
Note2: SSR/SSC drive output and DC4~20mA output are not electrically insulated from inner circuits.
So,non-grounding type sensor must be used.

# [4] Connection diagram [for 24V DC/24V AC power supply]

1) PXW4 · PXZ4 · PXV4 type

Connection diagram (with alarm)

—Socket type—
(11Pin)

<Inputs>

Note 1

250Ω

DC4~20mA

DC1~5V

R.T.D

<Control output>
Contact output

Alarm output (1 point)

T.C.

(Back view)

Power 24Vac or 24Vdc 50/60Hz

<Alarm output>

Common
Alarm output1 (high alarm)
Alarm output2 (low alarm)

<Control output>

SSR/SSC Driving output

DC 4~20mA Output

Connection diagram (without alarm)

—Socket type—
(8 Pin)

<Inputs>

Note 1

250Ω

DC4~20mA

DC1~5V

R.T.D

Contact output

T.C.

(Back view)

Power 24Vac or 24Vdc 50/60Hz

<Control output>

SSR/SSC Driving output

DC 4~20mA Output

Note1: Use the 250Ω resistance(accessory).
Note2: SSR/SSC drive output and DC4~20mA output are not electrically insulated from inner circuits. So,non-grounding type sensor must be used.

2) PXW5 · 9 · PXZ5 · 9 type

—Standard type—

Note 1

250Ω   DC1~5V

DC4~20mA

<Inputs>

T.C.

R.T.D.

Contact output

Power 24Vac or 24Vdc 50/60Hz

Alarm output 1 (high alarm)
Alarm output 2 (low alarm)
Heater burnout alarm output
Common

CT Input

<Control output 1>

<Control output 1>

SSR/SSC Driving output

DC 4~20mA Output

<use M3.5 screw>

—Dual type—

Note 1

250Ω   DC1~5V

DC4~20mA

<Inputs>

T.C.

R.T.D.

Contact output

Power 24Vac or 24Vdc 50/60Hz

Contact output <Control output 2>

Alarm output 1 (high alarm)
Alarm output 2 (low alarm)
Heater burnout alarm output
Common

CT Input

<Control output 1>

<Control output 1>

SSR/SSC Driving output

DC 4~20mA Output

<Control output 2>

DC 4~20mA Output

SSR/SSC Driving output

Note1: Use the 250Ω resistance(accessory).
Note2: SSR/SSC drive output and DC4~20mA output are not electrically insulated from inner circuits. So,non-grounding type sensor must be used.

⚠ Caution: Before connection to each controller, carefully check the voltage and polarities of the power supply to be used.
The above connections correspond to 24 V AC or DC.
If power supply within 100 to 240 V is connected, each controller will be permanently damaged and will not operate.

PXW4   **PXW7**   **PXW5**   **PXW9**

PXZ4   **PXZ7**   **PXZ5**   **PXZ9**

Micro Controller PXW,PXZ,PXV

［5］ **Socket outline diagram** [PXW4,PXZ4,PXV4 type]

Without alarm	With alarm

ATX1NS type (US socket)
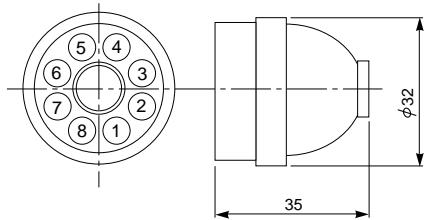
### TP411X type (rail mounting)
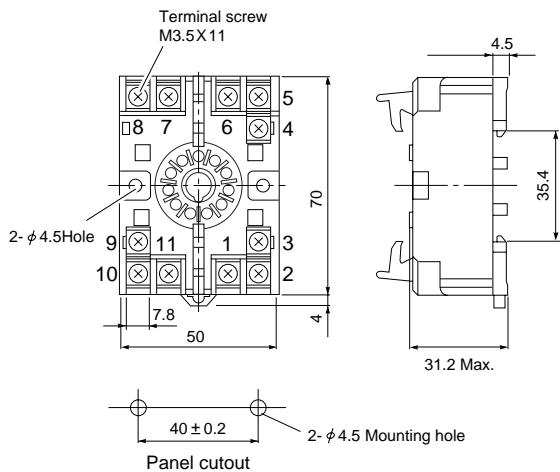
TP48SB type (back screw wiring)
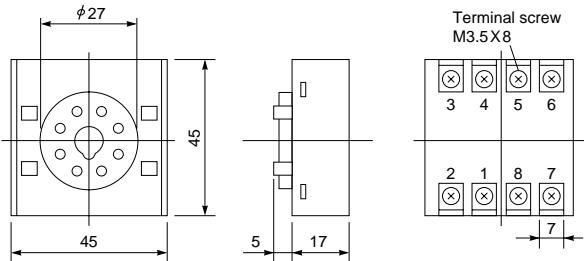

TP411SBA type (mounting panel)
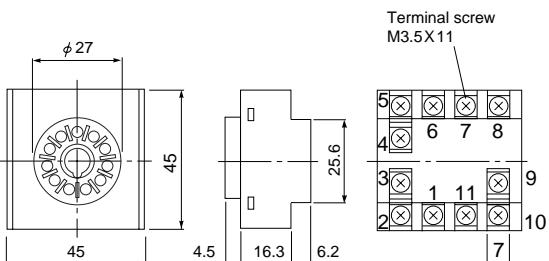
### TP48X type (rail mounting)
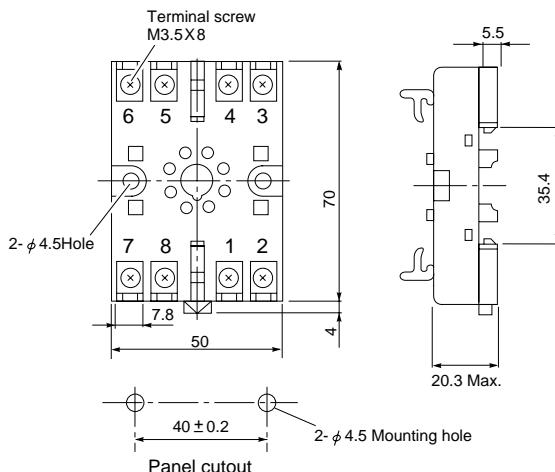
Appearance of various sockets

TP411X
TP48SB
TP48X
TP411SBA
ATX1NS
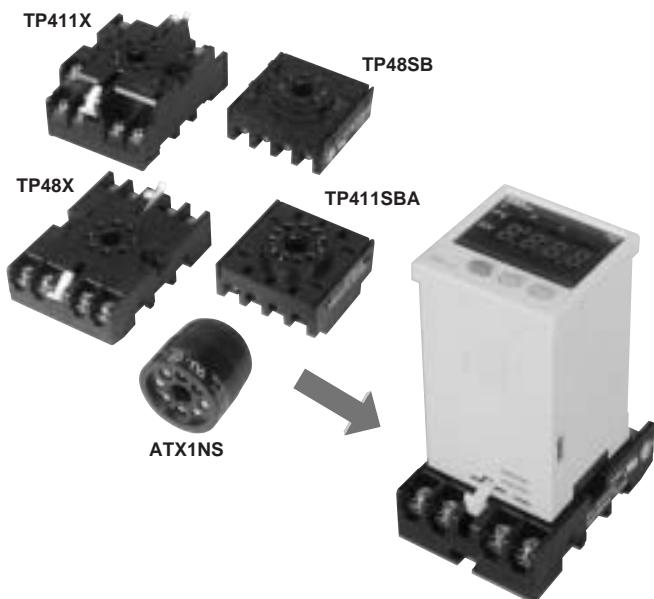
［6］ Alarm code table

Alarm

• Kind of alarm and alarm type code

P-AH (ALM1)	P-AL (ALM2)	Kind of alarm	Action diagram
0	0	Without alarm	→ PV
1	1	High absolute alarm	→ PV
2	2	Low absolute alarm	→ PV
3	3	High absolute alarm (with hold)	→ PV
4	4	Low absolute alarm (with hold)	→ PV
5	5	High deviation alarm	→ PV
6	6	Low deviation alarm	→ PV
7	7	High/low deviation alarm	→ PV
8	8	High deviation alarm (with hold)	→ PV
9	9	Low deviation alarm (with hold)	→ PV
10	10	High/low deviation alarm(with hold)	→ PV
11	11	High/low range deviation alarm(ALM1/2 individual action)	→ PV
−	12	High/low range absolute alarm	→ PV
−	13	High/low range deviation alarm	→ PV
−	14	High range absolute alarm and low range deviation alarm	→ PV
−	15	High range deviation alarm and low range absolute alarm	→ PV
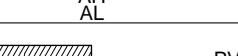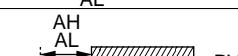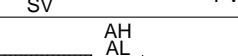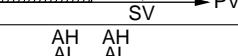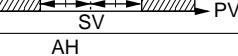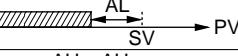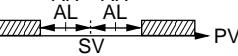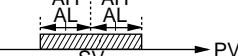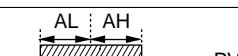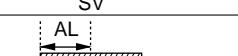
(Absolute alarm: codes 1–4; Deviation alarm: codes 5–10; Zone: codes 11–15)

Note : (1) Alarm output is ON in the alarm band marked ▨.
　　　(2) What is alarm with hold?
　　　　　The alarm is not turned ON immediately even when the measured value is in the alarm band.It turns ON when it goes out the alarm band and enters again.

SV (Set value)　PV (process value)　Upper/Lower limits deviation alarm
Power ON　Power OFF　Power ON
Upper/Lower limits deviation alarm
Upper/Lower limits deviation alarm with hold
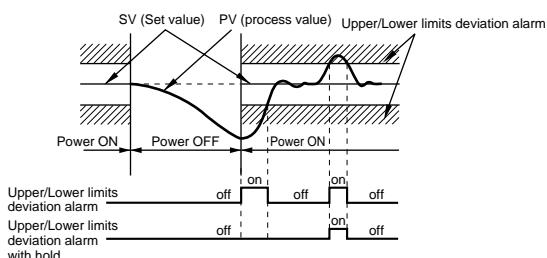
Comparison of the alarm code with conventional types
Conversion table for PYZ/W series "P-Ab" and PX series "P-AH" "P-AL"

• Alarm code conversion table(PYV/W/Z→PXV/W/Z)

Kind of alarm	PXV/W/Z code P-Ab	PXV/W/Z code P-AH	PXV/W/Z code P-AL
High deviation alarm	10	5	0
Low deviation alarm	5	0	6
Low deviation alarm with hold	69	0	9
High/low deviation alarm	15	5	6
High/low deviation alarm with hold	79	5	9
High-high absolute alarm	19	1	1
High absolute alarm	2	1	0
Low absolute alarm	1	0	2
Low absolute alarm with hold	65	0	4
High/low absolute alarm	3	1	2
High/low absolute alarm with hold	67	1	4
High absolute high deviation alarm	23	1	5
High absolute low deviation alarm	7	1	6
High deviation low absolute alarm	11	5	2
High deviation low absolute alarm with hold	75	5	4
High absolute low deviation alarm with hold	71	1	9
High/low absolute range alarm	179	−	12
High/low deviation range alarm	191	−	13
High absolute low deviation range alarm	183	−	14
High deviation low absolute range alarm	187	−	15

Heater burnout alarm current detector (CT)

・Specification : For 20-50A
・Type : CTL-12-S36-8F

φ 2.36
30
9
40
φ 12
M3 depth 4
30
40
7.5
15

・Specification : For 1-30A
・Type : CTL-6-S-H

21
15
7
2.8
φ 5.8
25
10.5
2.5
30
40
φ 3.5
10

Micro Controller PXW,PXZ,PXV
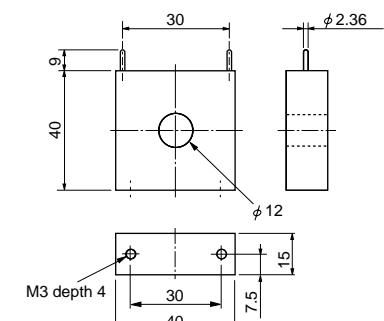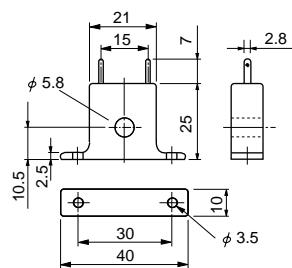
[7] Parameter table

PXW/PXV parameter table

Note : Figure with %* table below means "% of measuring range".

	Parameter	Setting range	Meaning of parameter	Unit	Value prior to delivery	User's set value	DSP assignment
No.1 block parameter	PRoG	roFF/rrUn/rHLd	Ramp soak control (start/stop/pause)	—	—		dsp1-1
	H	0-100%*	High alarm (ALM1) set value	Industrial/deviation industrial value	10		dsp1-2
	L	0-100%*	Low alarm (ALM2) set value	Industrial/deviation industrial value	10		dsp1-4
	HB	0.0-50.0	Heater burnout detect value setting (function OFF at 0)	A (ampere)	0.0		dsp1-8
	AT	0-2	Auto-tuning command (0:OFF/1:Standard/2:Low PV)	—	0		dsp1-16
	LoC	0-2	Setting lock (0:OFF/1:All lock/2:Lock,other than SV)	—	0		dsp1-32
No.2 block parameter	P	0.0-999.9	Proportional band (2-position action at 0)	%	5.0		dsp1-128
	I	0-3200	Integral time (integration OFF at 0)	Second	240		dsp2-1
	D	0.0-999.9	Differentional time (Differentiation OFF at 0)	Second	60.0		dsp2-2
	TC	1-150	Output 1 proportional cycle (RY:30/SSR:2/4 to 20mA:0)	Second	30/2/0		dsp2-4
	HYS	0-50%*	2-position action hysteresis	Deviation industrial value	1		dsp2-8
	TC2	1-150	Output 2 proportional cycle (RY:30/SSR:2/4 to 20mA:0)	Second	30/2/0		dsp2-16
	CooL	0.0-100.0	Cooling side proportional band coefficient	—	1.0		dsp2-32
	db	-50.0-50.0	Dead band	%	0.0		dsp2-64
	bAL	-100.0-100.0	Manual reset value (single 0.0/dual 50.0 prior to delivery)	%	0.0/50.0		dsp2-128
	Ar	0-100%*	Anti-reset wind up (100%* prior to delivery)	Deviation industrial value	100%*		dsp3-1
	P-n2	0-16	Input type code	—	Ordering specification		dsp3-2
	P-SL	-1999-9999	0% input scale	industrial value	Ordering specification Note3)		dsp3-4
	P-SU	-1999-9999	100% input scale	industrial value	Ordering specification Note3)		dsp3-8
	P-dP	0-2	Decimal point position code (0:□□□□/1:□□□.□/2:□□.□□)	—	Ordering specification Note3)		dsp3-16
	P-AH	0-11	High (ALM2) type code	—	Ordering specification		dsp3-32
	P-AL	0-15	Low (ALM1) type code	—	Ordering specification		dsp3-64
	PVOF	-10-10%*	Input bias	Deviation industrial value	0		dsp3-128
	SVOF	-50-50%*	Set value bias	Deviation industrial value	0		dsp4-1
	P-F	℃/℉	℃/℉ designation	—	Ordering specification		dsp4-2
	STAT	⋯	Ramp soak present position	—	—		dsp4-4
	SV-1	0-100%*	No.1 target value	industrial value	0% Note5)		dsp4-8
	TM1r	0-99h59m	No.1 ramp segment time	Hour/minute	0.00		dsp4-16
	TM1S	0-99h59m	No.1 soak segment time	Hour/minute	0.00		dsp4-32
	SV-2	0-100%*	No.2 target value	industrial value	0% Note5)		dsp4-64
	TM2r	0-99h59m	No.2 ramp segment time	Hour/minute	0.00		dsp4-128
	TM2S	0-99h59m	No.2 soak segment time	Hour/minute	0.00		dsp5-1
	SV-3	0-100%*	No.3 target value	industrial value	0% Note5)		dsp5-2
	TM3r	0-99h59m	No.3 ramp segment time	Hour/minute	0.00		dsp5-4
	TM3S	0-99h59m	No.3 soak segment time	Hour/minute	0.00		dsp5-8
	SV-4	0-100%*	No.4 target value	industrial value	0% Note5)		dsp5-16
	TM4r	0-99h59m	No.4 ramp segment time	Hour/minute	0.00		dsp5-32
	TM4S	0-99h59m	No.4 soak segment time	Hour/minute	0.00		dsp5-64
	Mod	0-15	Control designation before and after ramp soak	—	0 Note4)		dsp5-128
No.3 block parameter	P-n1	0-19	Control type code	—	Ordering specification		dsp6-2
	P-dF	0.0-900.0	Input filter time constant (filter OFF at 0)	Second	5.0		dsp6-4
	P-An	0-50%*	Alarm hysteresis	Deviation industrial value	1		dsp6-8
	PLC1	-3.0-103.0	Output 1 minimum ON pulse width	%	-3.0		dsp6-32
	PHC1	-3.0-103.0	Output 1 minimum OFF pulse width	%	103.0		dsp6-64
	PLC2	-3.0-103.0	Output 2 minimum ON pulse width	%	-3.0		dsp6-128
	PHC2	-3.0-103.0	Output 2 minimum OFF pulse width	%	103.0		dsp7-1
	FUZY	OFF/ON	Fuzzy control ON/OFF designation	—	OFF		dsp7-4
	ADJO	-50-50%*	Zero shift	Deviation industrial value	0		dsp7-16
	ADJS	-50-50%*	Span shift	Deviation industrial value	0		dsp7-32
	dSP1-7	0-255	Parameter display mask designation code	—	—		—

Note 1) Items shown in ▨ are not indicated at the time of delivery.   Note 2) Parameters shown in ☐ are indicated in accordance with your model.
Note 3) When you change these value, check all parameter's value after changing these value.
Note 4) Don't change this value from 0 to others.   Note5) 0% is equal to the setting value of "P-SL".

PXZ parameter table

Note : Figure with %* table below means "% of measuring range".

	Parameter	Setting range	Meaning of parameter	Unit	Value prior to delivery	User's set value	DSP assignment
No.1 block parameter	PRoG	oFF/rUn/HLd	Ramp soak control (start/stop/pause)	—	—		dsp1-1
	P	0.0-999.9	Proportional band (2-position action at 0)	%	5.0		dsp1-2
	I	0-3200	Integral time (integration OFF at 0)	Second	240		dsp1-4
	D	0.0-999.9	Differential time (Differentiation OFF at 0)	Second	60.0		dsp1-8
	AL	0-100%*	Low alarm (ALM2) set value	Industrial/deviation industrial value	10		dsp1-16
	AH	0-100%*	High alarm (ALM1) set value	Industrial/deviation industrial value	10		dsp1-32
	TC	1-150	Output 1 proportional cycle (RY:30/SSR:2/4 to 20mA:0)	Second	30/2/0		dsp1-64
	HYS	0-50%*	2-position action hysteresis	Deviation industrial value	1		dsp1-128
	Hb	0.0-50.0	Heater burnout detect value setting (function OFF at 0)	A (ampere)	0.0		dsp2-1
	AT	0-2	Auto-tuning command (0:OFF/1:Standard/2:Low PV)	—	0		dsp2-2
	TC2	1-150	Output 2 proportional cycle (RY:30/SSR:2/4 to 20mA:0)	Second	30/2/0		dsp2-4
	CooL	0.0-100.0	Cooling side proportional band coefficient	—	1.0		dsp2-8
	db	-50.0-50.0	Dead band	%	0.0		dsp2-16
	PLC1	-3.0-103.0	Output 1 minimum ON pulse width	%	-3.0		dsp2-32
	PHC1	-3.0-103.0	Output 1 minimum OFF pulse width	%	103.0		dsp2-64
	bAL	-100.0-100.0	Manual reset value (single 0.0/dual 50.0 prior to delivery	%	0.0/50.0		dsp3-1
	Ar	0-100%*	Anti-reset wind up (100%* prior to delivery)	Deviation industrial value	100%*		dsp3-2
	LoC	0-2	Setting lock (0:OFF/1:All lock/2:Lock,other than SV)	—	0		dsp3-4
	STAT	…	Ramp soak present position	—	—		dsp3-8
	SV-1	0-100%*	No.1 target value	industrial value	0% Note5)		dsp3-16
	TM1r	0-99h59m	No.1 ramp segment time	Hour/minute	0.00		dsp3-32
	TM1S	0-99h59m	No.1 soak segment time	Hour/minute	0.00		dsp3-64
	SV-2	0-100%*	No.2 target value	industrial value	0% Note5)		dsp3-128
	TM2r	0-99h59m	No.2 ramp segment time	Hour/minute	0.00		dsp4-1
	TM2S	0-99h59m	No.2 soak segment time	Hour/minute	0.00		dsp4-2
	SV-3	0-100%*	No.3 target value	industrial value	0% Note5)		dsp4-4
	TM3r	0-99h59m	No.3 ramp segment time	Hour/minute	0.00		dsp4-8
	TM3S	0-99h59m	No.3 soak segment time	Hour/minute	0.00		dsp4-16
	SV-4	0-100%*	No.4 target value	industrial value	0% Note5)		dsp4-32
	TM4r	0-99h59m	No.4 ramp segment time	Hour/minute	0.00		dsp4-64
	TM4S	0-99h59m	No.4 soak segment time	Hour/minute	0.00		dsp4-128
	Mod	0-15	Control designation before and after ramp soak	—	0 Note4)		dsp5-1
No.2 block parameter	P-n1	0-19	Control type code	—	Ordering specification		dsp5-4
	P-n2	0-16	Input type code	—	Ordering specification		dsp5-8
	P-dF	0.0-900.0	Input filter time constant (filter OFF at 0)	Second	5.0		dsp5-16
	P-SL	-1999-9999	0% input scale	industrial value	Ordering specification Note3)		dsp5-32
	P-SU	-1999-9999	100% input scale	industrial value	Ordering specification Note3)		dsp5-64
	P-AL	0-15	Low(ALM1)type code	—	Ordering specification		dsp5-128
	P-AH	0-11	High(ALM2)type code	—	Ordering specification		dsp6-1
	P-An	0-50%*	Alarm hysteresis	Deviation industrial value	1		dsp6-2
	P-dP	0-2	Decimal point position code (0:□□□□/1:□□□.□/2:□□.□□)	—	Ordering specification Note3)		dsp6-4
	PVOF	-10-10%*	Input bias	Deviation industrial value	0		dsp6-16
	SVOF	-50-50%*	Set value bias	Deviation industrial value	0		dsp6-32
	P-F	℃/℉	℃/℉ designation	—	Ordering specification		dsp6-64
	PLC2	-3.0-103.0	Output 2 minimum ON pulse width	%	-3.0		dsp6-128
	PHC2	-3.0-103.0	Output 2 minimum OFF pulse width	%	103.0		dsp7-1
	FUZY	OFF/ON	Fuzzy control ON/OFF designation	—	OFF		dsp7-2
	ADJO	-50-50%*	Zero shift	Deviation industrial value	0		dsp7-8
	ADJS	-50-50%*	Span shift	Deviation industrial value	0		dsp7-16
	dSP1-7	0-255	Parameter display mask designation code	—	—		—

Note 1) Items shown in ▢ are not indicated at the time of delivery.   Note 2) Parameters shown in ▢ are indicated in accordance with your model.
Note 3) When you change these value, check all parameter's value after changing these value.
Note 4) Don't change this value from 0 to others.   Note5) 0% is equal to the setting value of "P-SL".

Digital Thermostat (type:PAS3)

DIN 24× 48mm size
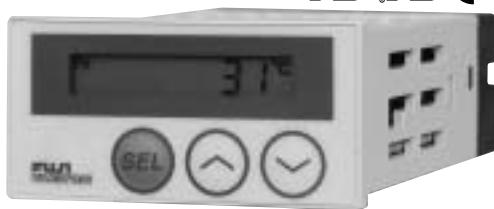
An alarm setter with on/off contact output.
**Most suited for detecting overheat in machines, equipments, etc.**
- Front panel having a DIN size of 24 x 48mm.
- Because thermocouples (5 types) and thermistors (0 to 100˚C) are connectable.
- Alarm set value and measured temperature value can be checked promptly using the front keys.
- This thermostat is capable of issuing 2 relay contact outputs. Therefore, any output of Upper/Lower limit pair, 2 upper limit and 2 lower limit can be selected.
- Mountable to a DIN rail using the DIN rail mounting adapter available at option. With this adapter, also mountable to a wall.

■Specifications

Item	Specification
Input	Number of inputs: 1 Input signal and measurable range: Refer to Table 1. Allowable signal source resistance: Thermocouple input 100 Ω max. Measurement cycle: 2 sec. or less Burnout function: Thermocouple input: UUU display Thermistor input: LLL display (Upscale or downscale at burnout settable) Input impedance: Thermocouple input 1 MΩ or higher Input filter: 0 to 90 sec. (settable in 1 sec. steps) Primary lag filter Input value compensation: Settable within ±10% of measurable range
Indication	Indication means: LCD (without back light) Value/parameter indication: 4 digits of 7 segments each (However, at the 1st digit, only - or 1 is indicated within -999 to 1999.) Contents of indication: Measured value, alarm set value 1, alarm set value 2, various parameters Each indicator of alarms 1 and 2, ˚C scale
Operation	Number of keys: 3 keys, sheet type keys (embossed) Alarm value setting resolution: 1˚C Key lock function: (Change of setting can be inhibited.)
Accuracy	Indication accuracy: Refer to Table 1. (However, error of a temperature sensor is not included.) Reference contact compensation error: ±3˚C (at 23˚C)
Alarm output	Number of outputs: 1 or 2 (as specified in CODE SYMBOLS) Contact structure: 1a contact Alarm type: Refer to Table 2. Contact capacity: 220 V AC/30 V DC, 2 A (resistance load) 220 AC/30 DC, 1 A (inductive load) Mechanical life of contact: 20 million activations or more (100 activations/min.) Electrical life of contact: 100,000 activations or more (rated load) Output resetting cycle: 2 sec. or less Alarm value settable range: Settable within 0 to 100% of measurable range Hysteresis width settable range: 0 to 110% of measurable range (settable in 1˚C steps) Alarm action delay time: Settable within 1 to 120 sec.
Power supply	Power supply voltage: 100 V (–15%) to 240 V (+10%) AC 50/60 Hz (±10%) Power consumption: 3 VA max. (with 100 V AC), 6 VA max. (with 240 V AC)
Operating conditions	Ambient temperature: 0 to 50˚C Ambient humidity: 90% RH max. (condensation unallowable)
Applicable standards	UL, C-UL, CE mark.
Body structure	Mounting method: Panel flush mounting External dimensions (H x W x D): 24 x 48 x 85 mm Weight: Approx. 100 g Casing material: Plastic (corresponding to flame resistance grade UL94V-0) Front protective structure: IP66 (corresponding to NEMA-4X) when using Fuji's genuine front waterproof packing part External terminals: Plug-in type (for bar terminals) Finish color: Ivory

■Alarm output hysteresis width

Alarm output hysteresis width (˚C)

(1˚C)   ON

Example) Alarm set value 50˚C
Alarm output hysteresis width 1˚C

Example 49˚C   Set value 50˚C

■Input signal, measurable range and indication accuracy (Table 1)

Input signal		Measurable range (˚C)	Minimum resolution	Indication accuracy
Thermocouple	J	0 to 800	1˚C	±3˚C
	K	0 to 1200	1˚C	±3˚C
	R	0 to 1600	4˚C	±4˚C
	T	0 to 400	1˚C	±3˚C
	E	0 to 600	1˚C	±3˚C
Thermistor	PB-36	0 to 100	1˚C	±4˚C

Note 1) Correct indication is not ensured within a range from 0 to 500˚C for an R type thermocouple.
Note 2) Switching between a thermistor and a thermocouple is not allowed.
Thermocouple input type can be changed by front key operation.

■Alarm types (Table 2)

| Code of PA1, 2	Alarm direction	Set value notation	With holding (Note 2)	Relay action at alarm	Action diagram (Note 1)
0	No alarm	–	–	–	
1	Upper limit	Absolute value	No	Relay excitation	
2	Lower limit	Absolute value	No	Relay excitation	
3	Upper limit	Absolute value	Yes	Relay excitation	
4	Lower limit	Absolute value	Yes	Relay excitation	
5	Upper limit	Absolute value	No	Relay non-excitation	
6	Lower limit	Absolute value	No	Relay non-excitation	
7	Upper limit	Absolute value	Yes	Relay non-excitation	
8	Lower limit	Absolute value	Yes	Relay non-excitation	

(Note 1) How to read action
▭ area: A range in which "ALM1 or ALM2" is indicated on LCD at the front.
▥ area: A range in which alarm relay is excited
△point: Alarm set value
The horizontal axis represents measured values (PV).

(Note 2) What is the hold function?
Even if the process value is within the alarm range when turning on power, the alarm does not turn on immediately but only after it leaves and then returns to the alarm range.

PV (process value)

Period where lower limit alarm is output

Power ON   Power OFF   Power ON

Lower limit alarm
Lower limit alarm (with hold)

■DIN rail mounting

② Mount PAS3.

① Connect wires to PAS3.
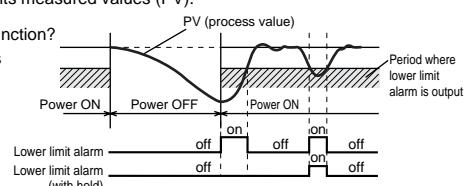
■Model

Input signal	Temperature sensor	Number of alarm	Model
Thermocouple	Option	1	PAS3K1Y1
		2	PAS3K1A1
Thermistor	Provided	1	PAS3H1Y1
		2	PAS3H1A1

■Optional items

Contents	Model
DIN rail mounting adapter	ZZP*CTK368715P1

■Setting at delivery

Measurable range	K thermocouple input (0 to 1200˚C)
	Thermistor input (0 to 100˚C)
Alarm set value	K thermocouple input: For 1-point alarm
	(upper limit 1200˚C)
	K thermocouple input: For 2-point alarm
	(upper limit 1200˚C, lower limit alarm 0˚C)
	Thermistor input: For 1-point alarm
	(upper limit 100˚C)
	Thermistor input: For 2-point alarm
	(upper limit 100˚C, lower limit alarm 0˚C)
Alarm hysteresis width	1˚C
Alarm delay time	0 sec.
Indication	Measured value
Burnout	Upscale at burnout
Input filter	5 sec.
Input value compensation	0%

Note 1) Switching between a thermistor and a thermocouple is not allowed.
Note 2) Thermocouple input type can be changed by front key operation.

■Scope of delivery

Thermostat unit, panel-mounting adapter,
front waterproof packing
Thermistor sensor added for thermistor input

■Atached thermistor sensor

• Attachment for thermistor-input thermostat

Measurable range	0 to 100˚C
B constant	3390 K
Nominal resistance value	6 kΩ (0˚C)
Lead wire	Heat-resisting vinyl chloride wire
Lead wire length	500 mm
Lead wire heat resisting temperature	−20 to 105˚C
Color code	Black
Accuracy	Within ±2˚C

• Outline diagram (unit: mm)
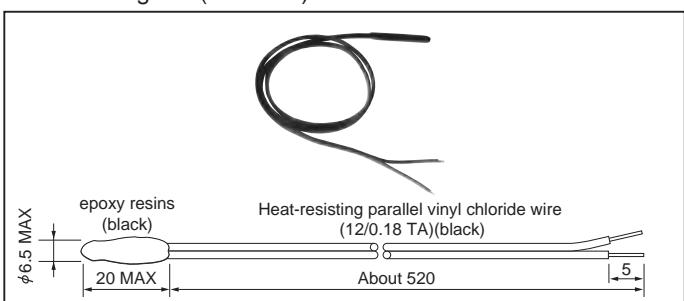
■Connection diagram
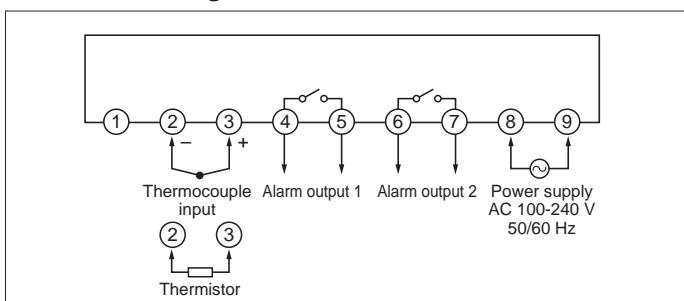
■Outline diagram (unit:mm)

■Panel cutout

For mounting "n" units

For close mounting
in horizontal direction

This mounting does not meet
NEMA-4X/IP66 (front waterproof
specification).
(Because the packing cannot be used
in horizontally close mounting.)

■DIN rail mounting adapter (option)

DIN rail mounting adapter (option)

For mounting on wall

Tightening torque 0.49Nm or less
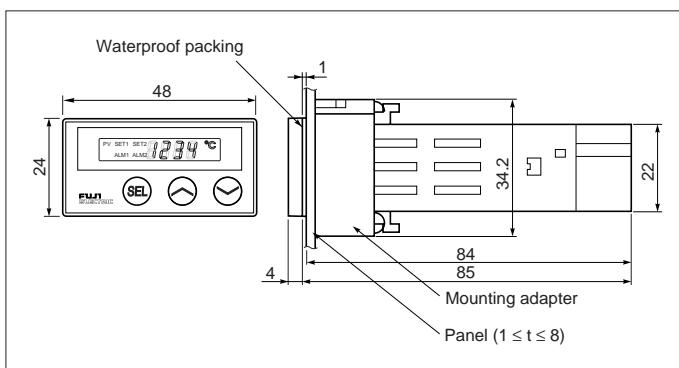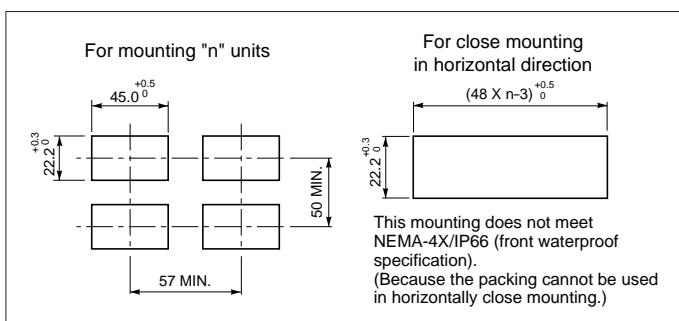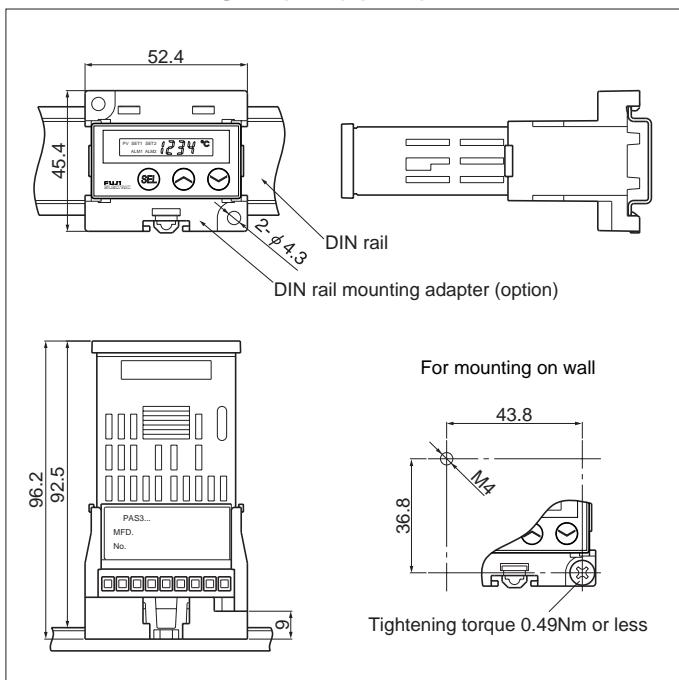
■Usable wiring materials

• Wire (TYPE: Single wire)
Gauge: AWG28 (0.1 mm^2) to AWG16 (1.25 mm^2)
Strip-off length: 5 to 6 mm

AWG28 to AWG16

5 to 6 mm

• Bar terminal
Dimension of strip-off conductor section: 2 x 1.5 mm or smaller
Length of strip-off conductor section: 5 to 6 mm

1.5MAX.

2MAX.

5 to 6 mm
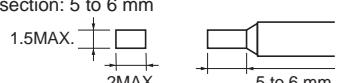
Temperature Sensor
Specifications / Outline diagram

Kind	Type	External dimensions (mm)	Specifications					Type specification
			Kind of element	Measurable temperature	Protecting tube		Cable length (mm)	
					Material	Insertion length (mm)		
Sheathed thermocouple	LCK-L type, extension cable design, with compensating wire		K thermocouple class 2	0~750˚C	SUS316	150 300 150 300	1 1 3 3	LCK-015L1 LCK-030L1 LCK-015L3 LCK-030L3
	LCK-G type, terminal box design					150 300	– –	LCK-015G0 LCK-030G0
	LCJ-L type, extension cable design, with compensating wire		J thermocouple class 2	0~650˚C	SUS316	150 300 150 300	1 1 3 3	LCJ-015L1 LCJ-030L1 LCJ-015L3 LCJ-030L3
	LCJ-G type, terminal box design					150 300	– –	LCJ-015G0 LCJ-030G0
Resistance bulb	LCZ-L type, extension cable design, with 1 m cable		Pt 100 Ω, class B, 3-wire system	-200~250˚C	SUS304	150 300	1 1	LCZ-015L1 LCZ-030L1
	LCZ-G type, terminal box design					150 300	1 1	LCZ-015G0 LCZ-030G0
Sheathed resistance bulb	LCH-L type, extension cable design, with 1 m cable		Pt 100 Ω, class B, 3-wire system, sheathed	-200~500˚C	SUS316	150 300	1 1	LCH-015L1 LCH-030L1
	LCH-G type, terminal box design					150 300	1 1	LCH-015G0 LCH-030G0
Low-cost thermocouple	LCA-K type, with compensating wire		K thermocouple class 2	0~350˚C	SUS304	100	1	LCA-K-L100
	LCA-J type, with compensating wire		J thermocouple class 2			100	1	LCA-J-L100
Low-cost resistance bulb	LCA-PT type		Pt 100 Ω, class B, 3-wire system	0~250˚C	SUS304	100	1	LCA-T-L100
Low-cost thermistor	LCA-TH type Note) Output characteristic unique to Fuji		Thermistor 0 to 150˚C -50~100˚C	0~150˚C -50~100˚C	SUS304	100 100	1 1	LCA-TH-L100 　0-150C LCA-TH-L100 　-50-100C
Fitting (separately available)	—	R1/8 or R1/4	For protecting tube diameter φ3.2, R1/8 thread For protecting tube diameter φ3.2, R1/4 thread For protecting tube diameter φ4.8, R1/8 thread For protecting tube diameter φ4.8, R1/4 thread					C32-A C32-B C48-A C48-B

Besides the above sensors, special types are available. Contact Fuji Electric's sales representative.

Temperature sensor selection guide

Sensor comes in three types; thermocouple, resistance bulb and thermistor. An appropriate sensor should be selected in consideration of the following characteristics.

■ Characteristics of each sensor

Item			Thermocouple		Resistance bulb		Thermistor	
			Sheathed type	With protecting tube	Sheathed type	With protecting tube	Sheathed type	With protecting tube
Measuring principle			Thermoelectromotive force		Change of electrical resistance with time (metal)		Change of electrical resistance with time (semiconductor)	
Process conditions	Temperature	Below -50°C	○	○	○	○	×	×
		-50 to 200°C	○	○	○	○	○	○
		200~1000°C	○	○	△	△	×	×
		Above 1000°C	○	○	×	×	×	×
	Small heat capacity substance		△	×	×	×	△	×
	Gas		○	○	○	○	○	○
	Liquid		○	○	○	○	○	○
	Corrosiveness		△	○	△	○	×	○
	Dust		○	○	○	○	○	○
Performance	Accuracy		△	△	○	○	△	△
	Response		○	△	△	×	○	△
	Sensitivity		△	△	△	△	○	○
	Lifetime		△	○	△	○	×	△
Characteristics	Advantage		Temperature measurable in small area / Appropriate material selectable depending on temperature / Time delay slight / Less affected by vibration and shock		Measurable with high accuracy / Temperature range near normal temperature is accurately measurable.		Time delay slight / High sensitivity	
	Drawback		Reference junction compensating mechanism necessary / Compensating wire necessary / Significantly affected by noise voltage		Influenced by self-heating / Unusable for high temperature / Vulnerable to mechanical shock		Substantially changed with time lapse / Linearity poor / Measuring range narrow	

■ Types and characteristics of thermocouples

Symbol	Main material		Working temperature (°C)		Feature
	Positive lead	Negative lead	Normal limit	Allowable overheat limit	
B	Pt70, Rh30	Pt94, Rh6	1500	1700	Usable for highest temperature among the types defined in JIS.
R	Pt87, Rh13	Pt100	1400	1600	Most used among platinum thermocouples.
S	Pt90, Rh10	Pt100	1400	1600	Many applications in Europe and U.S.A. Every platinum thermocouple is vulnerable to reducing atmosphere.
K	Ni, Cr	Ni, Ae	650~1000	850~1200	Many applications due to broad working temperature range. Vulnerable to reducing atmosphere.
E	Ni, Cr	Ni, Cu	450~700	500~800	Largest thermoelectromotive force among the thermocouples defined in JIS.
J	Fe	Ni, Cu	400~600	500~750	Less affected by reducing atmosphere, but positive lead iron apt to be oxidized.
T	Cu	Ni, Cu	200~300	250~350	Less affected by reducing atmosphere. Characteristic remains excellent down to comparatively low temperature (300°C).
N	Ni, Cr	Ni, Si	650~1100	700~1200	Developed as a type to replace K thermocouple. More stable.
PL2	Pt31, Pd55, Au14	Pd35, Au65	1300		Almost the same characteristics as K thermocouple, but usable at higher temperature and more durable.

(Note) N (Nicrosil Nisil) and PLⅡ (Platinel-Ⅱ) are not standardized in JIS.

Compensating Wire for Thermocouple (according to JIS C1610)   (Note) Class 2 will be excluded from JIS in future.

Distinction of surface coating by color

Kind	Class1	Class2 Note)	Old JIS	Kind	Class1	Class2 Note)	Old JIS
K	Green	Blue	Blue	S	Orange	Black	Black
J	Black	Yellow	Yellow	N	Pink	—	—
B	Gray	Gray	Gray	E	Bluish purple	Purple	Purple
R	Orange	Black	Black	T	Brown	Brown	Brown

Distinction of polarity by color

Polarity	Distinction of core coating by color		
	Class1	Class2 Note)	Old JIS
Positive side	Same color as surface coating in the table at left	Red	Red
Negative side	White	White	White

Cross-sectional structure

Core
Core coating
Surface coating
Shield
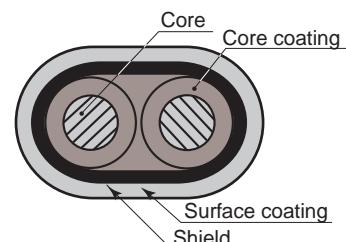
List of temperature controllers

PX Series

Classification	3-key type with large display				Digital thermostat	3-key type with PV/SV selective display	3-key type with PV/SV independent display	
Type	PXR3	PXR4	PXR5	PXR9	PAS3	PXV4	PXW4	

Front view (size mm)

Standard type — PXV4 (48✕48), PXW4 (48✕48)

Waterproof type — PXR3 (48✕24), PXR4 (48✕48), PXR5 (48✕96), PXR9 (96✕96), PAS3 (48✕24), PXV4 (48✕48), PXW4 (48✕48)

		3-key type with large display	Digital thermostat (PAS3)	PXV4	PXW4
Input signal	Pt100	●	−	●	●
	J thermocouple	●	●	●	●
	K thermocouple	●	●	●	●
	R thermocouple	●	●	●	●
	B thermocouple	●	−	●	●
	S thermocouple	●	−	●	●
	T thermocouple	●	●	●	●
	E thermocouple	●	●	●	●
	N thermocouple	●	−	●	●
	PLⅡ thermocouple	●	−	●	●
	1 to 5V DC	●	−	●	●
	4 to 20mA DC	● (With resistor)	−	● (With resistor)	● (With resistor)
Output signal	Relay	●	●	●	●
	For SSR/SSC drive	●	−	●	●
	4 to 20mA DC	●	−	●	●
Control method	ON-OFF	●	●	●	●
	PID	●	−	●	●
	Auto tuning PID	●	−	●	●
	Fuzzy	●	−	●	●
	Self-tuning	●	−	−	−
	Heating/cooling control	●	−	−	−
Indicating accuracy		±0.5% FS ±1digit ±1˚C	±3˚C	±0.5% FS ±1digit ±1˚C	
Communicating function (RS-485)		●	−	−	−
Transfer output in 4 to 20 mA DC		● (For PXR4, 5 and 9, contact Fuji Electric.)	−	−	−
Timer function		●	−	−	−
Digital input		●	−	−	−
Ramp soak function		● (8 ramp/soak)	−	● (4 ramp/soak)	● (4 ramp/soak)
Alarm output		●	●	●	●
Heater burnout alarm (current output unavailable)		● (Unavailable for PXR3)	−	−	−
Power supply voltage		100 to 240 V AC, 50/60 Hz or 24 V AC/DC (For PXR4, 5 and 9, contact Fuji Electric.)	100 to 240V AC	100 to 240 V AC, 50/60 Hz or 24 V AC/DC	
Front waterproof structure		●	●	●	●

3-key type with PV/SV independent display			8-key type with PV/SV selective display	8-key type with PV/SV independent display			Classification
PXW5	PXW7	PXW9	PXZ4	PXZ5	PXZ7	PXZ9	Type

Standard type — Front view (size mm):
PXW5 (48×96), PXW7 (72×72), PXW9 (96×96), PXZ4 (48×48), PXZ5 (48×96), PXZ7 (72×72), PXZ9 (96×96)

Waterproof type — Front view (size mm):
PXW5 (48×96), PXW7 (72×72), PXW9 (96×96), PXZ4 (48×48), PXZ5 (48×96), PXZ7 (72×72), PXZ9 (96×96)

PXW5 / PXW7 / PXW9	PXZ4 / PXZ5 / PXZ7 / PXZ9	Classification	
●	●	Pt100	Input signal
●	●	J thermocouple	
●	●	K thermocouple	
●	●	R thermocouple	
●	●	B thermocouple	
●	●	S thermocouple	
●	●	T thermocouple	
●	●	E thermocouple	
●	●	N thermocouple	
●	●	PLⅡ thermocouple	
●	●	1 to 5V DC	
● (With resistor)	● (With resistor)	4 to 20mA DC	
●	●	Relay	Output signal
●	●	For SSR/SSC drive	
●	●	4 to 20mA DC	
●	●	ON-OFF	Control method
●	●	PID	
●	●	Auto tuning PID	
●	●	Fuzzy	
−	−	Self-tuning	
●	● (Unavailable for PXZ4)	Heating/cooling control	
±0.5% FS ±1digit ±1˚C	±0.5% FS ±1digit ±1˚C	Indicating accuracy	
−	−	Communicating function (RS-485)	
−	−	Transfer output in 4 to 20 mA DC	
−	−	Timer function	
−	−	Digital input	
● (4 ramp/soak)	● (4 ramp/soak)	Ramp soak function	
●	●	Alarm output	
●	● (Unavailable for PXZ4)	Heater burnout alarm (current output unavailable)	
100 to 240 V AC, 50/60 Hz or 24 V AC/DC		Power supply voltage	
●	●	Front waterproof structure	

SPECIAL ATTENTION NEEDED for all Micro Controller X series products

(Please read carefully the following instructions.)

⚠ WARNING   **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.