

*Z*Series Digital Temperature Controller
Micro Controller X Series



Renovation of Control Technology for the 21st Century

...Full scale multi-function digital controller...

C O N T E N T S

MICRO CONTROLLER X SERIES

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MICRO CONTROLLER X (PXV4,PXW,PXZ)

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MICRO CONTROLLER X (PXV 3)

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Safety assurance product conforming
with international standards



● ISO9001

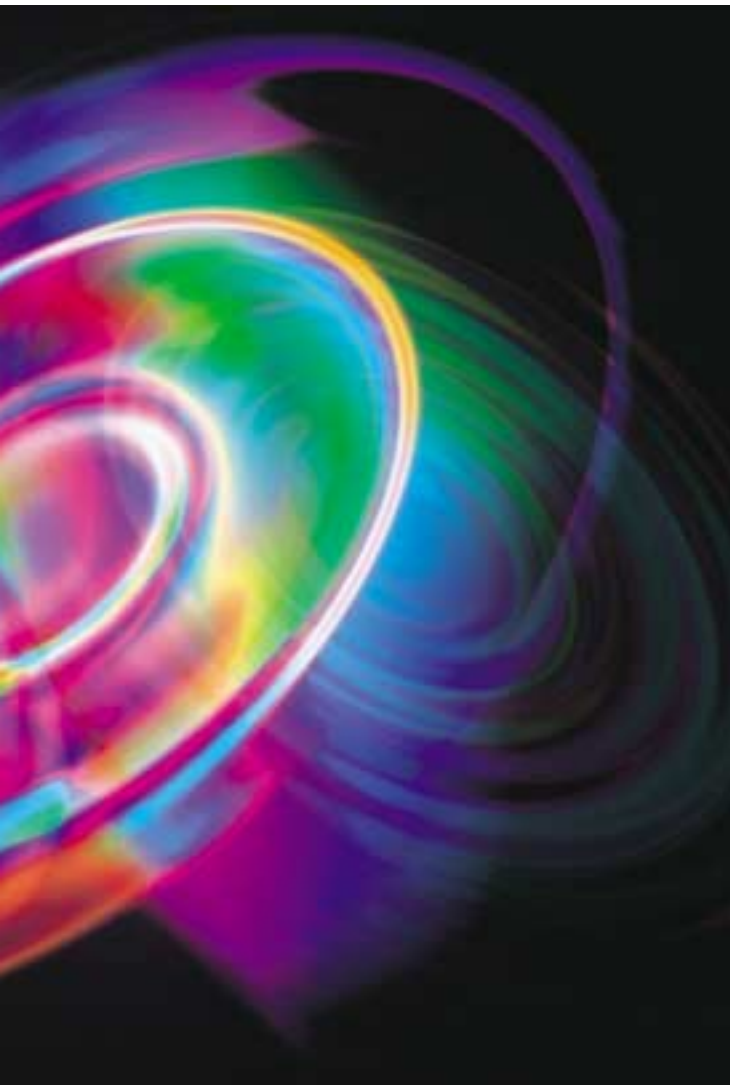
Standards on the verification of the quality of the systems involving the design/development, manufacture, installation and associated service. Fuji Tokyo Factory has been approved by JQA (Japan's Quality Assurance Organization) (JMI-0122).

● UL Standards

Safety standards of the Underwriters Laboratories Inc., USA. There are many states and cities in USA, requiring UL approval for sales of electric equipment.

● C-UL Standards

Standards on the type-approval tests performed by UL according to the CSA Standards (Canadian safety standards), equivalent to CSA type-approval tests. Electrical equipment which does not comply with the CSA Standards cannot be marketed in Canada.



◆ Features

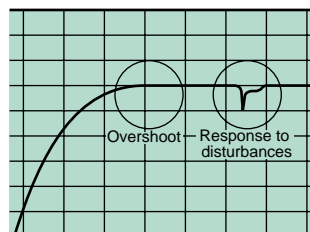
Series types

- 3-key type/8-key type
- PV/SV independent or selective display
- New series of micro controller (size; 48 X 24mm) designed for mounting on small type devices
- New series of micro controller complied with 24VAC/24VDC power supply unit

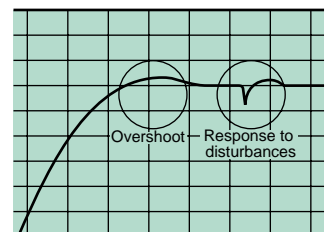
Superb functions

- Fuzzy control function is self-contained in all series and all models
- Excellent control that is free from effects of overshoot and external disturbance

Fuzzy control



Typical PID control



Easy operation

- 3-key operation system(PXV/PXW Series)

Excellent environment resisting characteristic

- Front panel water-proof structure conforming with NEMA4X(IEC Standards equivalent to IP66), allowing use in a place where subjected to a direct spray of water.

● CE mark

Safety standards of the European Union(EU)pertaining to CE marking.Only the products complying with the CE marking standards are allowed to be marketed in the countries of Europe.



● NEMA4X

Water-proofing standards in America.NEMA4X is equivalent to IP66.(IEC Standards)
Water-proofing must be ensured against water spray of 264 ℓ /min from a 2.5cm dia.hose.


MICRO CONTROLLER X (PXV4, PXW, PXZ)

1 Products range

3-key type PXV series (PV/SV selective display type)

Size		48 X 48mm
Type		PXV4
External appearance	Standard	
	Water-proof type	

3-key type PXV series 1/32DIN (PV/SV selective display type)

Size		48 X 24.5mm
Type		PXV3
External appearance	Water-proof type	

3-key type PXW series (PV/SV independent display type)

Size		48 X 48mm	48 X 96mm	72 X 72mm	96 X 96mm
Type		PXW4	PXW5	PXW7	PXW9
External appearance	Standard				
	Water-proof type				

8-key type PXZ series (PV/SV independent display type)

Size		48 X 48mm	48 X 96mm	72 X 72mm	96 X 96mm
Type		PXZ4(PV/SV selective display type)	PXZ5	PXZ7	PXZ9
External appearance	Standard				
	Water-proof type				

2 Ordering code

PXV

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

Digit	Specification	Note	4	5	6	7	8	9	10	11	12	13	14
4	<Front panel size> 48 X 48mm		4										
5	<Input signal> Thermocouple(C) Thermocouple(F) Resistance bulb Pt 100,3-wire(C) Resistance bulb Pt 100,3-wire(F) 4-20mA DC 1-5V DC		T R N S B A										
6	<Control output> Contact reverse action output Contact direct action output SSR/SSC drive reverse action output SSR/SSC drive direct action output 4-20mA DC reverse action output 4-20mA DC direct action output		A B C D E F	Y									
7	<Control output 1> Contact reverse action output Contact direct action output SSR/SSC drive reverse action output SSR/SSC drive direct action output 4-20mA DC reverse action output 4-20mA DC direct action output		A B C D E F										
8	<Version No.>						2						
9	<Additional specifications> None With process alarm(1point) With 4 ramp/soak With process alarm (1point) + 4 ramp/soak With process alarm (2points) With process alarm (2points) + 4ramp/soak							0 1 4 5 F G					
10	<Instruction manual and power supply voltage> Japanese,100 to 240 Vac English,100 to 240 Vac Japanese, 24 Vac/24Vdc English, 24 Vac/24Vdc								Y V A B				
11	<Socket> None									0 0 0			
12	For rail mounting (8-pin screw terminal)	Note1								1 0 0			
13	For panel mounting (8-pin screw terminal) For panel mounting (8-pin soldered terminal) For rail mounting (11-pin screw terminal) For panel mounting (11-pin screw terminal)	Note2 Note3 Note4 Note5								2 0 0 3 0 0 4 0 0 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

Digit	Specification	Note	4	5	6	7	8	9	10	11	12	13	14
4	<Front panel size> 48 X 48mm 48 X 96mm 72 X 72mm 96 X 96mm		4 5 7 9										
5	<Input signal> Thermocouple(C) Thermocouple(F) Resistance bulb Pt 100,3-wire(C) Resistance bulb Pt 100,3-wire(F) 4-20mA DC 1-5V DC		T R N S B A										
6	<Control output 1> Contact reverse action output Contact direct action output SSR/SSC drive reverse action output SSR/SSC drive direct action output 4-20mA DC reverse action output 4-20mA DC direct action output		A B C D E F										
7	<Control output 2> None Contact reverse action output Contact direct action output SSR/SSC drive reverse action output SSR/SSC drive direct action output 4-20mA DC reverse action output 4-20mA DC direct action output	Note6 Note6 Note6 Note6 Note6 Note6				Y A B C D E F							
8	<Version No.>						2						
9	<Additional specifications> None With process alarm With heater burnout alarm With process alarm + heater burnout alarm With 4 ramp/soak With process alarm + 4 ramp/soak With heater burnout alarm + 4 ramp/soak With process alarm + heater burnout alarm + 4 ramp/soak With process alarm (2points) With process alarm (2points) + 4ramp/soak	Note8 Note6 Note6 Note6 Note8 Note6 Note6 Note6 Note9 Note9						0 1 2 3 4 5 6 7 F G					
10	<Instruction manual and power supply voltage> Japanese,100 to 240 Vac English,100 to 240 Vac Japanese, 24 Vac/24Vdc English, 24 Vac/24Vdc	Note7 Note7							Y V A B				
11	<Socket> None									0 0 0			
12	For rail mounting (8-pin screw terminal)	Note1								1 0 0			
13	For panel mounting (8-pin screw terminal) For panel mounting (8-pin soldered terminal) For rail mounting (11-pin screw terminal) For panel mounting (11-pin screw terminal)	Note2 Note3 Note4 Note5								2 0 0 3 0 0 4 0 0 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

Digit	Specification	Note	4	5	6	7	8	9	10	11	12	13	14
4	<Front panel size> 48 X 48mm 48 X 96mm 72 X 72mm 96 X 96mm		4 5 7 9										
5	<Input signal> Thermocouple(C) Thermocouple(F) Resistance bulb Pt 100,3-wire(C) Resistance bulb Pt 100,3-wire(F) 4-20mA DC 1-5V DC		T R N S B A										
6	<Control output 1> Contact reverse action output Contact direct action output SSR/SSC drive reverse action output SSR/SSC drive direct action output 4-20mA DC reverse action output 4-20mA DC direct action output		A B C D E F										
7	<Control output 2> None Contact reverse action output Contact direct action output SSR/SSC drive reverse action output SSR/SSC drive direct action output 4-20mA DC reverse action output 4-20mA DC direct action output	Note6 Note6 Note6 Note6 Note6				Y A B C D E F							
8	<Version No.>						2						
9	<Additional specifications> None With process alarm With heater burnout alarm With process alarm + heater burnout alarm With 4 ramp/soak With process alarm + 4 ramp/soak With heater burnout alarm + 4 ramp/soak With process alarm + heater burnout alarm + 4 ramp/soak With process alarm (2points) With process alarm (2points) + 4ramp/soak	Note8 Note6 Note6 Note8 Note6 Note6 Note6 Note9 Note9						0 1 2 3 4 5 6 7 F G					
10	<Instruction manual and power supply voltage> Japanese,100 to 240 Vac English,100 to 240 Vac Japanese, 24 Vac/24Vdc English, 24 Vac/24Vdc	Note9 Note7							Y V A B				
11	<Socket> None									0 0 0			
12	For rail mounting (8-pin screw terminal)	Note1								1 0 0			
13	For panel mounting (8-pin screw terminal) For panel mounting (8-pin soldered terminal) For rail mounting (11-pin screw terminal) For panel mounting (11-pin screw terminal)	Note2 Note3 Note4 Note5								2 0 0 3 0 0 4 0 0 5 0 0			
14	<Optional specification> Front panel water-proof structure (NEMA-4X), black case												D

Note1) If not otherwise specified when ordering, the input signal and range are as follows :

Thermocouple input : K thermocouple, 0 to 400°C (SV value at 0°C)

Resistance bulb input : 0 to 150°C (SV value at 0°C)

Voltage input : Scaling 0 to 100% (SV value 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 kind 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: ATX2PSB

Note3) Type: ATX1NS

Note4) Type: TP411X

Note5) Type: TP411SB

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 heater 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) Available only on 48 X 48mm type.

MICRO CONTROLLER X (PXV4, PXW, PXZ)

3

Specifications

PXV/PXW/PXZ

<Control function> — Standard type

Control action	PID control with auto-tuning/Fuzzy control with auto-tuning
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 999.9sec, setting in 0.1sec 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	0 to 50% of measuring range, 2-position action only
Anti-reset wind up	0 to 100% of measuring range, auto setting with auto-tuning
Input sampling cycle	0.5sec
Control cycle	0.5sec

<Control function> — Dual output type(heating/cooling type)

Heating proportional band(P)	0 to 999.9% of measuring range
Cooling proportional band(P)	Heating proportional band X cooling proportional band coefficient Cooling proportional band coefficient=0 to 100.0 0:2-position 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=0:2-position action(without dead band)for heating and coolingI,D=0:Proportional action	
Proportional cycle	1 to 150sec, relay contact output, SSR/SSC drive output only
Hysteresis width	2-position 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 PL2 Resistance bulb: Pt100 Voltage/current: 1 to 5V DC 4 to 20mA DC (Current input is used with supplied 250 Ω external resistor)
Input range	See Measuring range table.
Burnout	For thermocouple/resistance bulb input, control output over scale direction is selectable 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 Electrical life:100 thousand cycles or more Minimum switching current:100mA(24Vdc) SSR/SSC drive(voltage pulse): 15 to 30V DC at ON/ 0.5V DC or less at OFF, Max. current: 60mA 25mA(With alarm 2points on 48 X 48mm size) 4 to 20mA DC: Allowable load resistance;600 Ω or less
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<Output> — Dual output type(heating/cooling type)

Control output	For dual output type, 1 of the following 3 types is selected on both heating and cooling types. 48 X 48mm type is not acceptable. Relay contact(SPDT contact): 220V AC/30V DC, 3A(resistive load) Mechanical life:10 million cycles or more Electrical life:100 thousand cycles or more Minimum switching current:100mA(24Vdc) 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;600 Ω or less (Note)When SSR/SSC drive output of heating/cooling side is selected, the total current should be less than 60mA.
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<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°C):	Thermocouple±(0.5% of measuring range)±1digit±1°C R thermocouple 0 to 500°C;±(1% of measuring range) ±1digit±1°C B thermocouple 0 to 400°C;±(5% of measuring range) ±1digit±1°C 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(resistive load), Mechanical life:10 million cycles or more Electrical life:100 thousand cycles or more Minimum switching current:100mA(24Vdc) 48 X 48mm 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 Electrical life:100 thousand cycles or more Minimum switching current:100mA(24Vdc) 48 X 48mm 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.
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<Self-check>

Method	Monitoring of program error with watchdog timer
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Specifications

PXV/PXW/PXZ

<Operation and storage condition>

Operating temperature	-10 to 50°C
Operating humidity	90%RH or less(Non condensing)
Storage temperature	-20 to 60°C
Insulation category	2
Pollution degree	II

<General specifications>

Rated voltage	100(-15%) to 240(+10%)Vac 50/60Hz, 24Vac(±10%) 50/60Hz, 24Vdc(±10%)
Power consumption	10VA or less(100V AC) 15VA or less(240V AC, 24VAC, 24VDC)
Insulation resistance	20M Ω 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;1M Ω or more Voltage;400k Ω or more Current;250 Ω (external resistor)
Allowable signal source resistance	Thermocouple;100 Ω or less Voltage;1k Ω or less
Allowable wiring resistance	Resistance bulb;10 Ω or less per wire
Reference junction compensation accuracy	±1°C (at 23°C)
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>

Parameter mask function	Parameter display is disabled by software.
Ramp soak function(option)	4 ramp/4 soak

<Structure>

Mounting method	Panel flush mounting or surface mounting Surface mounting;48 X 48mm type only
External terminal	48 X 48mm type;8-pin or 11-pin socket Other types;screw terminal(M3.5 screw)
Case material	Plastic
External dimensions	See outline diagram.
Mass	48 X 48mm;approx 150g 48 X 96mm;approx 300g 72 X 72mm;approx 300g 96 X 96mm;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	48 X 48mm type;controller,panel mounting bracket, socket(when specified),instruction manual 1 volume Other types;controller,panel mounting bracket, instruction manual 1volume
Water-proof type	48 X 48mm type;controller,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(°C)	Input range(°F)
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
PL2	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.	

MICRO CONTROLLER X (PXV4, PXW, PXZ)

4 Outline diagram/panel cut [Standard type]

1) 48 X 48mm type

(unit:mm)

Type	External dimensions	Panel cut
PXV 4 PXW 4 PXZ 4		<p>Side stick mounting (Not used for water-proof type)</p>

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

2) 48 X 96mm type

(unit:mm)

Type	External dimensions	Panel cut												
PXW 5 PXZ 5		<p>Side stick mounting</p> <table border="1"> <thead> <tr> <th>Q'ty</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> <th>6</th> </tr> </thead> <tbody> <tr> <td>a</td> <td>93</td> <td>141</td> <td>189</td> <td>237</td> <td>285</td> </tr> </tbody> </table>	Q'ty	2	3	4	5	6	a	93	141	189	237	285
Q'ty	2	3	4	5	6									
a	93	141	189	237	285									

3) 72 X 72mm type

(unit:mm)

Type	External dimensions	Panel cut
PXW 7 PXZ 7		

4) 96 X 96mm type

(unit:mm)

Type	External dimensions	Panel cut
PXW 9 PXZ 9		

Outline diagram/panel cut [Water-proof type]

1) 48 X 96mm type

(unit:mm)

Type	External dimensions	Panel cut
PXW 5 PXZ 5		

2) 72 X 72mm type

(unit:mm)

Type	External dimensions	Panel cut
PXW 7 PXZ 7		

3) 96 X 96mm type

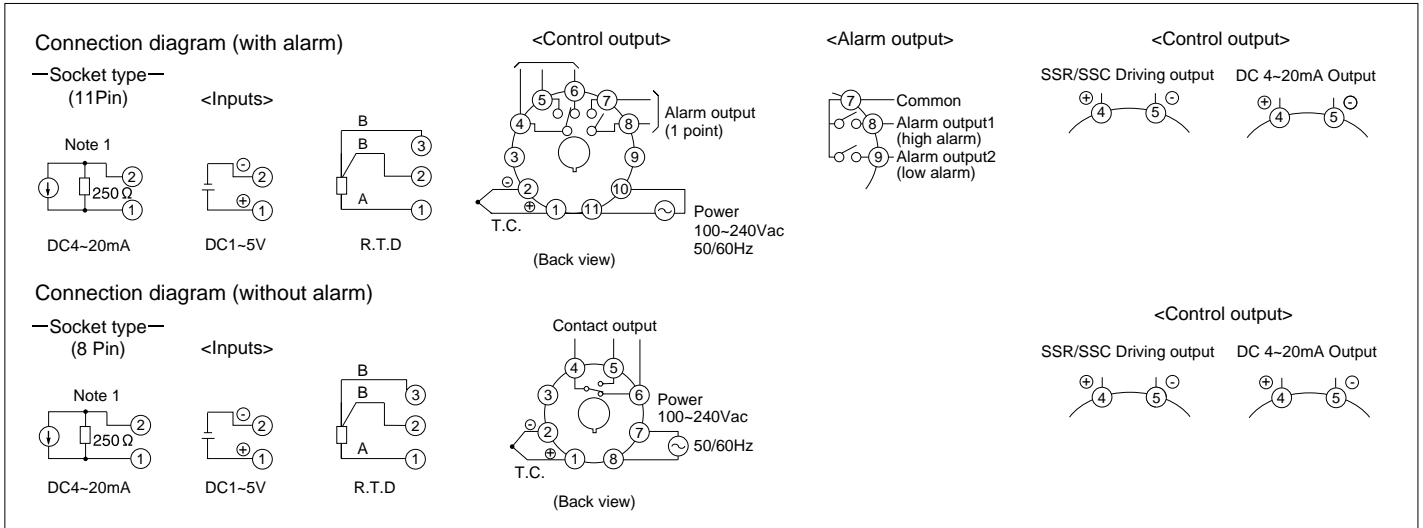
(unit:mm)

Type	External dimensions	Panel cut
PXW 9 PXZ 9		

MICRO CONTROLLER X (PXV4, PXW, PXZ)

5 Connection diagram [for 100 to 240Vac power supply]

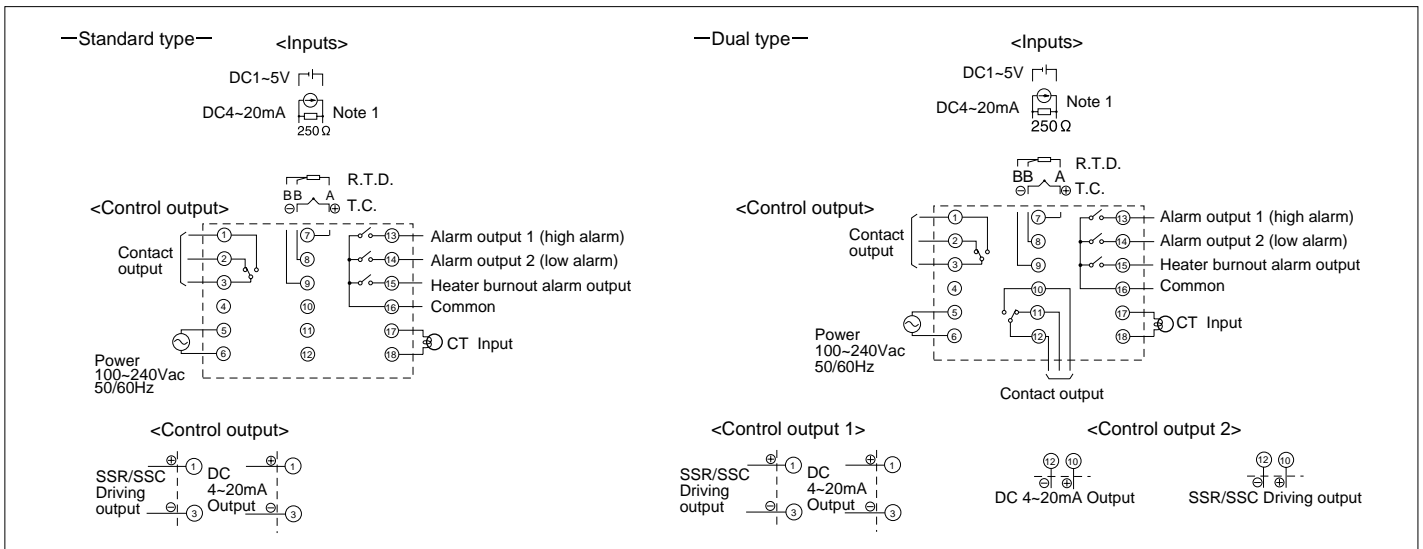
1) PXV4 · PXW4 · PXZ4 type



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.

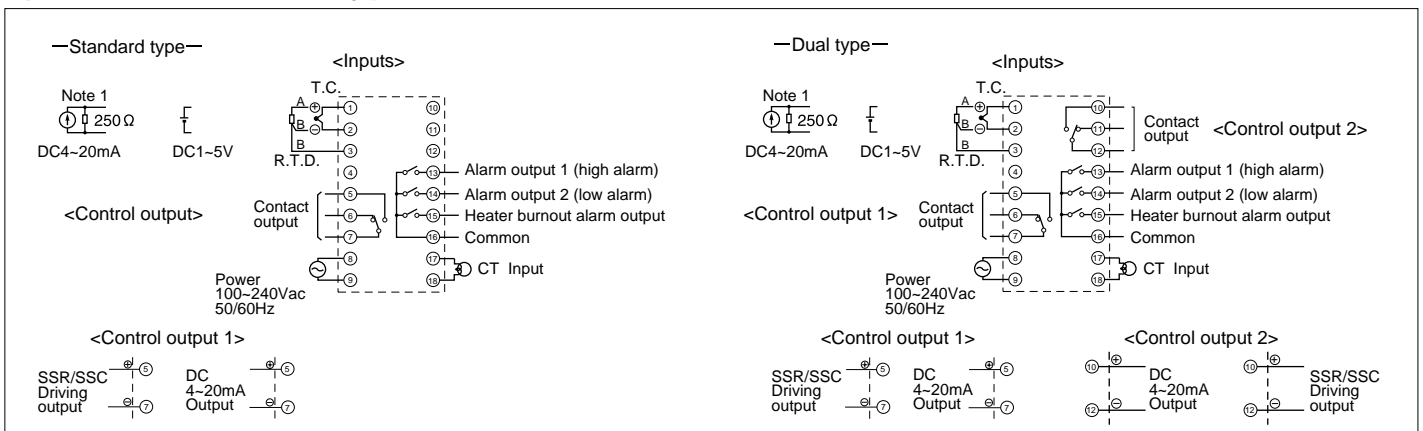
2) PXW7 · PXZ7 type



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

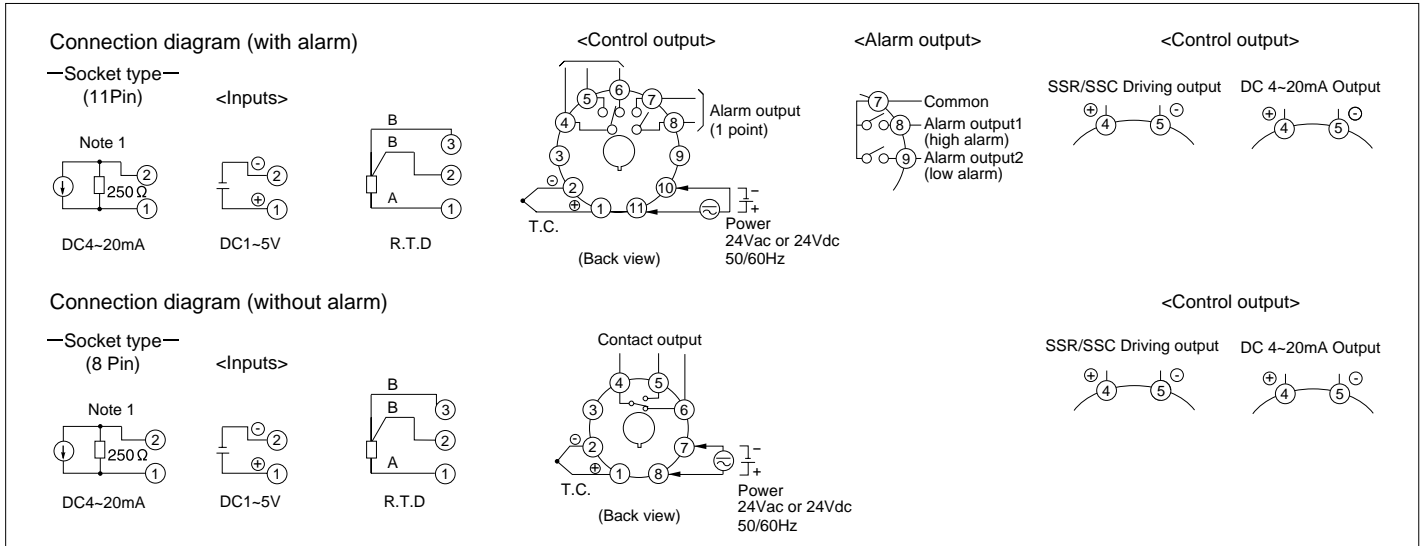


Note1: Use the 250Ω resistance(accessory).

Note2: SSR/SSC drive output and DC4-20mA output are not electrically insulated from inner circuits. So, non-grounding type sensor must be used.

Connection diagram [for 24Vdc/24Vac power supply]

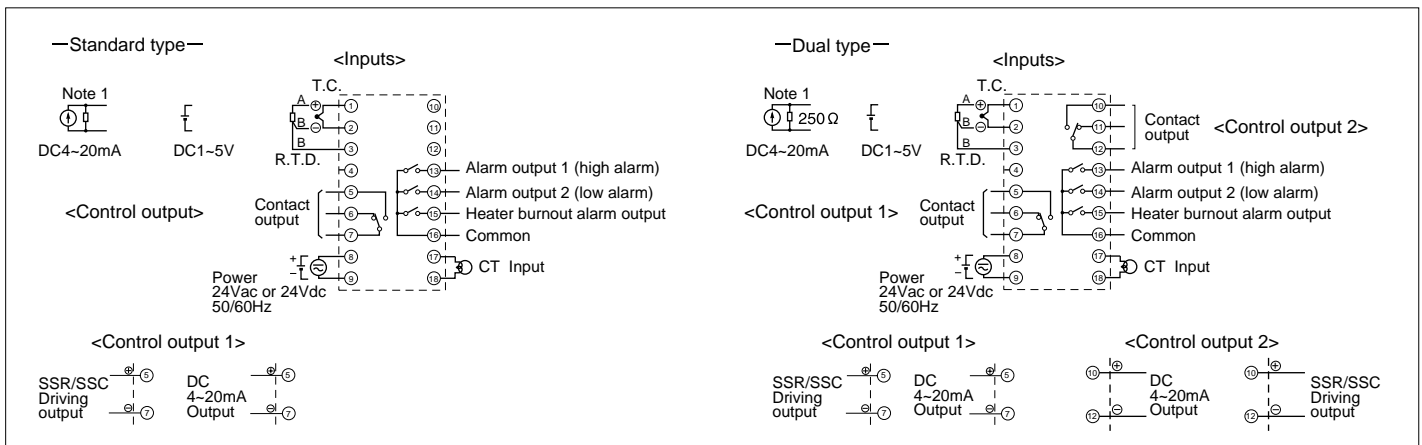
1) PXV4 • PXW4 • PXZ4 type



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



Note1: Use the 250Ω resistance(accessory).

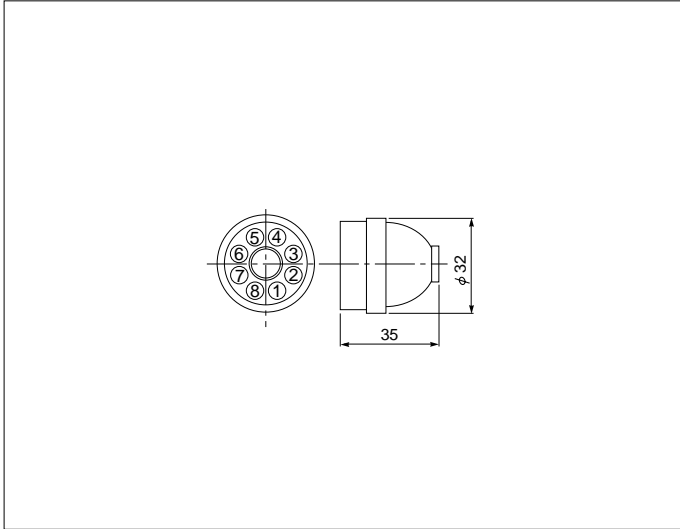
Note2: SSR/SSC drive output and DC4-20mA output are not electrically insulated from inner circuits. So, non-grounding type sensor must be used.

MICRO CONTROLLER X (PXV4, PXW, PXZ)

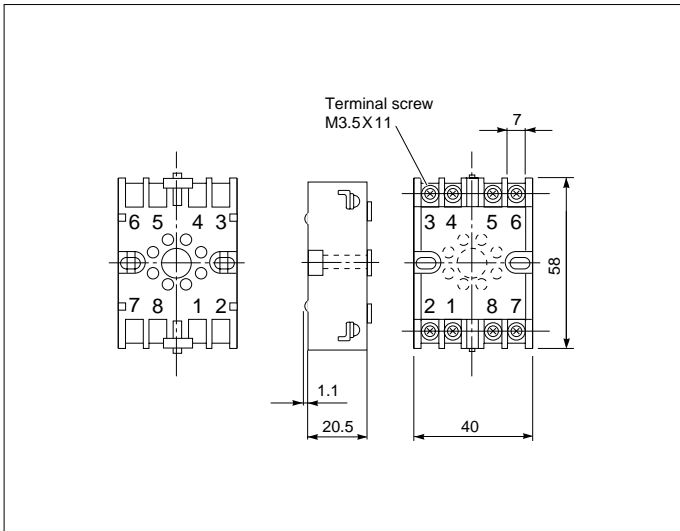
6 Socket outline diagram [PXV4, PXW4, PWZ4 type]

Without alarm

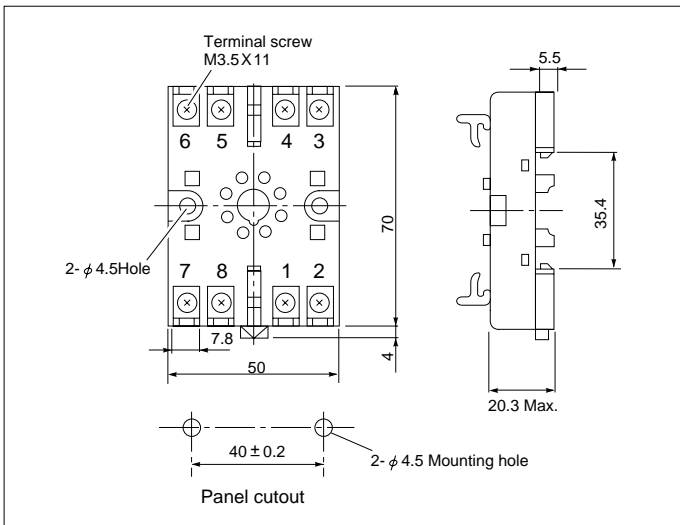
ATX1NS type (US socket)



ATX2PSB type (back screw wiring)

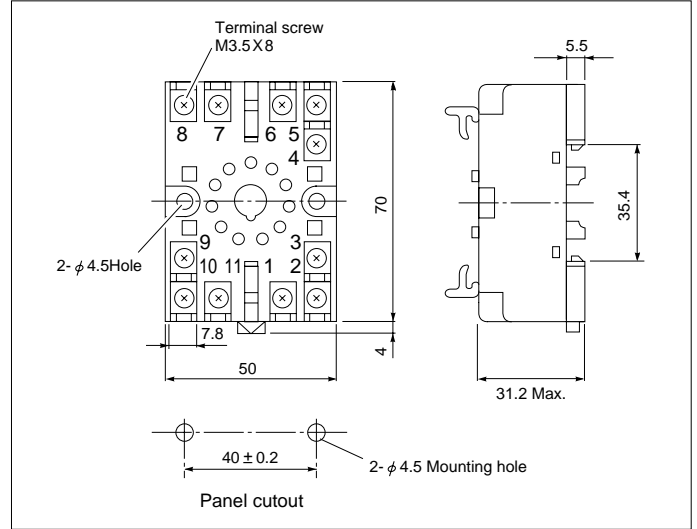


TP48X type (rail mounting)

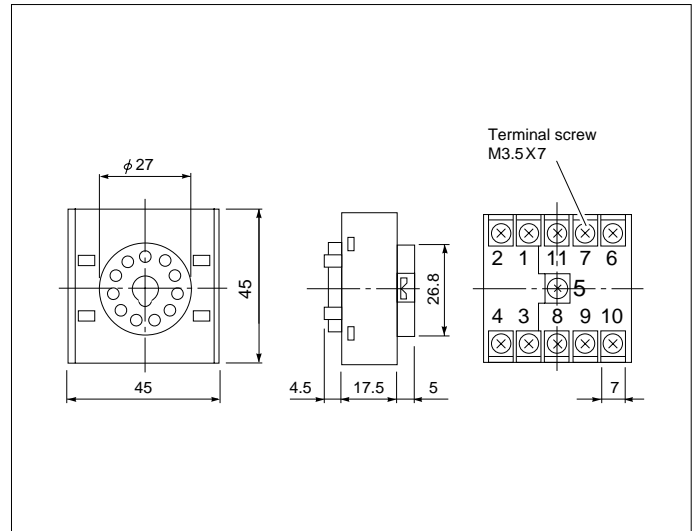


With alarm

TP411X type (rail mounting)



TP411SB type (mounting panel)



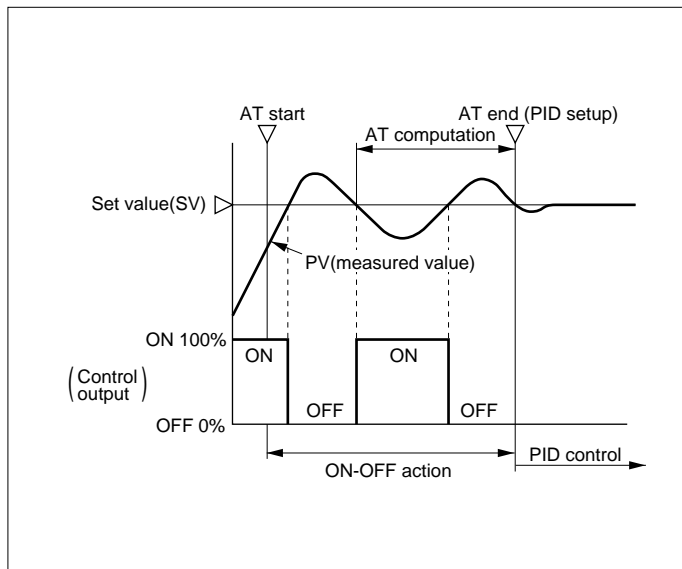
7 Functions

Function 1

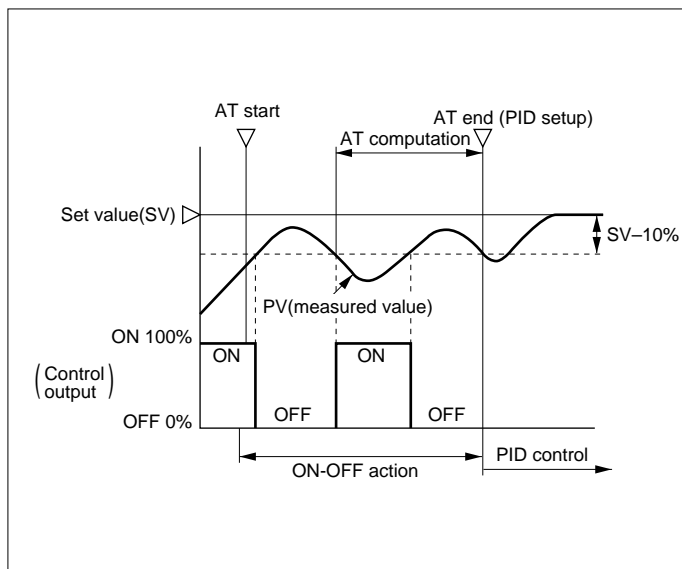
Auto-tuning

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

(a) Standard type



(b) Low PV type



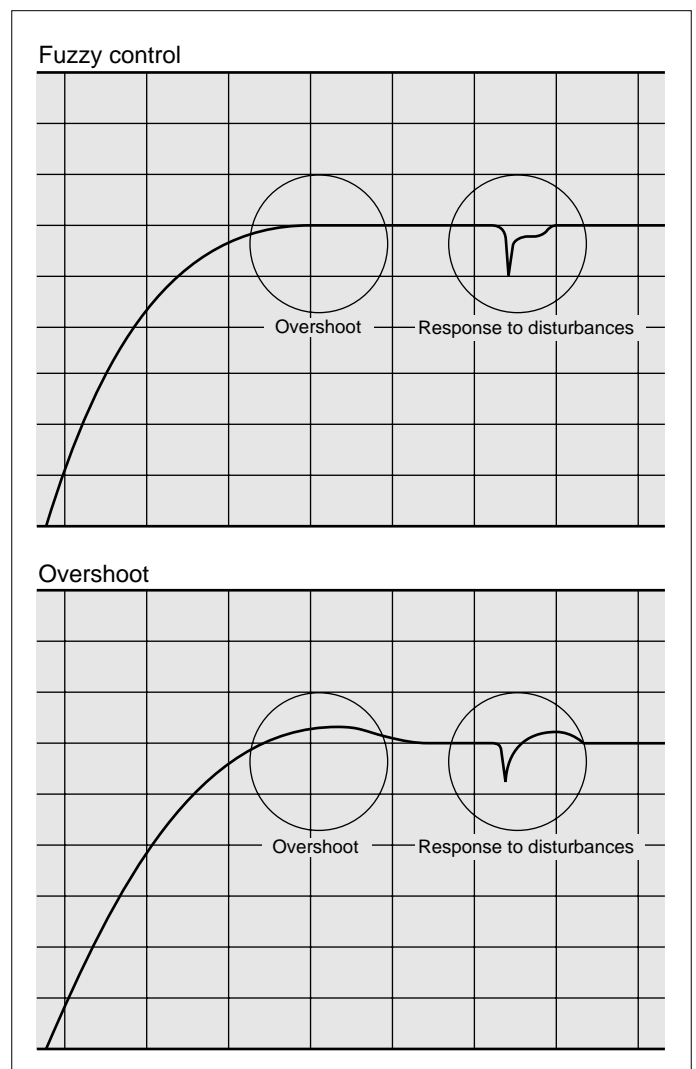
- Note : (1) The PID parameter which has been automatically set at the completion of auto-tuning is saved even when the power is turned OFF, eliminating the need for auto-tuning for succeeding operations.
- (2) During auto-tuning, control output turns ON and OFF action, which largely changes the value of PV depending on process. Do not use the auto-tuning function if such a phenomenon is not allowed.
- (3) Do not use the auto-tuning function for a process having a quick response, such as pressure control, flow control, etc.

Function 2

Fuzzy control function

Fuzzy operation is used to suppress overshoot to improve the response to external disturbances. It monitors measured value for suppressing overshoot with the startup time remaining unchanged, providing a quick conversion at the time of response to external disturbances.

Comparison between fuzzy control and conventional control



MICRO CONTROLLER X (PXV4, PXW, PXZ)

7 Functions

Function 3-1 Alarm

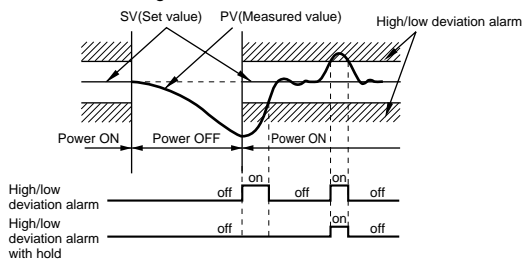
Kind of alarm and alarm type code

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

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.



Function 3-2

Reference data

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	PXV/W/Z code	
	P-Ab	P-AH	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	68	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

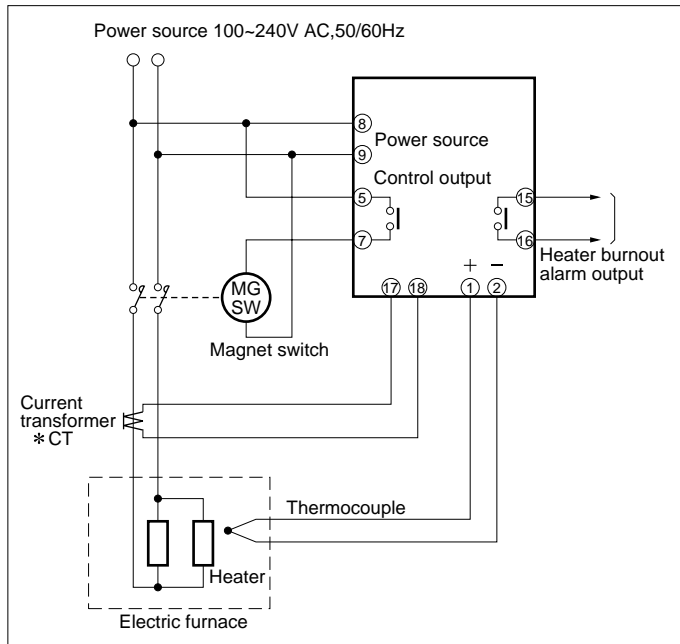
Functions

Function 4

Heater burnout alarm(option)

- Heater burnout is detected then the alarm is emitted immediately.
- Separate type current transformer(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 thyristor phase angle control system.

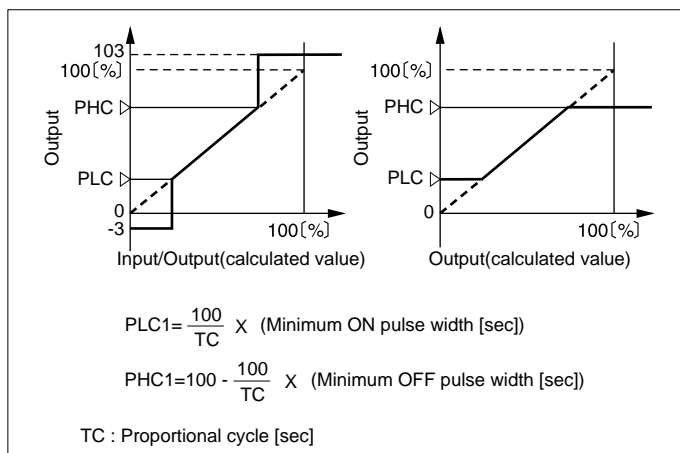
Example of the connection of the heater burnout alarm(type PXW5,PXZ5,PXW9,PXZ9)



Function 5

Output limit

(Relay output and SSC/SSR drive output only)
This function is used to set the minimum ON/OFF pulse width to control output, preventing accidental fire or back-fire of burner.



Function 6

Parameter mask function(standard 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 DSP1-7.
Example of setting to(DSP1-7)

Parameter	DSP
P	DSP1-128
I	DSP2-1
D	DSP2-2

- (a)To mask parameter P
1) Check DSP value for Preferring to parameter table
2) Add 128 to the value set to DSP1.
- (b)To mask parameter P, I, D
1) Check DSP value for P, I, D referring to parameter table.
2) Add 128 to the value set to DSP1.
Add 1+2=3 to the value set to DSP2.

For allocation of DSP of each parameter, refer to the parameter table on Page17and18. DSP1-7 cannot be masked.

Function 7

User adjust function

This function is used for the input calibration by the user in a simple manner. Calibration is effected by inputting zero and span points to the input range being used and then by setting errors. The user calibration function is an independent function and the instrument can easily be reset to the initial conditions(prior to delivery).

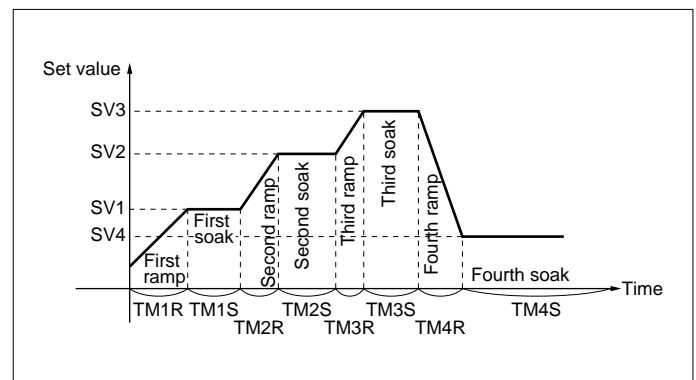
Example)0-400°C input range
{ Indication at 0°C input:-1°C
{ Indication at 400°C input:402°C

In the above example,when 1 is set to ADJO parameter and -2 to ADJS parameter,the display indicate 0°C at 0°C input and indicate 400°C at 400°C input.When 0 is set to ADJO parameter and 0 to ADJS parameter the instrument is set in the calibration status prior to delivery from the factory.

Function 8

Ramp soak function

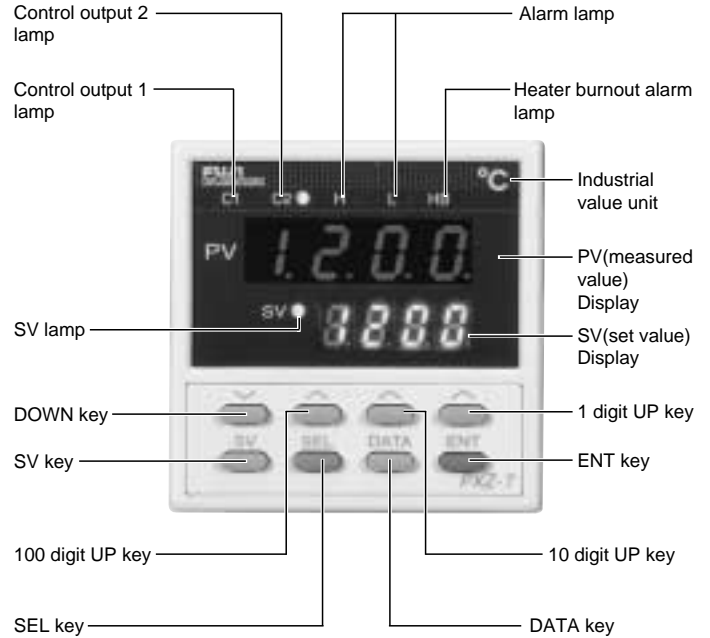
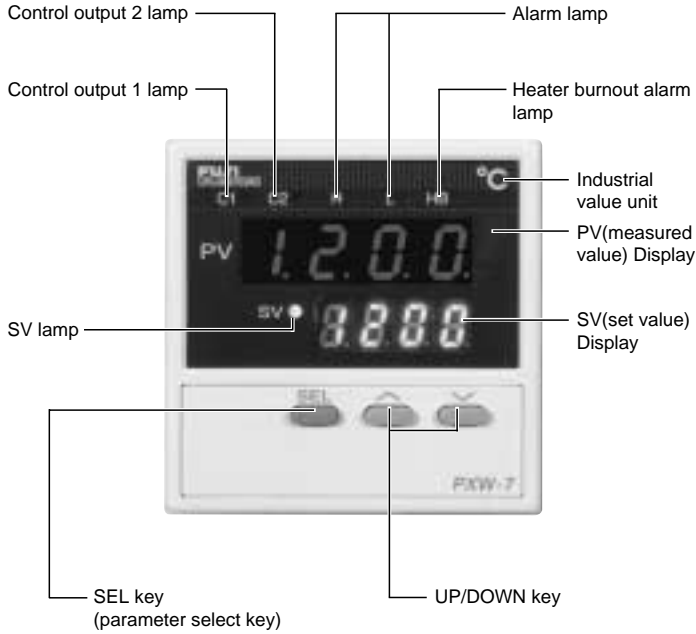
Function of automatically changing the set point value with the elapsing of time,in accordance with the preset pattern, as shown below.This function is capable of programming a maximum of 4 ramp soaks



MICRO CONTROLLER X (PXV4, PXW, PXZ)

8 Operation

Names of operating parts



Name	Function
Control output 1 lamp	Lamp is lit when control output 1 is ON.
Control output 2 lamp	Lamp is lit when control output 2 is ON.
Alarm lamp	Lamp is lit when alarm is detected. At the same time,alarm output is ON.
Heater burnout alarm lamp	Lamp is lit when heater burnout is detected. At the same time ,heater burnout alarm output is ON.
PV(measured value)display	Measured value is indicated.
SV(set value) display	Set value is indicated. Also,parameter data is indicated at the time of setting parameter.
SEL key	Used for the selection of SV/PV display, selection of the parameter block,selection of parameter,display of parameter value,etc.
UP/DOWN key	Used for change of the SV value,parameter call,and setting data up/down at the time of setting the parameters.
SV lamp	Lamp is lit when a set value (SV) is displayed.

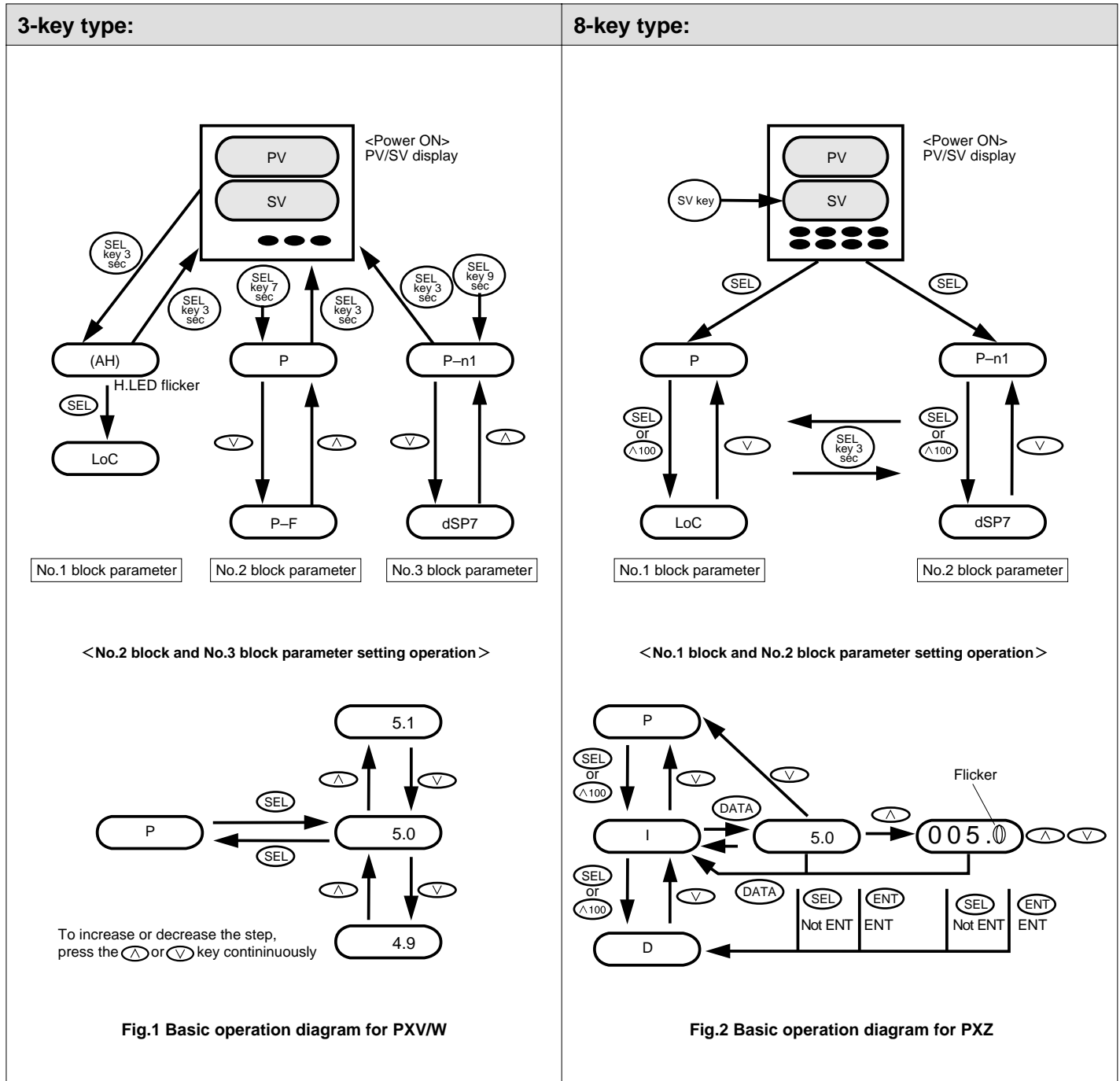
Name	Function
Control output 1 lamp	Lamp is lit when control output 1 is ON.
Control output 2 lamp	Lamp is lit when control output 2 is ON.
Alarm lamp	Lamp is lit when alarm is detected. At the same time,alarm output is ON.
Heater burnout alarm lamp	Lamp is lit when heater burnout is detected. At the same time ,heater burnout alarm output is ON.
PV(measured value)display	Measured value is indicated.
SV(set value) display	Set value is indicated. Also,parameter data is indicated at the time of setting parameter.
1 digit UP key	Used to increase the value of 1 digit data at change of the SV value or setting data.
10 digit UP key	Used to increase the value of 10 digit data at change of the SV value or setting data.
100 digit UP key	Used to increase the value of 100 digit data at change of the SV value or setting data.
DOWN key	Used to decrease the value of flickering data at change of SV value or setting data.
SV key	Used to select the SV/PV display. Other size:Display mode is reet from parameter display to set value (SV) display.
SEL key	Used for selection of parameter blocks or parameters.
DATA key	Used to display the value of parameters.
ENT (enter) key	Used to enter the value of parameters.

9 Basic operation

Operation method

The basic operation of PXV/W/Z is as shown in the diagrams below. On the single display type for PXV4/PXZ4, the single display unit is used for the display of PV/SV.

In this case, PV/SV display can be selected by pressing SEL and PV/SV keys. When non-operating status continues for 30 seconds PV/SV display return to the status at power ON.



MICRO CONTROLLER X (PXV4, PXW, PXZ)

10 Parameter table No.1

PXV/W parameter table Note:Figure with %* table below means "% of measuring range".

	Parameter	Setting range	Meaning of parameter	Unit	Value prior to delivery	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	Differential time(Differentiation OFF at 0)	Second	60.0	dsp2-2
	TC	1-150	Output 1 proportional cycle	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	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%FS	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	—	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	°C/F	°C/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	—	—	—

Note1) Items shown in [] are not indicated at the time of delivery. Note2) Parameters shown in [] are indicated in accordance with your model.
 Note3) When you change these value, check all parameter's value after changing these value.
 Note4) Don't change this value from 0 to others. Note5) 0% is equal to the setting value of "P-SL".

Parameter table No.2

PXZ parameter table Note:Figure with %* table below means “% of measuring range”.

	Parameter	Setting range	Meaning of parameter	Unit	Value prior to delivery	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	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	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%FS	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	—	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		℃/F	℃/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	—	—	—	

Note1) Items shown in are not indicated at the time of delivery. Note2) Parameters shown in are indicated in accordance with your model.

Note3) When you change these value, check all parameter's value after changing these value.


Note4) Don't change this value from 0 to others. Note5) 0% is equal to the setting value of "P-SL".

MICRO CONTROLLER X (PXV 3)

1 Outline diagram & type 2 Specifications

3-key type PXV series 1/32DIN (PV/SV selective display type)

Size	48 X 24.5mm
Type	PXV3
External appearance	Water-proof type



PXV

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

PXV 3 4 5 6 7 8 9 10 11 12 13
3 2 - 9 0 0 0

Digit	Specification	Note											
4	<Front panel size> 48 X 24.5mm		3										
5	<Input signal> Thermocouple(°C) Thermocouple(°F) Resistance bulb Pt 100,3-wire(°C) Resistance bulb Pt 100,3-wire(°F) 1-5V DC	Note1		T R N S A									
6	<Control output> Contact reverse action output Contact direct action output SSR/SSC drive reverse action output SSR/SSC drive direct action output 4-20mA DC reverse action output 4-20mA DC direct action output	Note2		A B C D E F									
7	<Option> Note Alarm 1 point Relay contact output (control output 2, direct action) Ramp/soak Alarm 1 point + ramp/soak Relay contact control output (direct action) + ramp/soak			Y A B C D E									
8	<Version No>						2						
9	<Terminal>									9			
10	<Instruction manual and power supply voltage> Japanese, 100 to 240 Vac English, 100 to 240 Vac Japanese, 24 Vac/24Vdc English, 24 Vac/24Vdc										Y V A B		

Note1) If not otherwise specified when ordering, the input signal and range are as follows :
 Thermocouple input : K thermocouple, 0 to 400°C (SV value at 0°C)
 Resistance bulb input : 0 to 150°C (SV value at 0°C)
 Voltage input: Scaling 0 to 100% (SV value 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 kind of the thermocouple input or resistance bulb input.

Note2) It is available in case of 100 to 240Vac(the 10th digit is "Y" or "V")

<Control function> — Standard type

Control action	PID control with auto-tuning/Fuzzy control with auto-tuning
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 999.9sec,setting in 0.1sec 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	0 to 50% of measuring range,2-position action only
Anti-reset wind up	0 to 100% of measuring range,auto setting with auto-tuning
Input sampling cycle	0.5sec
Control cycle	0.5sec

<Input>

Input signal	Thermocouple: J K R B S T E N PL2 Resistance bulb: Pt100 Voltage/current: 1 to 5V DC
Input range	See measuring range table.
Burnout	For thermocouple/resistance bulb input,control output over scale direction is selectable upper side or lower side

<Output> — Standard type

Control output	1 of the following 3 types is selected. Relay contact (SPST contact): 220V AC/30V DC, 2A (resistive load) Mechanical life:10 million cycles or more Electrical life:100 thousand cycles or more Minimum switching current:100mA(24Vdc) SSR/SSC drive(voltage pulse): 5.5±1V DC at ON/ 0.5V DC or less at OFF, Max. current 20mA or less 4 to 20mA DC:Allowable load resistance 600Ω or less
----------------	--

<Setting and indication>

Parameter setting method	digital setting with 3 keys
PV/SV display method	PV/SV select display LED; 4 digits
Status display	Control output, alarm output
Setting accuracy	0.1% of measuring range or less
Indication accuracy (at 23°C):	Thermocouple±(0.5% of measuring range)±1digit±1°C R thermocouple 0 to 500°C; ±(1% of measuring range) ±1digit±1°C B thermocouple 0 to 400°C; ±(5% of measuring range) ±1digit±1°C Resistance bulb,voltage; ±(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(resistive load), Mechanical life:10 million cycles or more Electrical life:100 thousand cycles or more Minimum switching current:100mA(24Vdc)

Specifications

<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
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<Operation and storage condition>

Operating temperature	-10 to 50°C
Operating humidity	90%RH or less (Non condensing)
Storage temperature	-20 to 60°C
Insulation category	2
Pollution degree	II

<General specifications>

Rated voltage	100(-15%) to 240(+10%)Vac 50/60Hz, 24VAC(±10%), 50/60Hz, or 24VDC(±10%)
Power consumption	5VA or less(100V AC) 8VA or less(240V AC, 24VAC, 24VDC)
Insulation resistance	20M Ω 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;1M Ω or more Voltage;400k Ω or more
Allowable signal source resistance	Thermocouple;100 Ω or less Voltage;1k Ω or less
Allowable wiring resistance	Resistance bulb;10 Ω or less per wire
Reference junction compensation accuracy	±1°C (at 23°C)
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>

Parameter mask function	Parameter display is disabled by software.
Ramp soak function(option)	4 ramp/4 soak

<Structure>

Mounting method	Panel flush mounting
External terminal	Plug-in terminal (nine terminal)
Case material	Plastic
External dimensions	See outline diagram.
Mass weight	approx. 100g
Protective structure	Front panel water-proof structure; NEMA4X (equivalent to IEC standards IP66) Rear case;IEC IP20
Enclosure color	Black (front panel,case)

<Scope of delivery>

Standard type (water-proof type)	Controller, panel mounting bracket, instruction manual water-proof packing
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Measuring range table

Input signal	Input range(°C)	Input range(°F)
Resistance bulb		
Pt100 Ω	0 to 150	32 to 302
Pt100 Ω	0 to 300	32 to 572
Pt100 Ω	0 to 500	32 to 932
Pt100 Ω	0 to 600	32 to 1112
Pt100 Ω	-50 to 100	-58 to 212
Pt100 Ω	-100 to 200	-148 to 392
Pt100 Ω	-150 to 600	-238 to 1112
Pt100 Ω	-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
PL2	0 to 1300	32 to 2372
DC voltage 1 to 5V DC	Scaling range; -1999 to 9999	

MICRO CONTROLLER X (PXV 3)

3 Option

Alarm

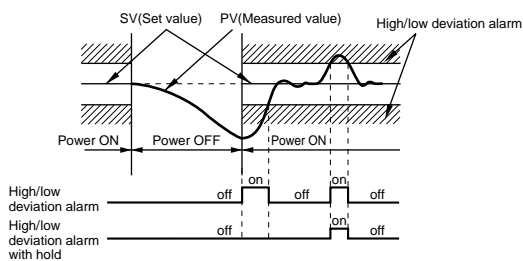
Kind of alarm and alarm type code

	P-AH (ALM)	Kind of alarm	Action diagram
	0	Without alarm	
Absolute alarm	1	High absolute alarm	
	2	Low absolute alarm	
	3	High absolute alarm (with hold)	
	4	Low absolute alarm (with hold)	
Deviation alarm	5	High deviation alarm	
	6	Low deviation alarm	
	7	High/low deviation alarm	
	8	High deviation alarm (with hold)	
	9	Low deviation alarm (with hold)	
	10	High/low deviation alarm (with hold)	
Zone	11	High/low range deviation alarm	

Note: (1) Alarm output is ON in the alarm band marked

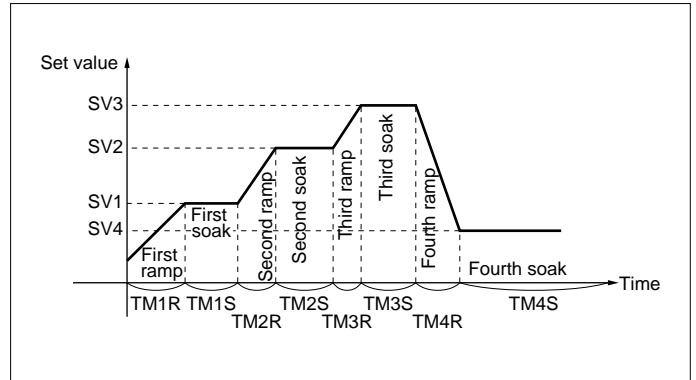
(2) What is alarm with hold?

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.



Ramp soak function

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



Note) For details of functions, refer to the following items.

- Function 1; Auto tuning functionPage 12
- Function 2; Fuzzy control functionPage 12
- Function 5; Output limit functionPage 14
- Function 6; Parameter mask functionPage 14
- Function 7; User adjust functionPage 14

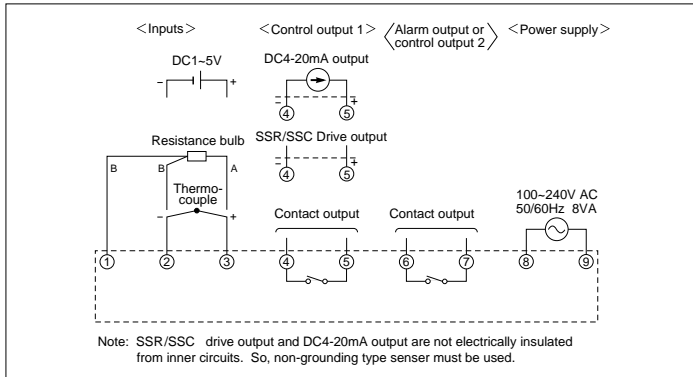
4 Outline diagram/panel cut

1) Outline diagram

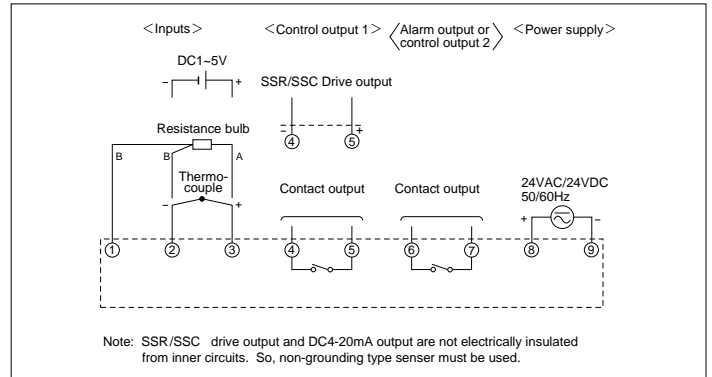
(unit:mm)

Type	External dimensions	Panel cut
PVX 3		

2) For 100 to 240Vac power supply

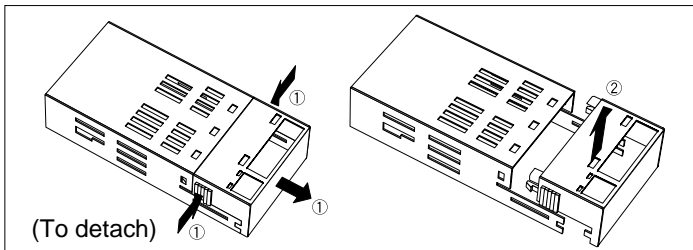


For 24Vac/24Vdc power supply

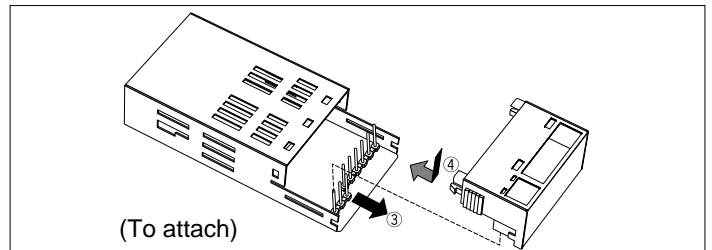


3) Wiring Method

1. How to attach/detach the terminal



- Press the both sides of the terminal with fingers to release the lock and pull out the terminal cover backward.
- When the terminal cover is pulled out to a full extent, raise the terminal cover upward to remove it from the main body.



- Pull out the base plate to a full extent. Insert terminals into pins on the base plate and slide the base plate forward until it is locked.
- Pull out the base plate to a full extent. Insert terminals into pins on the base plate and slide the base plate forward until it is locked.

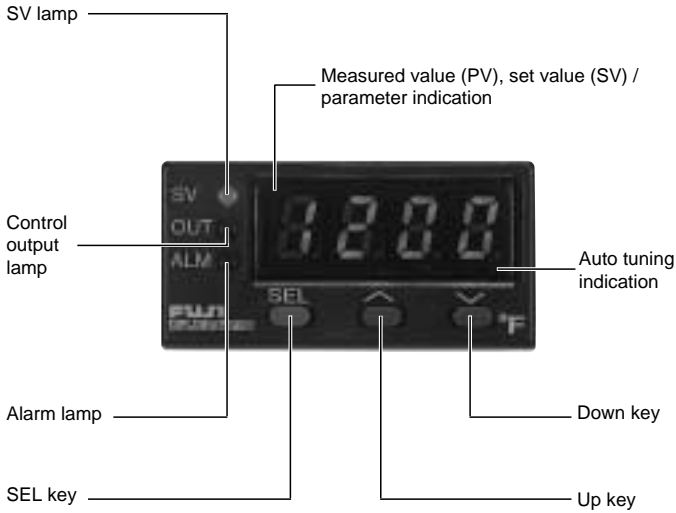
2. Specified wiring materials

Type	Terminal No.	Cross section (Note 1)	Bare wire length (Note 2)
Input terminal	1, 2, 3	0.14mm ² (AWG26) ~0.9mm ² (AWG18)	4mm
Output & power terminals	4 to 9	0.22mm ² (AWG24) ~2.0mm ² (AWG14)	6mm

MICRO CONTROLLER X (PXV 3)

5 Basic operation

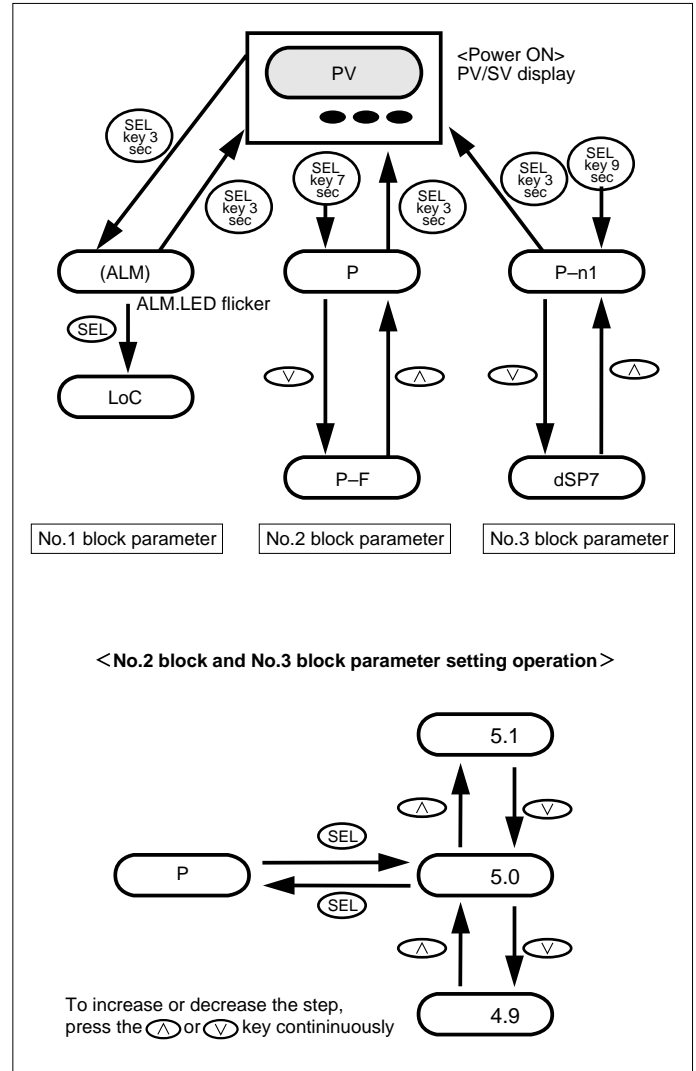
Names of operating parts and their functions



Name	Functions, specifications
Set value (SV) lamp	Lamp is lit when a set value (SV) is displayed.
Measured value (PV), set value(SV)/parameter indication	Parameter symbols or codes are indicated during measurement of measured value (PV), set value (SV) and parameters.
SEL key	Used for the selection of SV/PV display, selection of the parameter block, selection of parameter, display of parameter value, etc.
Up/Down key	Used for change of the SV value, parameter call, and setting data up/down at the time of setting the parameters.
Auto tuning indication	This indication flickers during PID auto tuning.
Control output 1 lamp	This lamp is lit when control output 1 is ON.
Alarm lamp or control output 2 lamp	This lamp lights during operation of alarm function, and flickers while alarm value is being set or this lamp is lit when control output 2 is ON.

Operation

The basic operation of PXV is illustrated below. PV and SV values are both indicated on the 1-step display. Selection of PV/SV indication is achieved by pressing SEL key. When non-operating condition continues for 30 seconds, the display returns to the state of indication of PV obtained just after power ON.



⑥ Parameter table

PXV3 Note:Figure with %* table below means “ % of measuring range”.

	Parameter	Setting range	Meaning of parameter	Unit	Value prior to delivery	DSP assignment
No.1 block parameter	PRoG	roFF/rrUn/rHLd	Ramp soak control(start/stop/pause)	—	—	dsp1-1
	ALM	0-100%*	alarm(ALM)set value	Industrial/deviation industrial value	10	dsp1-2
	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	Differential time(Differentiation OFF at 0)	Second	60.0	dsp2-2
	TC	1-150	Output 1 proportional cycle	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	Second	30	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%FS	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	—	Ordering specification Note3)	dsp3-16
	P-AH	0-11	High(ALM2)type code	—	Ordering specification	dsp3-32
	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	°C/°F	°C/°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	—	—	—

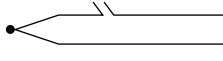
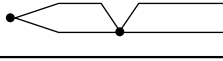
Note1) Items shown in are not indicated at the time of delivery. Note2) Parameters shown in are indicated in accordance with your model.
 Note3) When you change these value, check all parameter's value after changing these value.
 Note4) Don't change this value from 0 to others. Note5) 0% is equal to the setting value of "P-SL".

MICRO CONTROLLER X SERIES

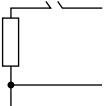
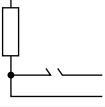
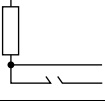
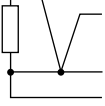
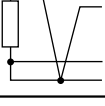
◆ Sensor fault operation

Operation on detection of sensor fault


● Thermocouple

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

● Resistance bulb input

Condition	Display	Control output
Break 	UUUUU	ON or more than 20mA OFF or less than 4mA
	LLLLL	OFF or less than 4mA ON or more than 20mA
	LLLLL	ON or more than 20mA OFF or less than 4mA
2-wire or 3-wire break		
Short circuit 	LLLLL	OFF or less than 4mA ON or more than 20mA
		

● 4-20mA DC

Break 	LLLLL	OFF or less than 4mA ON or more than 20mA
Short circuit 		

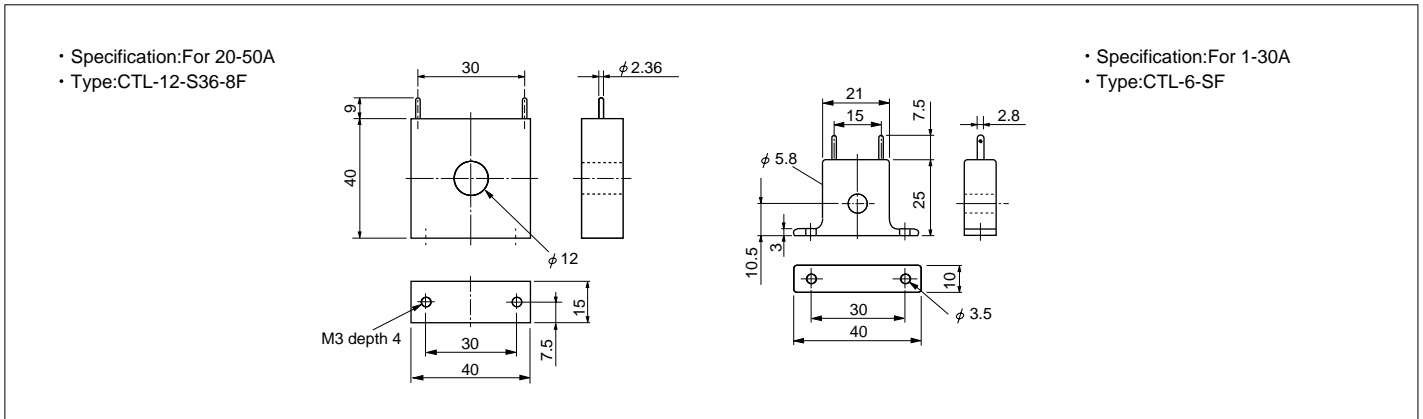
● 1-5VDC

Over-range	UUUUU	OFF or less than 4mA
Under-range	LLLLL	ON or more than 20mA

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

◆ Related products

1. Heater burnout alarm current detector(CT)



SPECIAL ATTENTION NEEDED for all Micro Controller X series products

(Please read carefully the following instructions.)

⚠ WARNING Over-temperature Protection

Any control system should be designed with prior consideration that any part of the system has potential to fail.

In case of temperature controlling, a continuance of heating on should be regarded as the most dangerous state.

The followings are the most probable causes of inducing continuance of heating on:

- 1) The failure of the controller with heating output constantly on
- 2) The disengagement of the temperature sensor out from the system
- 3) The short circuit or the open circuit in the thermocouple wiring
- 4) Valve or switch contact point outside the system is locked to keep heating on

In any application in which it is apprehended that physical injury or destruction of equipment might occur, please install an independent safeguard equipment to prevent over-temperature which shut down the heating circuit, and for additional safety we recommend this equipment to have its own temperature sensor.

The alarm output signal of the controller is not designed to work as protective measures when the controller is in failure condition.

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