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The New PXR4

More Features and Greater Versatility Than Any Other PX Series Controller

Fuji Electric's powerful self-tuning 1/16 DIN temperature/process controller with low-cost communications option

The new PXR4 controller is packed with features, to meet a wide variety of needs in the process industries. Low-cost options include RS485 communications, digital input, timer function, heater burnout alarm, dual outputs, and programmable alarms.

One of the most impressive features is the large LED display — larger than any other 1/16 DIN controller on the market. The faceplate, designed for NEMA 4X (IP66 equivalent), is watertight and corrosion-resistant. The easy-to-use 3-button keypad allows for programming similar to the popular PXW controller. The screw-terminal on the back further reduces the cost by eliminating the need for sockets.

The controller has all the standard features that you expect from a PX series controller, and more. In addition to auto-tuning and fuzzy control, it now comes with self-tuning — an innovation in the control field. It automatically retunes the controller under certain conditions, without the need to revert to auto-tuning. The standard 8-segment ramp/soak feature has been expanded to include two patterns that can be linked to create a 16-step profile. The PXR4 accepts temperature and process inputs, and offers two control outputs and two programmable alarms.

Remote monitoring of up to 31 controllers at a time is possible with the RS485 option that uses the industry-standard Modbus™ protocol. Comes with free Windows®-based software, PXR-LITE™.

Now, you can easily set up the controller with the new program configuration loader option with Windows®-based software. Programs for different applications can be saved to and from the controller. Call TTI for more details.



Large LED Display

- 4-digit, 13 mm-high display for PV
- waterproof — conforms to NEMA-4X/IP66

Digital Input

- change between setpoints (SVO, SV1)
- start/reset the ramp/soak
- start/stop the auto tuning
- cancel the alarm latch
- start the incorporated timer

PID plus self tuning

PID plus fuzzy control

Timer Function

- on-delay or off-delay timer activated with digital input
- up to 2 timer outputs can be obtained

Heating/Cooling control

- obtain both heating and cooling control output

Heater Burnout Alarm

- if heater burns out, alarm goes off

Ramp/Soak Function

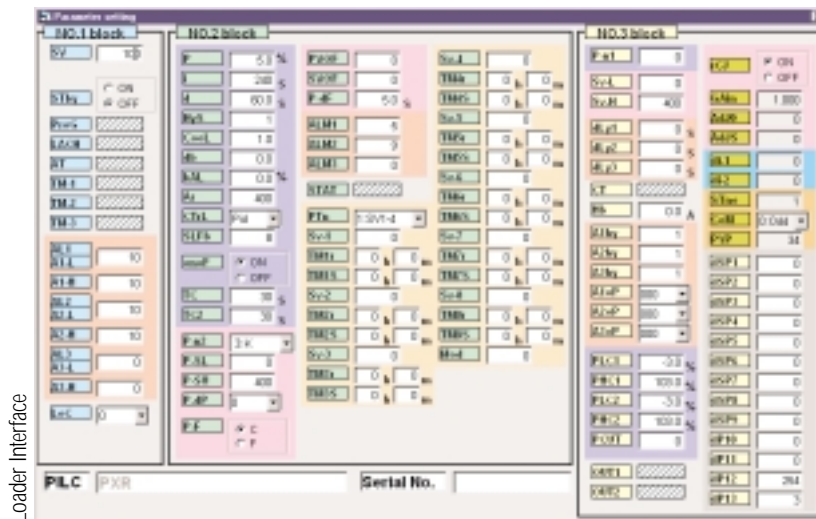
- up to 16 ramp/soak segments
- up to two 8-segment patterns

Communications Function

- RS485 (Modbus™ protocol) interface permits remote monitoring from a PC. Free Windows®-based software, PXR-LITE™.

Warranty

- manufactured in a ISO 9001 facility and backed by a 3-year warranty



Loader Interface

FUJI
ELECTRIC



GENERAL SPECIFICATIONS	
Power Supply Voltage	100 (-15%) to 240V (+10%) AC, 50/60Hz
Power Consumption	8VA or less (100V AC) or 10VA or less (220V AC)
Insulation Resistance	20M Ω or more (500V DC)
Dielectric Strength	Power supply-ground ... 1500V AC for 1 min Power supply-others ... 1500V AC for 1 min Ground-relay output ... 1500V AC for 1 min Ground-alarm output ... 1500V AC for 1 min Others ... 500V AC for 1 min
Input Impedance	Thermocouple: 1M Ω or more Voltage: 450 k Ω or more Current: 250 Ω (external resistor)
Allowable Signal Source Resistance	Thermocouple: 100 Ω or less Voltage: 1 k Ω or less
Allowable Wiring Resistance	RTD: 10 Ω or less per wire
Reference Junction Compensation Accuracy	$\pm 1^{\circ}\text{C}$ at 23°C
Input Value Correction	$\pm 10\%$ of measuring range
Set Value Correction	$\pm 50\%$ 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 (50/60Hz): 140 dB or more

INPUT SELECTION	
Input Signal	Thermocouple: J, K, R, B, S, T, E, N, PL2 RTD: Pt100 Voltage, current: 1 to 5V/4 to 20 mA DC, 0 to 5V/0 to 20 mA DC (apply current input via supplied 250 Ω resistor)
Burnout	For thermocouple or RTD input, control output direction (upper or lower) is selectable

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 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 For relay contact output or voltage pulse output only
Hysteresis Width	1 to 50% of measuring range For On/off action only
Anti-Reset Windup	0 to 100% of measuring range Automatically set at auto-tuning
Input Sampling Cycle	0.5 sec
Control Cycle	0.5 sec

CONTROL OUTPUT 1	
Control Output 1	Select one type out of three below: Relay contact: SPDT, 220V AC/30V DC, 3A (resistive load) Mechanical life: 10 million operations (no load) Minimum switching current 100 mA (24V DC) Voltage pulse: ON-17 to 25V DC; OFF-0.5V DC or less; 20 mA or less 4 to 20 mA DC: allowable load resistance 600 Ω or less

CONTROL FUNCTIONS OF HEATING/COOLING CONTROL TYPE (OPTION)	
Heating Side Proportional Band (P)	0 to 999.9% of measuring range
Cooling Side Proportional Band (P)	Heating side proportional band x cooling side proportional band coefficient 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. On/off action (without dead band) for heating and cooling sides if P, I,D=0 / Proportional action if I,D=0
Proportional Cycle	1 to 150 sec. For relay contact output or voltage pulse 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 set at auto-tuning
Overlap, Dead Band	$\pm 50\%$ of heating side proportional band
Input Sampling Cycle	0.5 sec
Control Cycle	0.5 sec

OUTPUT SELECTION OF HEATING/COOLING CONTROL TYPE (CONTROL OUTPUT 2) (OPTION)	
Control Output 2	Relay contact: SPST, 220V AC/30V DC, 3A (resistive load) Mechanical life: 10 million operations (no load) Electrical life: 100,000 operations (rated load) Minimum switching current: 100 mA (24V DC)

OPERATION AND DISPLAY SECTION	
Parameter Setting Method	Digital setting by 3 keys. Key lock function provided
Display Unit	Process value/set value displayed individually 4 digits, 7-segment LED
Status Display LED	Control output, process alarm output, heater burnout alarm output
Setting Accuracy	0.1% or less of measuring range
Indication Accuracy (at 23°C)	Thermocouple at \pm (0.5% of measuring range) ± 1 digit $\pm 1^{\circ}\text{C}$ Thermocouple R at 0 to 500°C : \pm (1% of measuring range) ± 1 digit $\pm 1^{\circ}\text{C}$ Thermocouple B at 0 to 400°C : \pm (5% of measuring range) ± 1 digit $\pm 1^{\circ}\text{C}$ RTD, voltage/current: \pm (0.5% of measuring range) ± 1 digit

ALARM (OPTION)	
Alarm Type	Absolute alarm, deviation alarm, zone alarm with upper and lower limits for each. Hold function available. Alarm latch function provided
Alarm ON-Delay	Delay setting 0 to 9999 sec settable in 1 sec steps
Process Alarm Output	Relay contact: SPST, 220V AC/30V DC, 1A (resistive load) Mechanical life: 10 million operations (no load) Electrical life: 100,000 operations (rated load) Minimum switching current: 100 mA (24V DC) 2 output points, output cycle 0.5 sec
Heater Burnout Alarm Output	Relay contact: SPST, 220V AC/30V DC, 1A (resistive load) Mechanical life: 10 million operations (no load) Electrical life: 100,000 operations (rated load) Minimum switching current: 100 mA (24V DC) 1 output point, output cycle 0.5 sec

DIGITAL INPUT (OPTION)	
Points	1
Electrical Specifications	5V DC, approx. 2mA
Input Pulse Width	0.5 sec or more
Function (1 of the 6 functions is selected)	Set value (SV0, SV1) changeover Start/stop control action Start/reset ramp/soak action Start/stop auto-tuning Cancel alarm latch Start incorporated timer

TIMER FUNCTION	
Start	By digital input option
Setting	0 to 9999 sec settable in 1 sec steps
Action	Event ON-delay or OFF-delay
Signal Output	Alarm output relays used. 2 points are available

COMMUNICATION FUNCTION (OPTION)	
Physical Specifications	EIA RS485
Communication Protocol	Modbus (RTU). Free Windows®-based software, PXR-LITE™
Communication Method	2-wire method. Half-duplex bit serial, start-stop sync type
Data Type	8 bits. Parity: odd/even/none
Communication Rate	9600 bps
Connection Aspect	multi-drop up to 31 controllers
Communication Distance	Total extension 500m or less
RS232C/RS485 Signal Converter	RSFC24 (recommended)

OTHER FUNCTIONS	
Parameter Mask Function	Parameter display is disabled from keypad
Ramp/Soak Function	Totally 8 ramps/8 soaks. 1 or 2 program patterns. Digital input allows start/reset of the action
Heater Current Detection	Current detector for 1 to 30 A ... CTL-6-S for 20 to 50 A ... CTL-12 Alarm setting range: 1 to 50 A
Applied Standards	UL, c-UL recognized (file no. E131280), CE approved, CSA (pending)

OPERATING AND STORAGE CONDITIONS	
Ambient Operating Temp.	14 to 122°F (-10 to 50°C)
Ambient Operating Humidity	Less than 90% RH (no condensation)
Storage Temperature	-4 to 140°F (-20 to 60°C)

STRUCTURE	
Mounting Method	Panel flush mounting
External Terminal	Screw terminal (M3 screw)
Case Material	Plastic (non-combustible grade UL94VG-0 equivalent)
Dimensions	Approx. 2 x 2 x 3.1 in. (48 x 48 x 79.8 mm)
Mass	Approx. 200g
Protective Structure	Front waterproof structure NEMA4X (IEC standard IP66 equivalent) (when mounted on panel with supplied gasket) Rear case: IEC IP20
Outer Color	Black (front frame, case)

OPTIONAL ITEMS	
Current Transformer (CT)	For 1 to 30 A: CTL-6-S For 20 to 50 A: CTL-12
Signal Converter for Communication Function	RSFC24

INSULATION BLOCK DIAGRAM	
Power Supply	Process variable input Heater current detector input internal circuit Voltage pulse, 4 to 20 mA 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 (RS485) Digital Input
Heater burnout alarm output	

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

ORDERING INFORMATION		
P	X	R
4		
1		
		V
FRONT PANEL SIZE		
CODE		(\$) PRICE
1/16 DIN screw terminal type		4 179
INPUT SIGNAL		
CODE		(\$) PRICE
Thermocouple °C		T N/C
Thermocouple °F		R N/C
RTD (Pt100) °C		N N/C
RTD (Pt100) °F		S N/C
4–20mA DC, 1-5V DC		B N/C
0–20mA DC, 0-5V DC		A N/C
CONTROL OUTPUT 1†		
CODE		(\$) PRICE
Relay (SPDT) (reverse action)		A N/C
Relay (SPDT) (direct action)		B N/C
SSR driver (reverse action)		C N/C
SSR driver (direct action)		D N/C
4–20mA DC (reverse action)*		E N/C
4–20mA DC (direct action)*		F N/C
CONTROL OUTPUT 2††		
CODE		(\$) PRICE
None		Y N/C
Relay (SPST) (reverse action)**		A 35
Relay (SPST) (direct action)**		B 35
ALARM OPTIONS		
CODE		(\$) PRICE
Heater break alarm w/ process alarm (1 point)***		3 50
None		4 N/C
Process alarm (2 points)		5 30
ADDITIONAL OPTIONS		
CODE		(\$) PRICE
None		– N/C
With RS485 (Modbus)		R 40
With digital input (1 point)		DI 30
With RS485 (Modbus) + digital input (1 point)		DI-R 70

* Not available with heater break alarm

** Not available with heater break alarm w/ process alarm
(1 point) or process alarm (2 points)

*** Not available with RS485 + digital input (1 point). Current
transformer required. Please specify part # (see below).

† 0 to 10V DC output — future option

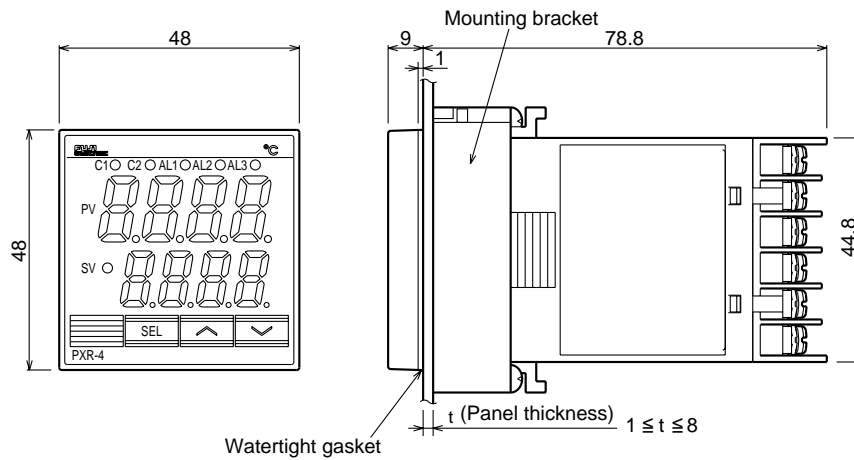
†† SSR and 4 to 20mA DC — future option

CURRENT TRANSFORMERS	PART #	(\$) PRICE
1–30A	CTL-6-S	23
20–50A	CTL-12	40

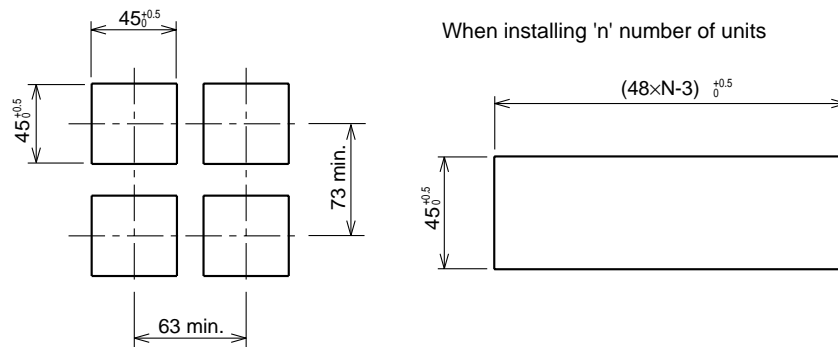
SIGNAL CONVERTER	PART #	(\$) PRICE
RS485 to RS232	RSFC24	135

PROGRAM LOADER	(\$) PRICE
PXR4 loader assembly	250

DIMENSIONS (unit:mm)

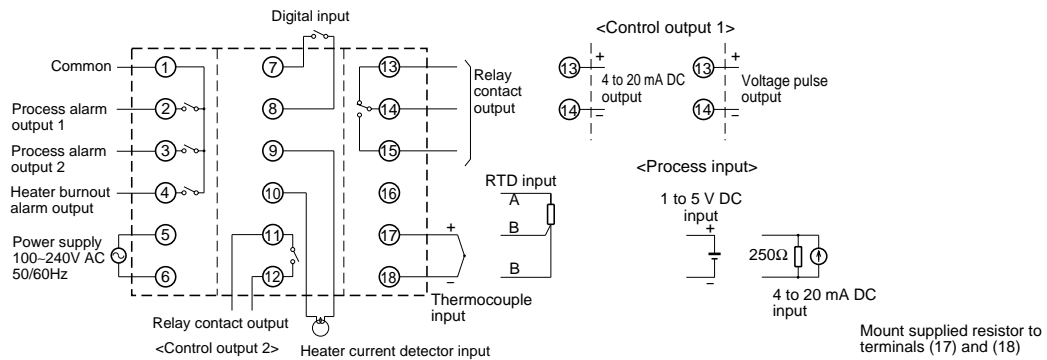


PANEL CUTOUT (unit:mm)



WIRING DIAGRAM

Without communication function



With communication function

