

Z SERIES MICRO CONTROLLER X

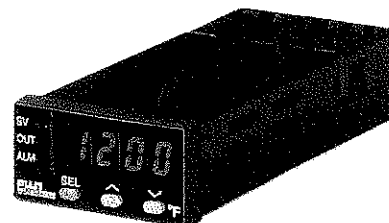
—48 X 24mm—

DATA SHEET

PXV3

Micro Controller X (PXV3) is a small, economical temperature controller having a built-in micro-processor, and measures only 48 X 24mm in accordance with DIN standard.

It accepts input from thermocouples, resistance bulbs, and voltage, and incorporates numerous control functions for on-off control, FUZZY control and PID control.



FEATURES

1. **Multiple input, easily programmable range**
The micro controller X accepts inputs from 9 different types of thermocouples, resistance bulb, or voltage, and settings and alterations can readily be made easily by user.
2. **Wide range of power supply**
The micro controller X operates on AC voltage ranging from 100V-15% to 240V+10%.
3. **PID auto-tuning function standard equipment**
Optimum PID parameters can be determined automatically.
4. **Front panel of water-proof design**
Front panel is water-proof comply with IEC IP66/ NEMA4X.
5. **Ramping SV (Option)**
SV can be changed slowly toward the destined SV. (Max. 4 ramp-soak)
6. **Compactness**
Instrument depth only 106mm saves space.
7. **A simple design and easy operation.**

2. Input

(1) PV input signal:

Input		Remarks
Thermocouple input	J K R B S T E N (Nichrosil-Nisil) PL-II (Platinel)	<ul style="list-style-type: none"> • Reference junction compensating function built in • Burnout circuit built in
Resistance bulb input	Pt100 (IEC)	<ul style="list-style-type: none"> • Burnout circuit built in

Voltage input	1 to 5V DC	Input resistance, 450kΩ
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SPECIFICATIONS

1. Control functions

- (1) PID control: Proportional band (P): 0 to 999.9%
Fuzzy control: Integral time (I): 0 to 3200 sec
Derivative time (D): 0 to 999.9 sec
(2-position control at P=0, proportional control at I,D=0)

(2) PID auto-tuning

(3) Control cycle: 0.5 sec

(4) Output cycle: 1 to 150 sec (contact; SSR drive output)

(5) Anti-reset windup:

0 to 100% FS variable

(6) Ramp SV: Max. 4 ramp-soak program. (option)

(2) Table of input type codes

Type	Code
• RTD	
• Pt100 (IEC)	1
Thermocouple	
• J	2
• K	3
• R	4
• B	5
• S	6
• T	7
• E	8
• N	12
• PL-II	13
Voltage input	
1 to 5VDC	16

(3) Table of output type codes (standard range)

		Range of measurement (°C)	Range of measurement (°F)	With decimal point (°C)	With decimal point (°F)	
RTD (IEC)	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	×	×	
PLII		0 to 1300	32 to 2372	×	×	
DC Voltage	1 to 5VDC	-1999 to 9999 (Scaling is possible)				

(4) Burnout

Control output is held at upper/lower limit value when temperature sensor open.

For resistance bulb input, detection is allowed even if any of the three wires is discontinued.

3. Output

Control output signal:

Output selectable from the following

Contact output	SPST contact	Electrical expect. life 220V AC, 2A, resistive load 10 ⁶ cycle Mechanical expect. life 10 ⁷ cycle
SSR driver output	Voltage	ON 20mA max./5.5 V DC ±1V OFF 0.5V max.

Table of output code:

Code (P-nl)	Output type	Control action		Burn-out detection			
		Output 1	Output 2	Output 1	Output 2		
0	Single	Reverse action	—	Lower limit	—		
1				Upper limit			
2		Direct action		Lower limit			
3				Upper limit			
4	Dual	Reverse action	Direct action	Lower limit	Lower limit		
5				Upper limit			
6				Lower limit		Upper limit	
7				Upper limit			
8				Direct action			Lower limit
9							Upper limit
10		Lower limit	Upper limit				
11		Upper limit					
12		Reverse action		Reverse action	Lower limit	Lower limit	
13					Upper limit		
14					Lower limit		Upper limit
15					Upper limit		
16	Direct action		Lower limit		Lower limit		
17			Upper limit				
18	Lower limit	Upper limit					
19	Upper limit						

4. Setting and indication

- (1) Accuracy: RTD, 1 to 5VDC : ±0.5% full scale (FS)
±1 digit
Thermocouple : ±0.5%FS±1°C±1 digit
R thermocouple : ±1%FS±1°C±1 digit
0 to 400°C
B thermocouple : ±5%FS±1°C±1 digit
0 to 500°C

(2) Setting method:

Key operation (3 keys)

(3) Indicator: 4 digit 7 segment LED (Green)

(4) Status indication:

SV display
Control output
Alarm (option)

5. Alarm (option)

(1) Alarm:

One type of alarm can be selected from those in Fig. 1 by using the front panel key.

Relay contact output	SPST contact	Resistive load; 220V AC, 1A

6. Power failure processing

Set values, PID parameters are retained in nonvolatile memory and restarts automatically.

7. Self-diagnosis

Program failure is monitored by watchdog timer

8. Operating and storage condition

(1) Ambient temperature:

-10 to 50°C

(2) Ambient humidity:

90%RH or less (no condensation is required)

(3) Storage temperature:

-20 to 60°C

9. General specifications

(1) Power supply: 100V-15% to 240V+10% AC

(2) Power consumption:

Approx. 5VA/100V AC, approx. 8VA/220V AC

(3) Dielectric strength:

1500V AC 1min (power supply to earth to relay output, earth to alarm output)
500V AC (other)

(4) Insulation resistance:

20MΩ or more (500V DC)

10. Structure

(1) Mounting method:

Panel flush mounting

(2) Enclosure: Plastic housing

(3) Terminal configuration:

(4) External dimensions:

48 (W) x 24.5 (H) x 99 (D) mm

(5) Mass (weight): Approx. 100g

(6) Finish color: Front panel: Munsell N1.5

Case: Brown translucent

11. Scope of delivery

Controller mounting bracket, packing

PXV3 Parameter

Parameter	Indication	Meaning	dSP assignment	Range
block 1st block	PRoG	Ramp/soak command	dSP1-1	roFF/rrun/rHLd
	H	Alarm S.P.	dSP1-2	0-100%FS
	AT	Auto-turning command	dSP1-16	0-2
	LoC	Parameter-lock	dSP1-32	0-2
2nd block	P	Proportional band	dSP-128	0.0-999.9%
	I	Integral time	dSP2-1	0-3200sec
	D	Derivative time	dSP2-2	0.0-999.9sec
	TC	Proportional cycle time of Control output 1	dSP2-4	0-150sec
	HYS	ON/OFF hysteresis	dSP2-8	0-50%FS
	TC2	Proportional cycle time of Control output 2	dSP2-16	0-150sec
	Cool	Proportional gain for cooling	dSP2-32	0.0-100.0
	db	Dead band	dSP2-64	-50.0-50.0%
	bAL	MV offset	dSP2-128	-100.0-100.0%
	Ar	Anti-reset windup	dSP3-1	0-100%FS
	P-n2	Input type code	dSP3-2	0-16
	P-SL	Lower PV range	dSP3-4	-1999-9999
	P-SU	Upper PV range	dSP3-8	-1999-9999
	P-dP	Decimal point position	dSP3-16	0-2
	P-AH	Alarm type code	dSP3-32	0-11
	PVOF	PV offset	dSP3-128	-10-10%FS
	SVOF	SV offset	dSP4-1	-50-50%FS
	P-F	Centigrade/Fahrenheit	dSP4-2	°C/F
	STAT	Ramp/sock status	dSP4-4	---
	SV-1	1 st S.P.	dSP4-8	0-100%FS
	TM1r	1st ramping time	dSP4-16	0-99h59m
	TM1S	1st soaking time	dSP4-32	0-99h59m
	SV-2	2nd S.P.	dSP4-64	0-100%FS
	TM2r	2nd ramping time	dSP4-128	0-99h59m
	TM2S	2nd soaking time	dSP5-1	0-99h59m
	SV-3	3rd S.P.	dSP5-2	0-100%FS
	TM3r	3rd ramping time	dSP5-4	0-99h59m
	TM3S	3rd soaking time	dSP5-8	0-99h59m
	SV-4	4th S.P.	dSP5-16	0-100%FS
	TM4r	4th ramping time	dSP5-32	0-99h59m
TM4S	4th soaking time	dSP5-64	0-99h59m	
MOD	Control code (Ramp/soak)	dSP5-128	0-15	
3rd block	P-n1	Control type code	dSP6-2	0-19
	P-dF	Input filter	dSP6-4	0.0-900.0sec
	P-An	Alarm hysteresis	dSP6-8	0-50%FS
	PLC1	MV low limitof OUT1	dSP6-32	-3.0-103.0%
	PHC1	MV high limitof OUT1	dSP6-64	-3.0-103.0%
	PLC2	MV low limitof OUT2	dSP6-128	-3.0-103.0%
	PHC2	MV high limitof OUT2	dSP7-1	-3.0-103.0%
	FUZY	Fuzzy control function switch	dSP7-4	oFF/on
	ADJ0	Zero shift	dSP7-16	-50-50%FS
	ADSJ	Span shift	dSP7-32	-50-50%FS
dSp1 to dsp7	Parameter mask 1 to 7	—	0-255	

Table of alarm action codes

	ALM (P-AH)	Alarm type	Action diagram
	0	No alarm	
Absolute value alarm	1	Absolute upper limit	
	2	Absolute lower limit	
	3	Absolute upper limit (with hold)	
	4	Absolute lower limit (with hold)	
Deviation alarm	5	Upper limit deviation	
	6	Lower limit deviation	
	7	Upper and lower limit deviation	
	8	Upper limit deviation (with hold)	
	9	Lower limit deviation (with hold)	
	10	Upper and lower limit deviation (with hold)	
Range alarm	11	Deviation from upper and lower limit of a range	

Note 1: A change of alarm action type can cause the alarm set value to be changed, but this is not a malfunction.
 2: After the alarm type is changed, turn on/off the unit once.

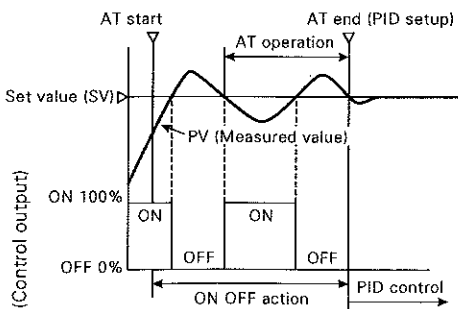
Functions

(1) Auto-tuning

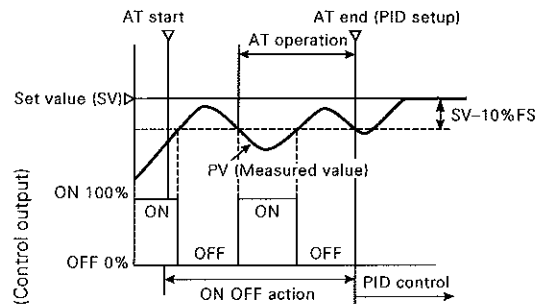
PID parameters are automatically set by controller's measurement and operation function.

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



- Remarks: (1) 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, 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.

(2) Fault display

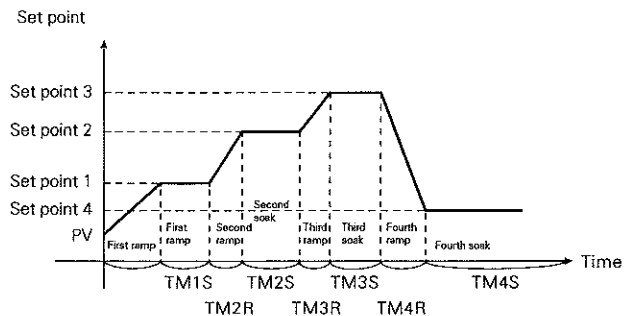
This unit has a display function to indicate several abnormalities. If an abnormality occurs, eliminate the cause of abnormality immediately. After the cause is eliminated, turn off the power once before the power is turned on.

Display	Cause	Control output
UUUU	(1) When the thermocouple sensor burnt out. (2) When the RTD (A) is burnt out. (3) When the PV value exceeds the upper limit value of the range +5% FS.	(1) When the burnout direction is set to the lower limit (Standard), the control output is turned off.
LLLL	(1) When the RTD (B or C) is burnt out. (2) When the RTD (between A and B, or between A and C) is shorted. (3) When the PV value is below the lower limit value of the range -5% FS. (4) When the 1 to 5VDC wiring is opened or shorted.	(2) When the burnout direction is set to the upper limit, the control output is turned on.
LLLL	(1) When a PV value of below -199.9 is displayed.	The control is continued. (Note) The control is continued until it reaches below -5%FS. When it reaches below -5%FS, the burnout.
Err	When the setting of P-SL/P-SU is improper.	Both the control output and alarm output will turn off.
FRL7	Fault in the unit.	Underlined. (Stop the use immediately.)

(3) Ramp soak (option)

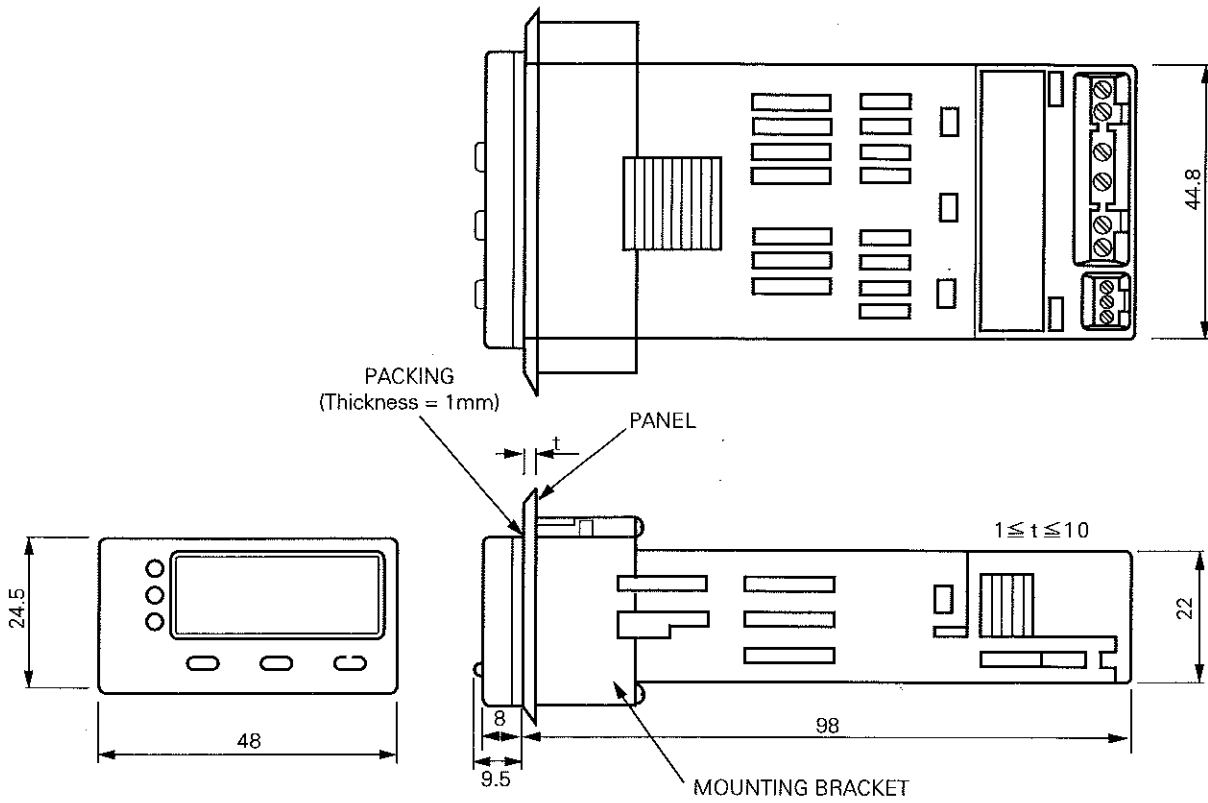
Function to automatically change the set point value with elapsing of time, in accordance with the preset pattern, as shown below. This device allows maximum of 4 ramp soak programs.

This first ramp starts at the value measured immediately before the program is executed (PV).

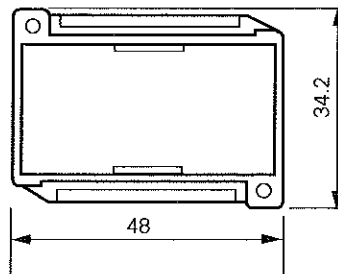


Ramp : Region in which the SP changes toward the target value.
 Soak : Region in which the SP keeps unchanged at the target value.
 Power on can automatically trigger the program run (power-on start function), or an external contact signal can also do that. (See another guide, "Operation Manual")

OUTLINE DIAGRAM (Unit:mm)

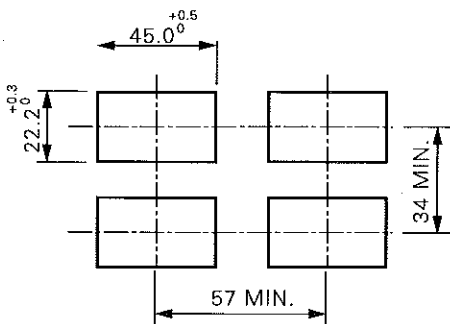


MOUNTING BRACKET

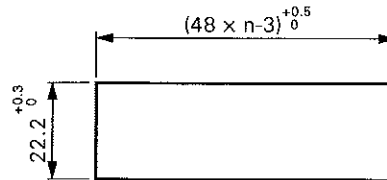


PANEL CUTOUT

MOUNTING n UNITS



SIDE STICK MTG.T



In this case, this controller does not comply with NEMA 4XIP66.

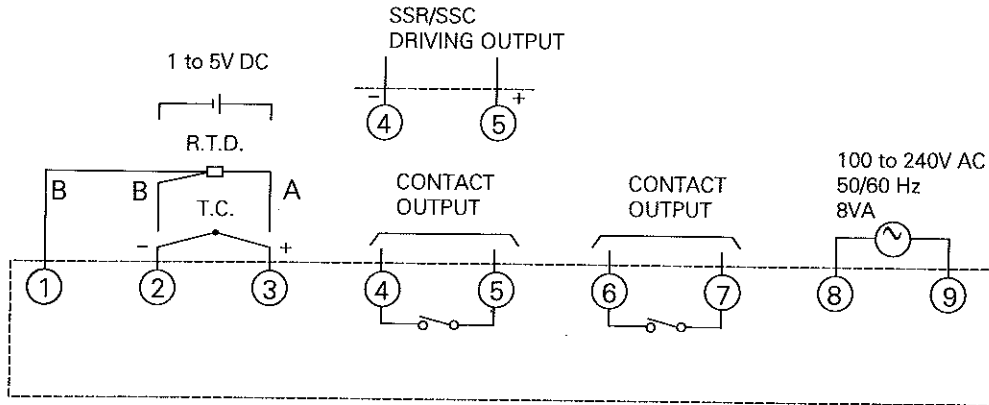
CONNECTION DIAGRAM

< INPUTS >

< CONTROL
OUTPUT 1 >

< ALARM OUTPUT OR
CONTROL OUTPUT 2 >

< POWER >



Note : SSR/SSC driving output is not isolated electrically from the internal circuit.
Be sure to use a non-grounded type sensor.