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# PTC / TC / MTC / MPS series

Precise Low-Noise Temperature Controllers



PTC-20 (Peltier Controller)



TC-20 (Heat Only Controller)

Modern electrophysiological techniques often call for experiments to be carried out at different temperatures. The npi electronic line of temperature control instruments are designed for heating and/or cooling purposes in electrophysiological set-ups where precise control, low-noise operation, and reliability are critical. They are available with one or two control channels, for control with Peltier elements (PTC series) or for heating only using resistive heaters (TC / MTC series). A low-noise DC power supply for e.g. objective heaters is obtainable as well.

## Features:

- ⇒ Low-noise DC power output
- ⇒ One or two control channels
- ⇒ Heat-only or Peltier control
- ⇒ Three modes of operation:  
Direct, sensor or external mode
- ⇒ Two thermometers
- ⇒ External sensor input
- ⇒ Digital displays
- ⇒ Proportional-integral (PI) control
- ⇒ Control accuracy typically  $\pm 0.2\text{ }^{\circ}\text{C}$

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## For Peltier Elements (PTC Series)



### PTC-10

- ⇒ For heating and cooling
- ⇒ One control channel
- ⇒ Bipolar DC output  $\pm 15$  V, 5 A max.
- ⇒ Control using one of two possible thermometers

### PTC-20

- ⇒ For heating and cooling
- ⇒ Two independent control channels
- ⇒ Bipolar DC output  $\pm 15$  V, 3 A max. per channel

## Heat Only (TC / MTC Series)



### TC-10

- ⇒ For heating only
- ⇒ One control channel
- ⇒ Monopolar DC output 12 V, 2.5 A max.
- ⇒ Control using one of two possible thermometers

### TC-20

- ⇒ For heating only
- ⇒ Two independent control channels
- ⇒ Monopolar DC output 12 V, 2 A max. per channel



### MTC-20/2SD

- ⇒ For heating only
- ⇒ One control channel
- ⇒ Control using one of two possible thermometers
- ⇒ Monopolar DC output 12 V, 1 A max.
- ⇒ Small desktop housing



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## Power Supply



### MPS-20

- ⇒ Low-noise, single channel power supply
- ⇒ Monopolar DC output
- ⇒ Output adjustable 1.5 V to 12 V, 2.5 A max.
- ⇒ For direct heating without control loop

## Accessories



Objective  
heater



HCS  
Heated chamber stage



HPT-G  
Heated perfusion cube  
(high flow rate)



HPC-2  
Heated perfusion cube  
(low flow rate)



HCMIS  
Peltier microincubator



HCPC  
Heating and cooling perfusion cube



Coolit Heat sink  
for HCMIS and HCPC



Ts100  
Temperature sensor (2x6 mm)

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## Technical Data

### TC-10/TC-20

**Sensor input:** for semiconductor sensors 2252  $\Omega$  at 25 °C (standard), Warner sensors (on request) or platinum sensors 100  $\Omega$  at 0 °C (on request), with electronic protection

**Sensor input (EXT. Mode):** 1 mV/°C

**ALARM and SHUTOFF:** disconnects POWER OUTPUT if temperature is below +3 °C (not connected or broken sensor) or above +60 °C (short circuited sensor), customized SHUTOFF temperatures possible

**Digital displays:** 3 1/2 digits, XX.X °C (temperature of SENSOR A or B) or XX.X V (voltage at power output)

**COMMAND INPUT:** analog input, 10 mV/°C, via BNC connector

**Set value control:** digital control, range: up to 60.0 °C, XX.X °C, or 0-100% of output voltage (DIRECT mode)

**Temperature OUTPUT (A, B):** analog outputs, 10 mV/°C, via BNC connector, output impedance: 250  $\Omega$

**Power output:** 12 V / 2.5 A (TC-10), 12 V / 2 A (TC-20, for each channel), short circuit protected, continuous DC

**Limiter:** control for the output voltage with a linear range from 0 - 100 %

**Control:** PI (proportional-integral) controller, accuracy typically  $\pm 0.2$  °C, gain range 10-10k, integration time 50 ms - 20 s (logarithmic scale)

**Measuring accuracy:** 0.1 °C at 25 °C

**Power requirements:** 115V / 230V AC, 60 / 50 Hz, fuse 1.6 / 0.8 A slow

**Dimensions:** 19" rackmount cabinet 19" (483 mm), 10" (250 mm), 3.5" (88 mm)

### PTC-10/PTC-20

**Sensor input:** for semiconductor sensors 2252  $\Omega$  at 25 °C (standard), Warner sensors (on request) or platinum sensors 100  $\Omega$  at 0 °C (on request), with electronic protection

**Sensor input (EXT. Mode):** 1 mV/°C

**ALARM and SHUTOFF:** disconnects POWER OUTPUT if temperature is below +3 °C (not connected or broken sensor) or above +60 °C (short circuited sensor), customized SHUTOFF temperatures possible

**Digital displays:** 3 1/2 digits, XX.X °C (temperature of SENSOR A or B) or XX.X V (voltage at power output)

**COMMAND INPUT:** analog input, 10 mV/°C, via BNC connector

**Set value control:** digital control, range: 02.0 °C to 60.0 °C, XX.X °C or 0-100% of output voltage (DIRECT modes)

**Temperature OUTPUT (A, B):** analog outputs, 10 mV/°C, via BNC connector, output impedance: 250  $\Omega$

**Power output:**  $\pm 15$  V / 5 A (PTC-10),  $\pm 15$  V / 3 A (PTC-20, for each channel), short circuit protected, continuous DC

**Limiter:** control for the output voltage with a linear range from 0-100 %

**Control:** PI (proportional-integral) controller, accuracy typically  $\pm 0.2$  °C, gain range 10 - 10k, integration time 50 ms - 20 s (logarithmic scale)

**Measuring accuracy:** 0.1 °C at 25 °C

**Power requirements:** 115 / 230V AC, 60 / 50 Hz, fuse 4 A / 2 A slow

**Dimensions:** 19" rackmount cabinet 19" (483 mm), 10" (250 mm), 3.5" (88 mm)

### MTC-20/2SD

**Sensor input:** for semiconductor 2252  $\Omega$  at 25 °C (standard)

**Sensor input (EXT. Mode):** sensitivity: 1 mV/°C

**ALARM and SHUTOFF:** disconnects POWER OUTPUT if temperature is below +3 °C (not connected or broken sensor) or above +60 °C (short circuited sensor), customized SHUTOFF temperatures possible

**Digital displays:** 3 1/2 digits, XX.X °C (temperature of SENSOR A or B) or XX.X V (voltage at POWER OUTPUT)

**COMMAND INPUT:** BNC connector, analog input, sensitivity: 10 mV/°C

**Set value control:** potentiometer, range: up to 60.0 °C, XX.X °C or 0-100% of output voltage (DIRECT mode)

**Temperature OUTPUT (A, B):** BNC connector, analog outputs, sensitivity: 10 mV/°C, output impedance: 250  $\Omega$

**POWER OUTPUT:** 12 V / 1 A, short circuit protected, continuous DC

**Limiter:** potentiometer for the maximum output voltage with a linear range from 0-100 %

**Control:** PI (proportional-integral) controller, accuracy typically  $\pm 0.2$  °C

**GAIN:** potentiometer, logarithmic scale, range: 10-10k

**INTEGRATION:** potentiometer, logarithmic scale, time range: 50 ms - 20 s

**Measuring accuracy:** 0.1 °C at 25 °C

**Power requirements:** 115V / 230V AC, 60 / 50 Hz, fuse 0.8 A / 0.4 A slow

**Dimensions:** desktop cabinet, 246 mm, 260 mm, 90 mm

### MPS-20

**Digital displays:** 4 digits, XX.XX V (voltage at POWER OUTPUT) or 3 digits X.XX A (current at POWER OUTPUT)

**POWER OUTPUT:** DC 12 V / 1.0 A, short circuit protected,

**Power requirements:** 115 / 230V AC, 60 / 50 Hz, fuse 0.8 / 0.4 A, slow

**Dimensions:** desktop cabinet, 246 mm, 260 mm, 90 mm

