Temperature Controller

PTC10 — Programmable temperature controller

PTC10 Temperature Controller

Introducing the PTC10 Programmable Temperature Controller from SRS — the ideal instrument for measuring temperature, controlling heaters, and logging temperature data.

The PTC10 Programmable Temperature Controller is a modular system that can be configured to suit a wide range of applications. The system consists of the PTC10 Controller and up to four I/O cards — two types of input cards for RTDs and thermocouples, and two types of output cards for controlling heaters. The I/O cards are ordered separately, and you can mix and match them in any way you wish.

Input Cards

The PTC321 input card supports up to four Pt RTD sensors. Each channel has a four-wire input with its own 1 mA current source for sensor excitation. The current can be reversed with each reading to cancel out stray thermocouple EMFs.

For thermocouples, the PTC330 four channel thermocouple input card should be used. It is factory configured to interface with either E, J, K or T type thermocouples. Each channel is electrically isolated allowing thermocouples to be attached to electrically-live equipment.

Both input cards have selectable low-pass filters that hel reduce noise and improve PID feedback performance.

- · Up to 16 input channels

- · Up to 4 PID feedback control channels

- · 50 Hz PID sampling

- · 1 mK resolution

- · Data logging on removeable flash media

- · USB, Ethernet, RS-232 interfaces (std.)

- · GPIB interface (opt.)

PTC330 Thermocouple card   *PTC321 Pt RTD card*

Output Cards

The PTC420 output card is a 120/240 VAC heater driver that delivers up to 5 A of current, and is intended to drive large heaters. Alternatively, the PTC430 DC output card delivers up to 50 VDC and 1 A of current for driving smaller heaters.

PTC420 AC output card   *PTC430 DC output card*

PID Feedback

Each output card is supported with a digital PID controller algorithm with automatic as well as manual tuning capability. You can servo PID controllers to any of the input signals, or the difference of any two input signals.

Since the temperature of most heaters is proportional to the square of the heater current or voltage, a square root filter is available to linearize the PID output.

Up to ten unique temperature ranges can be programmed with their own PID parameters.

Data Acquisition and Display

All temperature input channels are read simultaneously at a sampling rate that can be set between 1 Hz and 50 Hz. Temperature data can be displayed numerically or graphically

on the LCD display. A group of channels can be plotted on the same graph or on smaller individual graphs.

Alarms

Upper and lower alarm levels, or rate-of-change limits, can be assigned to each input channel. If these limits are exceeded, an audible alarm sounds, and assigned relays change state.

Programmability

Remote operation is supported with GPIB (opt.), RS-232 and Ethernet computer interfaces. All instrument functions can be controlled and read over any of the interfaces.

The PTC10 stores data on USB devices like flash keys, flash card readers, and USB hard drives. Data is stored in binary format to minimize file size and access time, but can be converted to ASCII text using an included application.

Multi-Purpose Ports

The PTC10 also has four configurable general purpose DACs/ADCs, eight bidirectional digital lines, and four relays. This can be replaced by the PTC332 single slot Pt RTD input card in case four output cards are needed in your application.

Flexibility

The PTC10 Programmable Temperature Controller has the flexibility to handle virtually any temperature control application. It's as useful in the research lab as it is in industry. The PTC10 is the right choice for all your temperature control experiments.

PTC322 Pt RTD card (single slot)

PTC10 rear panel

 Stanford Research System

PTC10 Temperature Controller

Data acquisition rate	1 to 50 Hz
Temperature resolution	<0.001 °C
PID feedback	Both manual and auto-tuning modes are available.
Data display	320 × 240 pixel touchscreen. Both numeric and graphical data displays.
Alarms	Upper and lower temperature limits, and rate-of-change limits can be set on each channel. If exceeded, an audio alarm and a relay closure will occur.
Analog ports	
# of ports	4 configurable DAC or ADC ports
Range	±10 VDC
Resolution	24-bit input, 16-bit output
Update rate	50 Hz
Connector	BNC
Computer interface	USB, Ethernet, and RS-232. GPIB (IEEE488.2) is optional.
Power	10 A
	88 to 132 VAC or 176 to 264 VAC, 47 to 63 Hz or DC
Dimensions	17" × 5" × 18" (WHL)
Weight	25 lbs.
Warranty	One years parts and labor on defects in material and workmanship.

PTC321 Pt RTD Card

Temperature range	−200 °C to 550 °C
Inputs	Four 100 Ω Pt RTD 4-wire inputs
Excitation	1
mA Accuracy	±30 mK
Noise	2 mKrms (10 samples/s)
Temp. coefficient	1.4 mK/°C
Signal conditioning	Selectable 1 and 10 second time constant digital LPFs are provided.
Signal detection	Card detects open and short circuit conditions.

PTC330 Thermocouple Card

Thermocouple types	E, J, K, or T
Temperature range	
E-type	−270 °C to 1000 °C
J-type	−210 °C to 1200 °C
K-type	−270 °C to 1370 °C
T-type	−270 °C to 400 °C
Inputs	Four thermocouple inputs
Input capacitance	<1 pF
Connector type	Omega mini thermocouple jacks
Accuracy	±500 mK (over 12 months)
Noise	20 mKrms (10
samples/s) Temp. coefficient	20 mK/°C
	(type K thermocouple at 164.0 K)

CMRR	100 dB
Common mode isolation	250 VAC

PTC420 AC Output Card

Output voltage	120/240 VAC
Max. output current	5 A
Cycle time	Adjustable between 1 and 240 s
Max. line voltage	250 VAC
Surge current	100 A max. (non-repetitive)
Output resolution	0.1 % at 10 s cycle time
Heater resistance (min.)	24 Ω (110 VAC), 46 Ω (230 VAC)

PTC430 DC Output Card

Max. output voltage	50 VDC
Voltage ranges	20 V and 50 V
Max. output current	1 A
Current ranges	0.1 A, 0.5 A, 1 A (50 V) or 2 A (20 V)
Output resolution	16-bit (24-bit with dithering)
Accuracy	±1 mA (1 A range)
	±0.1 mA (0.5 A range)
	±0.01 mA (0.1 A range)
Noise (rms), 25 Ω load	200 μV (2 A range)
	15 μV (0.5 A range)
	5 μV (0.1 A range)