



# Scientific Systems Design Inc

50 Unit #5 Steeles Ave East  
Milton,  
ONTARIO L9T 4W9  
Canada

Phone: 1 905 608 9307  
e-mail: [ssd@scisys.info](mailto:ssd@scisys.info)  
[www.scisys.info](http://www.scisys.info)

---

*Innovative Engineering for Science*

---

## PROPORTIONAL TEMPERATURE CONTROLLER

### PTC04

# Proportional Temperature Controller

## Temperature controller for incubators

### FEATURES

- \* High output power for rapid heating
- \* Compatible with our range of heating devices
- \* Temperature control below ambient with optional Peltier Controller (PC01)



The PTC04 is a proportional temperature control unit for use with incubators and temperature controlled solutions located away from sensitive recording instruments since it is powered by an external switch-mode power supply. These types of power supply often produce undesirable noise that can interfere with electrophysiological recordings. A low voltage direct current output is used to power heating elements together with a sensor for feedback proportional control. The required temperature is set using the front control panel. When the display selector is set to control the display reads the temperature of the control sensor. The set temperature must exceed ambient by at least 2 degrees centigrade. Set temperatures are not lost in the event of a power loss: unit can be left to operate from day to day without having to set temperature each time.

### SPECIFICATIONS OF PTC03

Readout accuracy	+/- 0.1 degrees centigrade.
Control accuracy	0.5 degrees centigrade below set temperature maximum difference.
Control stability	Not more than +/- 0.1 degree centigrade from control point.
Output power	36 Watts Max.
Output type	D.C. Proportional control.
Temperature range	10 to 60 degrees centigrade.
Sensors	Pt100 Platinum Resistance

## **PTC04 Temperature Controller user instructions.**

Please read before use.

1. Connect the heater to the 3 pole connector on the front panel.
2. Connect the sensors to the 7 pole connector on the front panel.
3. Turn the setting temperature knob down (rotate left).
4. Switch the 'control/set' switch to 'control'.
5. Connect the equipment to the external switch-mode power supply switch on at the wall plug.
6. The 'line on' LED should light.
7. The readout should read the temperature of the apparatus connected via the sensor. This will probably be a room temperature initially.
8. Switch the control/set switch to 'set'.
9. The readout should read a set temperature of around 10 degrees C.
10. Rotate the 'set temperature' knob to the right. As the readout passes the reading seen in [7], that is the temperature of the chamber, the 'heater on' LED should light. This shows that the equipment is now heating the chamber.
11. If the 'heater on' LED does not light, switch off the equipment, check the connections to the chamber and repeat the instructions from [1].
12. If the LED does light, continue turning the 'set temperature' knob until the desired chamber temperature shows on the readout.
13. Return the 'control/set' switch to 'control'.
14. The readout will now show the temperature increasing from the room temperature to the desired 'set' temperature.
15. The equipment will now heat up the chamber and control it at the desired temperature.
16. When the chamber approaches/reaches the required temperature as shown on the readout, the 'heater on' LED will reduce in brightness. This indicates that the unit is now controlling the temperature, that is, supplying just enough current to maintain the temperature against the heat losses. When the temperature is first reached it is possible for the 'heater on' LED to go off initially as there may be a slight overshoot. This depends on the thermal dynamics of the chamber.

If the unit fails to function correctly please follow the fault diagnosis procedure on a separate sheet.

### **Fuses: The following applies to PTC04 Issue No.1., Serial No. 1501 onwards**

**F1** is a F6.3A 5x20mm fuse. This fuse protects the output circuitry and is in the line to the heater. If this fuse blows a problem with the wiring to the heating element should be investigated. The heating element and associated wiring should present a resistance of approx 5 ohms.

### **NOTE**

A Zero Volts chassis 4mm connector to the rear is connected to the negative rail of the incoming negative or reference zero volts. Since the switch mode power supply is essentially 'floating' the zero volts chassis connection point will allow the system to be connected to the users ground point. Please note therefore that the zero volts chassis point is NOT a safety ground or a ground point connected to the mains ground.

There are no user adjustments or fuses inside the case and the covers should not be removed except by a repair engineer.



## **PTC04 design safety statement:**

The PTC04 is designed and constructed to ensure that it is safe to use when connected to the electricity supply system. The equipment is powered by an external 'Medical Power Supply' with 90V to 240V input and 12V 4.26A Low Voltage output that is connected to the PTC04 via a jack connector. The remainder of the electronic circuitry within PTC04 presents no shock hazard.

The External Medical Power Supply used for the PTC04 controller is rated at 50VA and is designed and manufactured in accordance with:

UL: File EN60601-1 /IEC/CSA CE, RoHS

Please also refer to specification sheet provided by the manufacturer

Full power represents 48VA and the output is also fuse protected, the fuse-holder is mounted on the rear panel.

EMC Specifications of external Medical Power Supply

Conducted Emissions EN55011 Class B, FCC Part 15, Class B.

Radiated Emissions EN55011 Class B, FCC Part 15, Class B.

Line Frequency Harmonics EN61000-3-2, Class A

Voltage Fluctuations/Flicker EN61000-3-3

Static Discharge Immunity EN61000-4-2, 6kV

Contact Discharge, 8kV air discharge

Radiated RF Immunity EN61000-4-3, 3V/m.

EFT/Burst Immunity EN61000-4-4, 2kV/5kHz.

Line Surge Immunity EN61000-4-5, 1kV differential, 2kV common-mode

Conducted RF Immunity EN61000-4-6, 3Vrms

Power Frequency Magnetic Field Immunity EN61000-4-8, 3A/m

Voltage Dip Immunity EN61000-4-11, Criteria A

Within the PTC04 the 12V DC is connected to a PCB mounted DC to DC converter to give +/- 15V for the electronic circuitry. The DC-DC converter is rated at 5 Watts and certified to: EN-60950-1, UL-60950-1, EN-60601-1

The equipment is designed for use as part of a research laboratory environment temperature control system. The output of the equipment is a heating current which flows through a user selectable external resistive heater. Should the temperature sensor be disconnected for any reason the system shuts off the power to the heater. A 6.3 Amp fuse in the output circuit, available on the rear panel, protects the output stages against accidental overload.

9th July 2015