

## **ML309 Thermistor Pod**

*Pod Series*

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### **Description**

A compact signal conditioner designed to work with 10 k $\Omega$  thermistors in the range 5 °C to 45 °C for biological temperature measurements. A delta temperature mode allows an offset to be applied so small changes in temperature can be observed.



### **System Compatibility**

The Thermistor Pod connects to any PowerLab hardware units with Pod ports (8-pin DIN inputs). PowerLab and MacLab (except 4s, 8s and 16s) units without Pod ports require the FE305 Pod Expander.

The Thermistor Pod is supported by the following versions of software:

#### **WINDOWS**

- LabChart v6 or later
- Chart v3.4.8 or later
- Scope v3.6.3 or later
- LabTutor v1.4 or later

#### **MACINTOSH**

- LabChart v6 or later
- Chart v3.6.3 or later
- Scope v3.6.3 or later

**Note:** Earlier software versions do not support Pods.

Visit our website for information on operating system requirements.

### **Transducer Compatibility**

The following transducers are suitable for use with the Thermistor Pod:

MLT409/A Skin Temperature Probe

MLT415/A Nasal Temperature Probe

MLT422/A Skin Temperature Probe

### **Applications**

The Thermistor Pod is suitable for biological temperature measurements such as skin temperature measurements, nasal temperature and respiration detection. The ML309 Thermistor Pod is not galvanically isolated.

### **Theory of Operation**

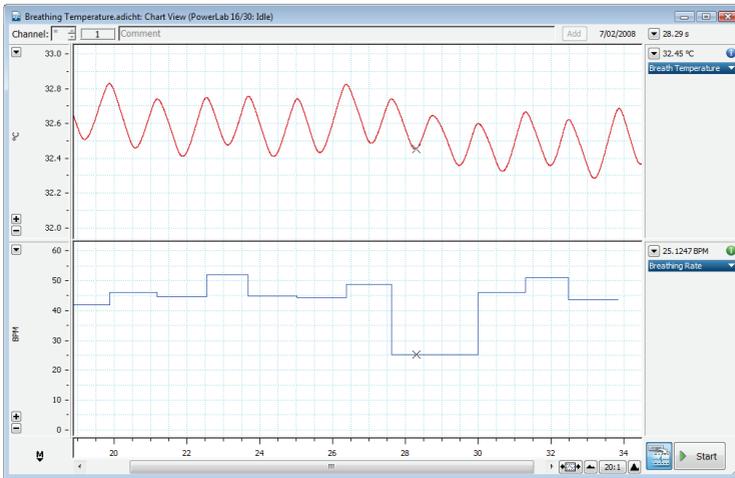
The thermistor transducer is fitted as one element in a full bridge circuit. Changes in the resistance of the thermistor element are converted to a voltage which is amplified to produce 50 mV/°C within the temperature range 5°C to 50°C. A 3-pole 10 Hz low-pass filter reduces noise bandwidth. A switchable offset circuit is used to provide a delta temperature mode for relative temperature measurement.

## Operating Instructions

Connect the thermistor transducer to the 3-pin (mini audio type) connector on the rear panel of the Thermistor Pod. Connect the 8-pin DIN cable from the rear panel of the Thermistor Pod to a PowerLab Pod port (or one of the Pod ports of a Pod Expander connected to the PowerLab). Do not connect other devices such as Front-ends or Instruments to the corresponding BNC connector on the channel used by the Pod.

Pods can be connected to the PowerLab unit while LabChart, Chart or Scope software is running, but not when recording data. Once detected, the functions of the Thermistor Pod are combined with those of the PowerLab and software, replacing the Input Amplifier dialog with the Thermistor Pod dialog (shown below).

The Thermistor Pod is preset to produce a temperature measurement accurate to the stated specifications without any need to calibrate.



*Breath temperature is measured on the top channel using the Thermistor Pod.  
The breathing rate is calculated from this and displayed on the second channel.*

## Stacking and Unstacking Pods

Pods stack by clicking into place on top of each other. To separate stacked Pods, push the top Pod towards the back and then pull them apart from the back. See picture on right.



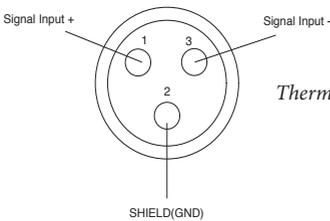
## Typical Data

The data below shows the temperature versus output voltage for a standard 10 k $\Omega$  thermistor. These output voltages could be used with the Multipoint Calibration Extension for LabChart (or Chart) to produce better accuracies over a wider range.

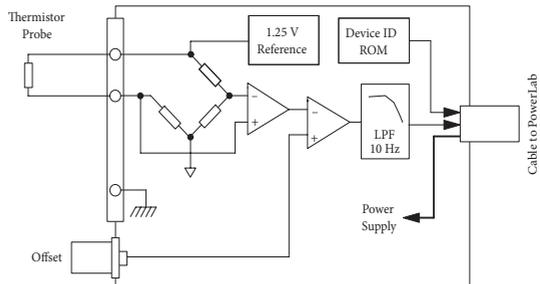
Temp ( $^{\circ}\text{C}$ )	Output (V)
0	-1.004
5	-0.845
10	-0.664
15	-0.461
20	-0.238
25	0.000
30	0.249
35	0.504
40	0.758
45	1.007
50	1.247

**Note:** Below 20  $^{\circ}\text{C}$ , the non-linearity in the thermistor output causes increasing errors in readings. Linear interpolation has been used for calibrating the Thermistor Pod over the range 5 - 45 $^{\circ}\text{C}$ . If greater accuracy is required between 0 - 20 $^{\circ}\text{C}$ , use the Multipoint Calibration Extension for LabChart (or Chart).

## Technical Diagrams



*Thermistor Pod pin-out diagram*



## Caution

Read "Statement of Intended Use" on our website or in "Getting Started with PowerLab" before use.

## Specifications

Thermistor type:	10 k $\Omega$ @ 25 °C
Measurement ranges:	5 °C to 45 °C in absolute mode $\Delta$ 1 °C to $\Delta$ 20 °C in five ranges with Delta Temp on
Output voltage:	50 mV/°C (0 mV = 25 °C)
Temperature accuracy:	$\pm$ 0.2 °C absolute (25 °C to 45 °C)
DC drift:	3 $\mu$ V/°C
Response time:	~200 ms (for a full scale change in temperature) Overall response will be dependent on the thermal response of thermistor probe
Temperature offset range:	50 °C overall (-5 °C to 45 °C absolute)
Input connector:	3-pin mini audio connector
Enclosure size:	108 x 58 x 35 mm (l x w x h)
Weight:	~200 g

All specifications were tested at the time of printing and are subject to change.

## Ordering Information:

ML309 Thermistor Pod

Suitable for use with:

MLT409/A	Skin Temperature Probe
MLT415/A	Nasal Temperature Probe
MLT422/A	Skin Temperature Probe

/A denotes Pod connection compatibility