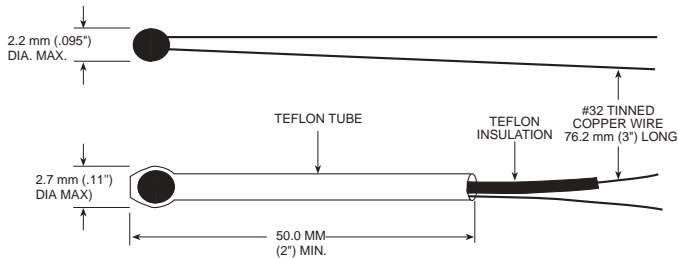


# OMEGA's Precision Interchangeable Thermistors

**Construction** - Thermistors are manufactured from oxides of nickel, manganese, iron, cobalt, magnesium, titanium and other metals. All are available epoxy encapsulated and colour coded, with two 75mm leads.



Thermistors with 0.2°C interchangeability also are available encased in a 50mm long waterproof Teflon® tube; order by adding 100 to the part number. For example: 44005 is a standard 3000 Ω thermistor; 44105 is a Teflon® encased thermistor with the same temperature/resistance values. Stiff wire is placed in the tube so that, with slight finger pressure, it can be bent to any configuration. For Teflon® encased thermistors, consult Sales.

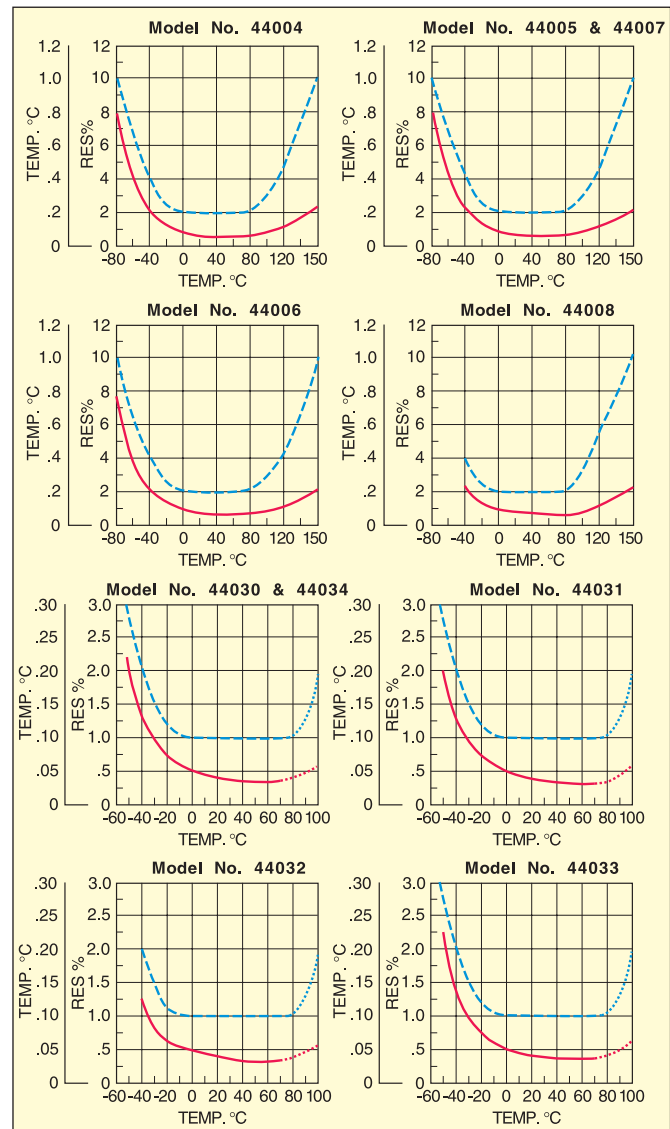
**Stability** - Finished thermistors are chemically stable and not significantly affected by aging or exposure to strong fields of hard nuclear radiation.

**Time Constant** -The time required for a thermistor to indicate 63% of a newly impressed temperature is called the time constant. For a thermistor suspended by its leads in a "well stirred" oil bath, it is 1 sec. max., or 2.5 sec. max. for Teflon® encased thermistors, and in still air it is 10 sec. max., or 25 sec. max. for Teflon® units.

**Dissipation Constant** - The power in milliwatts required to raise a thermistor 1°C above the surrounding temperature is the dissipation constant. For all thermistors suspended by their leads in a "well stirred" oil bath, it is 8 mw/°C min., or 1 mw/°C min. in still air.

**Operating Temperature** -Maximum operating temperature is 150°C. Long-term stability studies show that extended operation or continued cycling above 90°C will cause thermistors with values less than 2252 ohms at 25°C to exceed tolerances eventually. Thermistors 44030, 44031, 44032 and 44033 are designed for operation below 75°C. They will operate safely up to 100°C, but extended use above 75°C may cause a change in resistance. Storage temperature for thermistors is from -80 to 120°C.

**Tolerance Curves**- The following curves indicate conformance to standard resistance-temperature values as a % of resistance and as a maximum interchangeability error expressed as temperature.



— Resistance ±%  
 - - - - - Temperature ±C

## Thermistor Equation

Occasionally, it is advantageous to have a general mathematical expression for a thermistor. OMEGA finds the following equation best represents thermistor behavior:

$$\frac{1}{T} = A + B (\text{LOG}_e R) + C (\text{LOG}_e R)^3$$

Where T = °Kelvin; R = resistance; A, B, C = fitting constants. A, B and C may be found by writing three equations utilising three known data sets: R1, T1; R2, T2; R3, T3; and solving for A, B, and C. T1 and T3 should be chosen near the extremes of the temperature range of interest.

When -40°C ≤ T1, T2, T3 ≤ 150°C and |T2 - T1| ≤ 50°C, |T3 - T2| ≤ 50°C interpolation data generated by this equation will be accurate to ±0.01°C or better.

# Thermistor Elements and Compatible Instrumentation

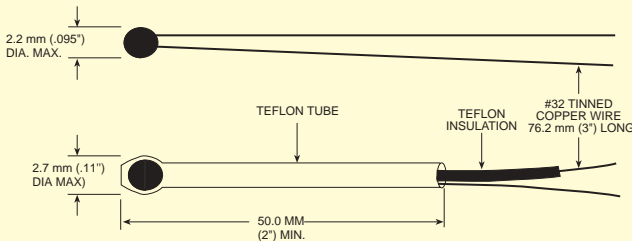


DP25-TH Panel Meter  
Full 5 year warranty standard  
See Section S



CN1507 TH Series Controllers  
Warranty extendable to 5 years  
See [www.omega.co.uk](http://www.omega.co.uk)

## 44000 Series Thermistor Elements



## Individual Precision Interchangeable Sensors, Available $\pm 0.2^\circ\text{C}$ & $\pm 0.1^\circ\text{C}$ Accuracy

Epoxy encapsulated, precision matched to standardised resistance temperature curves, providing predicted temperature accuracy based on resistance values and tolerances shown. For Teflon<sup>®</sup> encased elements, change the middle digit to a "1", and increase price by £14.75 for 0.2°C interchangeable elements or £40 for 0.1°C interchangeable elements.

**Ordering Example:** 44104 sensor, £10 + £14.75 = £24.75

	Model Number	Resistance @ 25°C (Ohms)	Maximum Working Temp	Storage & Working Temp. for Best Stability	Price Each
$\pm 0.2^\circ\text{C}$ Interchangeability 0-75°C	44004	2,252	150°C (300°F)	80 to +120°C (-110 to 250°F)	£10
	44005	3,000	150°C (300°F)	-80 to +120°C (-110 to 250°F)	10
	44007	5,000	150°C (300°F)	-80 to +120°C (-110 to 250°F)	10
	44006	10,000	150°C (300°F)	-80 to +120°C (-110 to 250°F)	10
	44008	30,000	150°C (300°F)	-80 to +120°C (-110 to 250°F)	10
$\pm 0.1^\circ\text{C}$ Interchangeability 0-75°C	44033	2,252	75°C (165°F)	-80 to +75°C (-110 to 165°F)	14.75
	44030	3,000	75°C (165°F)	-80 to +75°C (-110 to 165°F)	14.75
	44034	5,000	75°C (165°F)	-80 to +75°C (-110 to 165°F)	14.75
	44031	10,000	75°C (165°F)	-80 to +75°C (-110 to 165°F)	14.75
	44032	30,000	75°C (165°F)	-80 to +75°C (-110 to 165°F)	14.75

## Typical Thermometric Drift ( $\pm 0.2^\circ\text{C}$ Elements)

Operating Temp.	10 months	100 months
0°C	<0.01°C	<0.01°C
25°C	<0.01°C	0.02°C
100°C	0.20°C	0.32°C
150°C	1.5°C	not recommended

Discount Schedule	
1-9	.....Net
10-24	.....10%
25-49	.....15%
50-99	.....20%
100 & over	.....25%