PTS11 High Humidity NTC Temperature Probe

Overmolded, glass-encapsulated NTC thermistor probe for wet and condensing environments



10 kΩ NTC **IP67** **OVERMOLDED**

FEATURES

- -50 to 110 °C series operating temperature
- Glass-encapsulated NTC thermistor
- Sealed TPE or silicone overmold
- IP67 rated · liquid, air and gas media
- 10 kΩ at 25 °C standard, $B_{25/85}$ 3977 K
- ±1% R_{25} tolerance on standard versions
- Other resistance values and curves available
- Cable lengths from about 2 ft to over 13 ft
- Color-coded cable jackets
- Flying leads or factory-installed connector

DESCRIPTION

The PTS11 temperature sensor is designed for temperature applications in high humidity environments. The overmolded, glass-encapsulated NTC thermistor adds protection against water ingress where condensation and moisture are constant.

A low-cost, automated manufacturing process makes the PTS11 a cost-effective choice for OEM production. Versions are available in many cable lengths, jacket colors, housings and connectors. Contact us for custom designs.

APPLICATIONS

- Commercial refrigeration — cabinet, coil and line
- Commercial ice machines
- HVAC and room temperature sensing
- Commercial ovens
- Semiconductor equipment
- Liquid and gas chromatography

MAXIMUM ENVIRONMENTAL RATINGS

Operating Temperature	**-50 to 110 °C**	Environmental Rating	**IP67**
Storage Temperature	**-55 to 110 °C**	Media	**Liquid, air & gas**

Operational characteristics

Standard 10 kΩ version, T = 25 °C unless noted

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS
Resistance at 25 °C (note 1)	R_{25}	—	10	—	kΩ
R_{25} tolerance (note 2)	—	-1	—	1	%
B-value, 25/85 °C (note 1)	$B_{25/85}$	—	3977	—	K
B-value tolerance	—	-1	—	1	%
Operating temperature (note 3)	T_{OP}	-50	—	110	°C
Storage temperature	T_{ST}	-55	—	110	°C
Output	—	Resistance (passive, no supply)			—
Sensing element	—	Glass-encapsulated NTC			—
Environmental rating	—	IP67			—
Media	—	Liquid, air & gas			—
Probe housing	—	TPE or silicone overmold; SS316L option			—
Cable	—	2-conductor, 20–26 AWG			—

NOTES
1) Other resistance values and curves are available, including 10 kΩ / $B_{25/85}$ 3435 K and 50 kΩ / $B_{25/85}$ 3950 K versions. 2) ±1% on standard versions; confirm the tolerance for your version on its drawing. 3) Series rating. Each version is rated for its cable and housing materials; see the version drawing.

Electrical connections

PIN	WIRE	FUNCTION
P1	White	NTC
P2	Black	NTC

Two-wire resistive sensor. The thermistor is not polarized.

Termination options

MANUFACTURER	HOUSING
—	Flying leads, stripped
TE Connectivity	172336-1 · 172343-1
Molex	151049-2201 · 151049-2207
Molex	39-01-2020 · 43645-0200
JST	VHR-2N
Custom	Your connector, to order

Supplied with matching crimp terminals and retainers where used.

Resistance vs temperature

The PTS11 is a passive NTC thermistor: its resistance falls as temperature rises. Read it with a voltage divider or bridge and convert resistance to temperature in your controller using the B-value equation or a lookup table.

B-value equation

$$R_T = R_{25} \times e^{B(1/T - 1/T25)}$$

T and T_{25} are in kelvin (T_{25} = 298.15 K). For the standard version, R_{25} = 10 kΩ and B = 3977 K.

Temperature from resistance

$$1/T = 1/T_{25} + (1/B) \times \ln(R_T / R_{25})$$

Typical curve · 10 kΩ, B25/85 3977 K

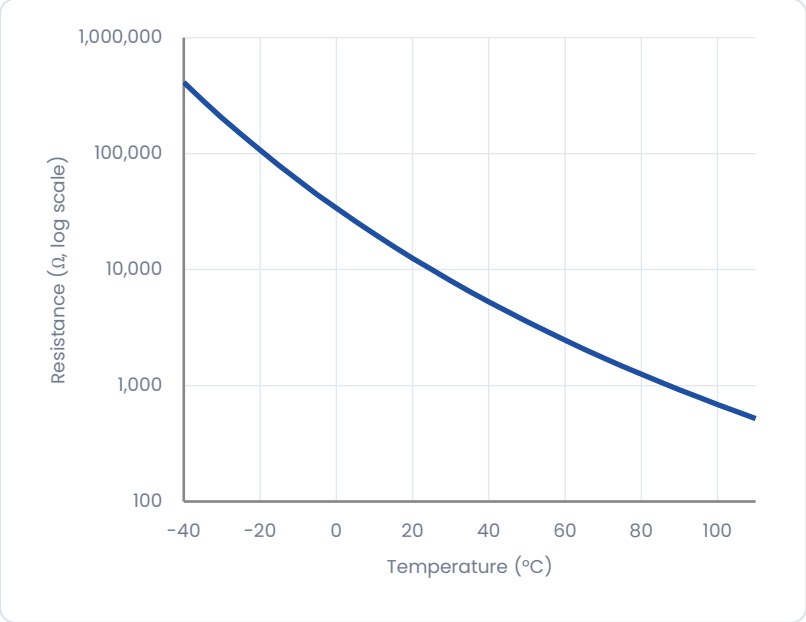


Fig. 1 — Calculated from the B-value equation.

Calculated resistance (kΩ)

°C	kΩ	°C	kΩ
-40	412.1	40	5.279
-30	204.3	50	3.563
-20	107.1	60	2.463
-10	58.95	70	1.739
0	33.90	80	1.253
10	20.27	90	0.919
20	12.55	100	0.685
25	10.00	110	0.519
30	8.025		

Values from the B-value equation, R_{25} = 10 kΩ, B = 3977 K. For reference only; actual values follow the thermistor's R-T curve within its tolerance. Full R-T tables are available on request.

DESIGN NOTES
Keep the measurement current low to limit self-heating. For best accuracy over a wide range, use the thermistor manufacturer's R-T table or a Steinhart-Hart fit rather than the single B-value.

Application information

Moisture protection

The NTC chip is sealed in glass, then overmolded directly onto the cable. The tip has no open seam, which adds protection against water ingress in condensing and high humidity locations.

Color-coded cables

Jacket colors identify each sensor's location. Standard refrigeration versions use green for cabinet air, blue for the evaporator coil and yellow for the discharge or liquid line.

Probe housings

Choose a TPE or silicone overmolded tip, or a stainless steel 316L housing sealed with epoxy where a rigid probe is needed.

Marking and traceability

Each sensor is labeled with its part number and an MMYY date code (MM = month, YY = year).

Mechanical dimensions — inches

Probe tip options

HOUSING	TIP Ø	TIP LENGTH
TPE overmold	0.195–0.196	0.78–0.80
Silicone overmold	0.250	0.79
SS316L housing	0.125	1.00
Stainless steel housing	0.200	0.80
SS316L housing	0.255	1.75

Typical values from standard version drawings. Your version's drawing is the controlling document.

Cable

Conductors	2
Gauge	20–26 AWG, by version
Overall length	About 2 ft to over 13 ft; custom
Length tolerance	±0.5 to ±1 in, by version



Fig. 2 — Blue coil version with overmolded tip and 2-position connector.

10 kΩ — Standard R_{25}

±1% — R_{25} tolerance, standard

110 °C — Max operating temp

IP67 — Environmental rating

Ordering information — standard versions

PART NUMBER	CABLE	LENGTH (IN)	TERMINATION	NTC (R25 / B25/85)	PROBE HOUSING
PTS11-3-1	Green	48	TE 172336-1	10 kΩ / 3977 K	TPE overmold
PTS11-3	Green	74	TE 172336-1	10 kΩ / 3977 K	TPE overmold
PTS11-5-1	Green	60	Molex 151049-2207	10 kΩ / 3977 K	TPE overmold
PTS11-5	Green	120	Molex 151049-2207	10 kΩ / 3977 K	TPE overmold
PTS11-2	Blue	74	TE 172343-1	10 kΩ / 3977 K	TPE overmold
PTS11-2-3	Blue	60	Molex 151049-2201	10 kΩ / 3977 K	TPE overmold
PTS11-2-1	Blue	90	Molex 151049-2201	10 kΩ / 3977 K	TPE overmold
PTS11-4	Yellow	74	TE 172343-1	10 kΩ / 3977 K	TPE overmold
PTS11-4-1	Yellow	64	Flying leads	10 kΩ / $B_{0/50}$ 3200 K	SS316L
PTS11-7	White	37.5	Molex 39-01-2020	10 kΩ / 3977 K	Black ABS
PTS11-3-3	Gray	158.5	Flying leads	10 kΩ / 3435 K	Silicone overmold
PTS11-1-SS-CP	Black	72.5	JST VHR-2N	50 kΩ / 3950 K	Stainless steel
PTS11-0-0-1.00-10KB-SS-M	Black	23	Molex 43645-0200	10 kΩ / 3977 K	SS316L

B-value is $B_{25/85}$ unless noted. Many versions are direct replacements for commercial refrigeration OEM part numbers; send us your part number to find a match.

Custom configurations

THERMISTOR	CABLE	PROBE	TERMINATION
R_{25} value	Length	Overmold	Flying leads
B-value / curve	Jacket color	Stainless housing	Connector
Tolerance	Wire gauge	Clips / mounting	Labeling

Configure your PTS11

Custom lengths, colors, thermistors and connectors are available for OEM volumes. Talk to an engineer to spec your part.

REQUEST A QUOTE
sales@phoenixsensors.com
(480) 462-1810

Notice: Phoenix Sensors LLC reserves the right to make changes to the product contained in this publication. Phoenix Sensors LLC assumes no responsibility for the use of any circuits described herein, conveys no license under any patent or other right, and makes no representation that the circuits are free of patent infringement. While the information in this publication has been checked, no responsibility, however, is assumed for inaccuracies. Phoenix Sensors LLC does not recommend the use of any of its products in life support applications where the failure or malfunction of the product can reasonably be expected to cause failure of a life-support system or to significantly affect its safety or effectiveness. Products are not authorized for use in such applications.