PXR4

1/16 DIN ADVANCED SELF-TUNING TEMPERATURE AND PROCESS CONTROLLER

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 Fuji Electric's superior controllers, 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. The purchase of a PXR4 with PC-communications includes our 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 for more details.

FEATURES

- **Advanced Control Functions**
  - PID Plus Self Tuning
  - PID Plus Fuzzy Control
- **Large LED Display**
  - 4-digit, 13 mm-high display for PV
  - Waterproof faceplate conforms to NEMA-4X/IP66
- **Digital Input**
  - Change between 2 setpoints
  - Change between ramp/soak and standby
  - Start/reset the ramp/soak
  - Start/stop the auto tuning
  - Cancel the alarm latch
  - Start the incorporated timer
- **Auto-Tune**
- **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 or 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

PXR4 SPECIFICATIONS

GENERAL SPECIFICATIONS

POWER SUPPLY VOLTAGE	100 (-15%) to 240V (+10%) AC, 50/60Hz
POWER CONSUMPTION	8VA or less (100VAC) or 10VA or less (220VAC)
REFERENCE JUNCTION COMPENSATION ACCURACY	±1°C at 23°C

INPUT

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
INPUT FILTER	0 to 900.0 sec set in 0.5 sec steps
BURNOUT	For thermocouple or RTD input, control output direction (upper or lower) is selectable

CONTROL FUNCTION

CONTROL ACTION	PID control (with auto-tuning, self-tuning) Fuzzy control (with auto-tuning)
PROPORTIONAL BAND (P)	0 to 999.9% of measuring range set in 0.1% steps
INTEGRAL TIME (L)	0 to 3200 sec set in 1 sec steps
DIFFERENTIAL TIME (D)	0 to 999.9 sec set in 1 sec steps
PROPORTIONAL CYCLE	1 to 150 sec set in 1 sec steps
HYSTERESIS WIDTH	0 to 50% of measuring range. For On/off action only
INPUT SAMPLING 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) 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 600Ω or less

OUTPUT SELECTION OF HEATING/COOLING CONTROL (CONTROL OUTPUT 2) (OPTION)

CONTROL OUTPUT 2	Relay contact: SPST, 220V AC/30V DC, 3A (resistive load)

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
INDICATION ACCURACY (AT 23°C)	Thermocouple at ± (0.5% of measuring range) ± 1 digit ±1°C Thermocouple R at 0 to 500°C: ± (1% of measuring range) ±1 digit ±1°C Thermocouple B at 0 to 400°C: ± (5% of measuring range) ±1 digit ±1°C RTD, voltage/current: ± (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 set in 1 sec steps
PROCESS ALARM OUTPUT	Relay contact: SPST, 220V AC/30V DC, 1A (resistive load) 2 output points, output cycle 0.5 sec
HEATER BURNOUT ALARM OUTPUT	Relay contact: SPST, 220V AC/30V DC, 1A (resistive load) 1 output point, output cycle 0.5 sec

DIGITAL INPUT (OPTION)

POINTS	1; contact closure
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 set 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 #E131280), CE approved

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

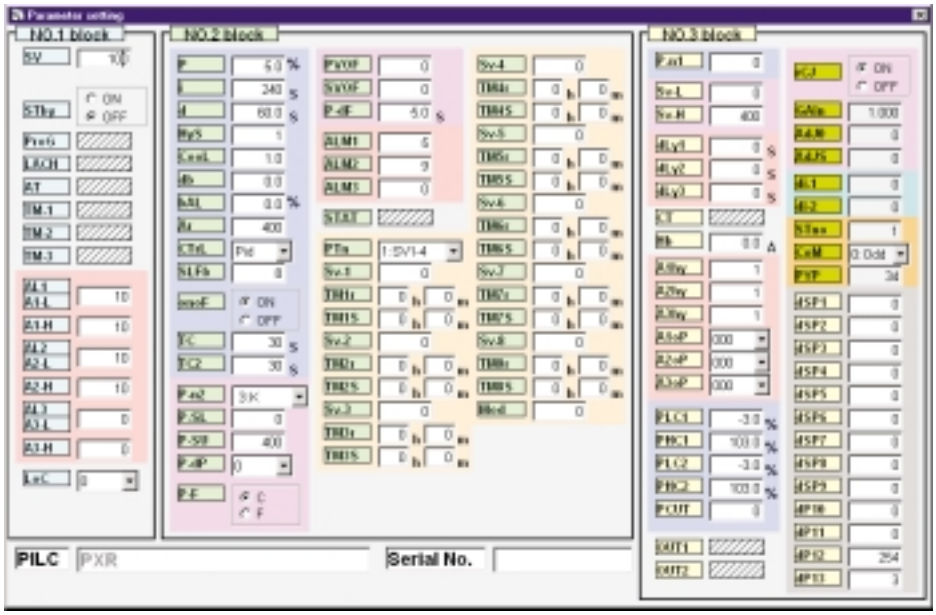
MOUNTING METHOD	Panel flush mounting
EXTERNAL TERMINAL	Screw terminal (M3 screw)
DIMENSIONS	Approx. 2 x 2 x 3.1 in. (48 x 48 x 79.8 mm)
PROTECTIVE STRUCTURE	Front panel NEMA4X (IEC standard IP66 equivalent) (when mounted on panel with supplied gasket). Rear case: IEC IP20
OUTER COLOR	Black (front panel, case)

OPTIONAL ITEMS

CURRENT TRANSFORMER	For 1 to 30 A: CTL-6-S For 20 to 50 A: CTL-12
SIGNAL CONVERTER FOR COMMUNICATION FUNCTION	RSFC24

PROGRAM LOADER INTERFACE

The Program Loader for Fuji Electric's PX and PXR series controllers is a powerful tool for the OEM customer. Using the PXR4 Loader Assembly, the controller can be configured from a PC running on Windows environment.

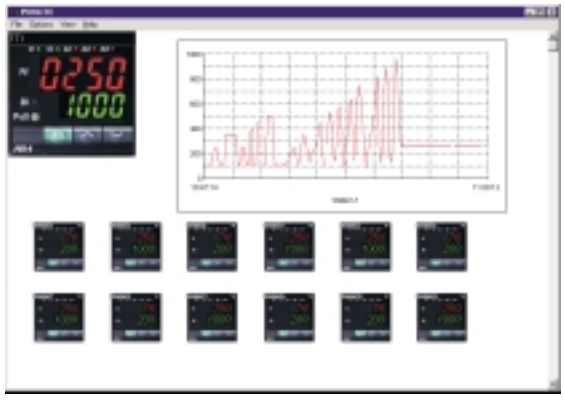


FEATURES

- Retrieve or Store Controller Data
- Selectively Mask or Unmask Parameters for Viewing on the Controller
- Clone Settings to Other Controllers From Saved Files
- Print Data Report

PXR-LITE COMMUNICATIONS SOFTWARE

PXR-LITE© is a free Windows-based software that is supplied with the communications option on a PXR controller. It is the latest in control and monitoring of Fuji Electric's PXR series controllers. It provides continuous remote monitoring of single or multiple controllers using a single half-duplex RS-485 line.



FEATURES

- Monitor and Control Up to 31 Controllers from a PC via RS485-RS232 Signal Converter
- Real-Time Charting and Data-Logging
- Remote Setpoint Adjustment
- Set Control Modes, Alarms and Other Control Parameters
- Remote Auto-Tuning and Ramp-Soak Programming
- Live Display of Process and Setpoint Values, Alarm Annunciators
- View Single-Station or Multi-Station Data
- Comprehensive Help File Included
- Runs on Windows Environment, 3.1 or Later

PXR4 ORDERING INFORMATION

P	X	R	A	–	B	C	D	1	–	E	V	–	F	–	G

To create a part number fill in the boxes above with the appropriate number and/or letter from the corresponding box below.

Box A: Front Panel Size
4 = 1/16 DIN screw terminal type

Box B: Input Signal
T = Thermocouple °C
R = Thermocouple °F
N = RTD (Pt100) °C
S = RTD (Pt100) °F
B = 4–20mA DC, 1-5 VDC
A = 0–20mA DC, 0-5 VDC

Box C: Control Output 1
A = Relay (SPDT) (reverse action)
B = Relay (SPDT) (direct action)
C = SSR driver (reverse action)
D = SSR driver (direct action)
E = 4–20mA DC (reverse action)*
F = 4–20mA DC (direct action)*
** Not available with heater break alarm*

Box D: Control Output 2
(Options C, D, E & F available summer 2003)
Y = None
A = Relay (SPST) (reverse action)*
B = Relay (SPST) (direct action)*
C = SSR driver (reverse action)
D = SSR driver (direct action)
E = 4–20mA DC (reverse action)**
F = 4–20mA DC (direct action)**
** Not available with heater break alarm with process alarm (1 point)*
*** Not available with heater break alarm*

Box E: Alarm Options
3 = Heater break alarm w/ process alarm (1 point)*
4 = None
5 = Process alarm (2 points)
** Not available with RS485 + digital input (1 point). Current transformer required. Please specify part # (see accessories)*

Box F: Additional Options
– = None *(standard, no code necessary)*
R = With RS485 (Modbus)
DI = With digital input (1 point)
DI-R = With RS485 (Modbus) + digital input (1 point)

Box G: Power Supply Options
(Option D available summer 2003)
– = 85-264 VAC
D = 24V AC/DC

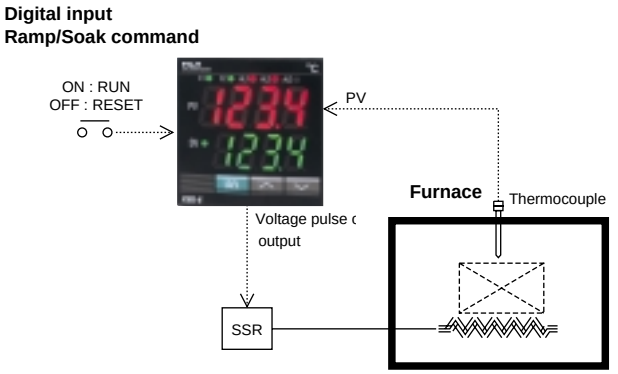
ACCESSORIES

CTL-6-S	Current Transformer for 1–30A
CTL-12	Current Transformer for 20–50A
RSFC24	RS485 to RS232 Signal Converter
PXR4 LOADER ASSEMBLY	Program loader for PXR4 (can be used for PX series also)

PXR APPLICATION EXAMPLES

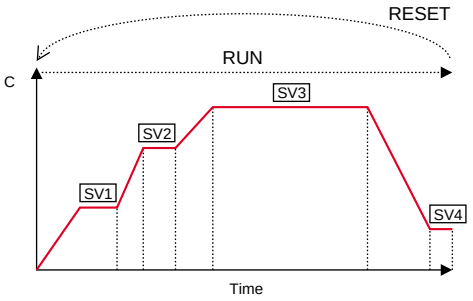
FURNACE / HEAT PATTERN CONTROL

Heat Pattern Control — Ramp/Soak Function



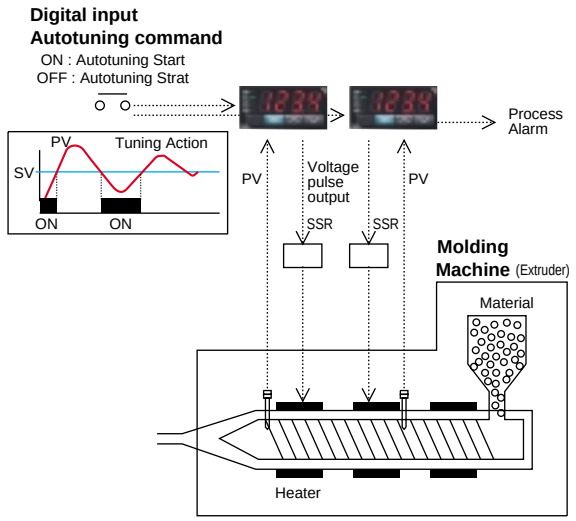
Ramp/Soak Function

- Control temperature according to “Heat pattern with ramp”
- Keep temperature stable for a certain period with "Heat pattern" and then cool down
- "Heat pattern" can be Started (RUN) /Reset by an external digital input.



PLASTIC MOLDING MACHINE

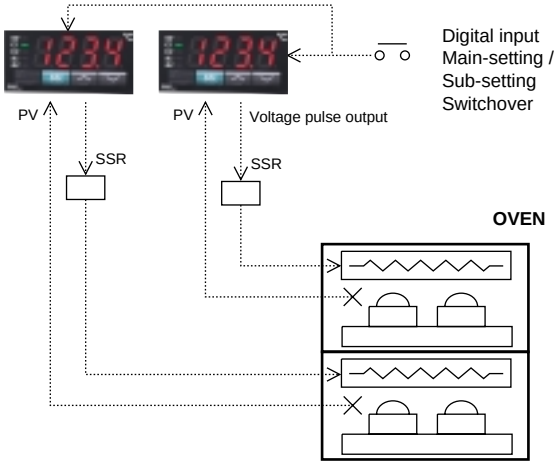
Stable temperature control required — Fuzzy + PID Control



Auto-Tuning can be started/stopped through external digital input

OVEN

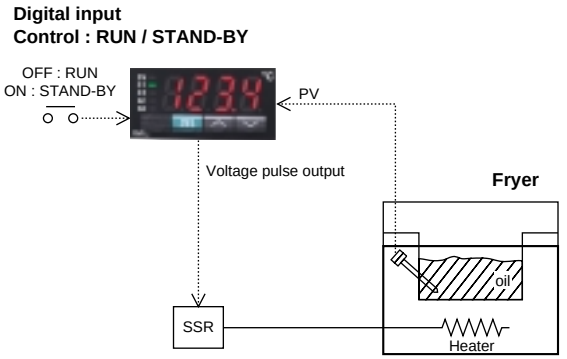
To change SV easily



Set Value (SV) can be selected/changed externally. <main SV, SV1~3 change over>

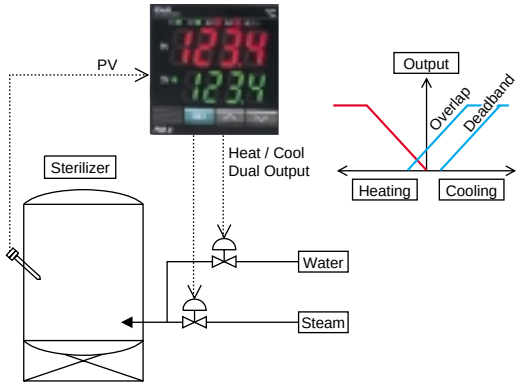
FRYER

To keep oil temperature stable



Control RUN/Stand-by selectable through external digital input

COOLING + HEATING CONTROL



Cooling output and Heating output can be overlapped or a “Dead-band” set between them.