

PTC resistors or thermistors are semi-conductor resistors with temperature sensitivity. The component's rapid and characteristic resistance increase with increase in temperature renders it ideal for temperature monitoring and as an overheating protection in electric motors, generators, transformers, etc.



Typical applications

The most typical application areas for temperature monitoring and overheating protection are electric motors, generators and transformers.

PTC resistors mounted in specially-adapted and customized devices and installations allow the component to be used in most applications where a corresponding monitoring/overheating protection is sought after.

Properties

- Very high repetitive accuracy
- Very long service life with hysteresis-free operation
- Low cost relative to other monitoring devices
- Small dimensions/low weight (extremely small variants available as alternatives)
- Quick response time
- Good linearity of the temperature/resistance characteristic curve
- A very sharp resistance increase when monitoring
- temperature permits simple monitoring of electronic
- devices and systems

Description/Function

The PTC thermistor is a temperature-dependent component. Its stated "transition temperature" or ROT (Rated Operation Temperature) is consistent with the Curie point of ceramic materials.

Resistance increases very sharply with a relatively small increase in temperature at ROT. This sharp increase is used to trigger a switching function in connected monitoring electronic devices. See technical data.

Versions

We stock single and triple PTC resistors for mounting in windings (see item list). The compact format allows the resistor to be mounted mechanically in a variety of designs ranging from standard versions to unique project executions.

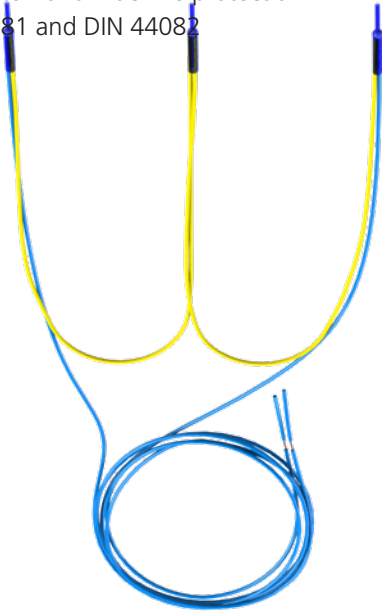
- Can be ordered for temperatures from +60°C to +180°C in accordance with DIN44081 and DIN44082 (manufactured up to +210°C but outside these norms' temperature intervals).
- Available in single and triple versions as stock items (applies to the most common temperatures).
- Adapted for compatibility with the most common thermistor relays on the market which comply with DIN VDE 0660.

Examples of variants

- Minimal size heat shrink tubing for mounting in windings, etc.
- Threaded version for installation in motor bearings, etc.
- Mounted in ring cable shoes for screw attachment to the heat sink, etc.
- Mounted in metal tubing (steel, brass, ceramic) for plug-in installation and temperature measurement of bearing housings, etc.

PTC

Electric motor- and machine protection
to DIN 44081 and DIN 44082



PTC-sensors

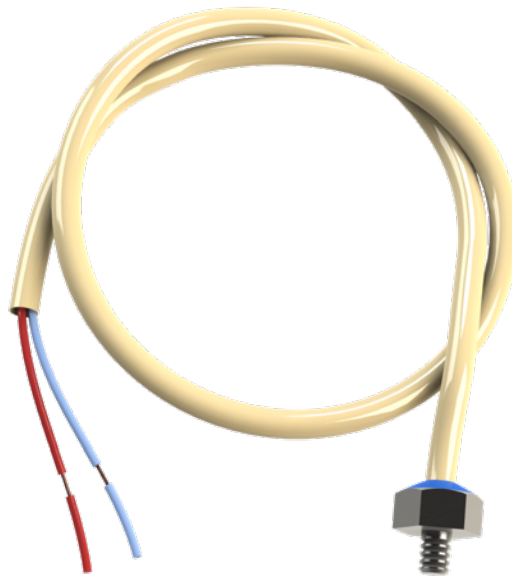
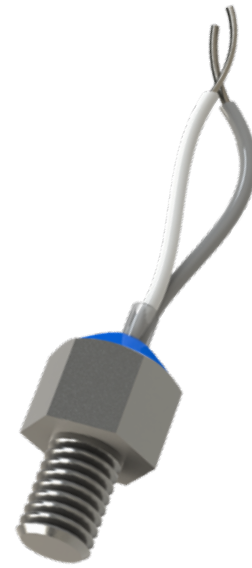
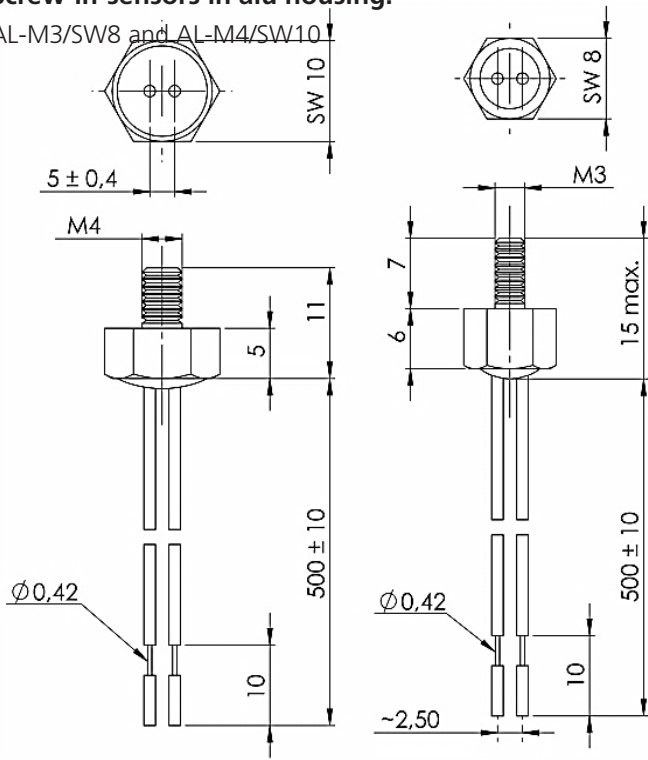
Examples of PTC-thermistor-housings



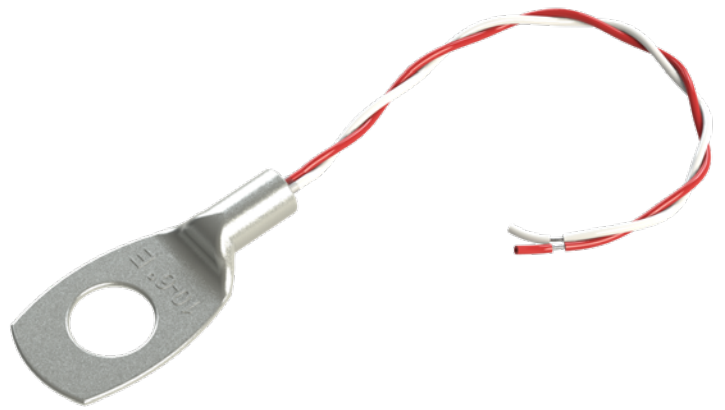
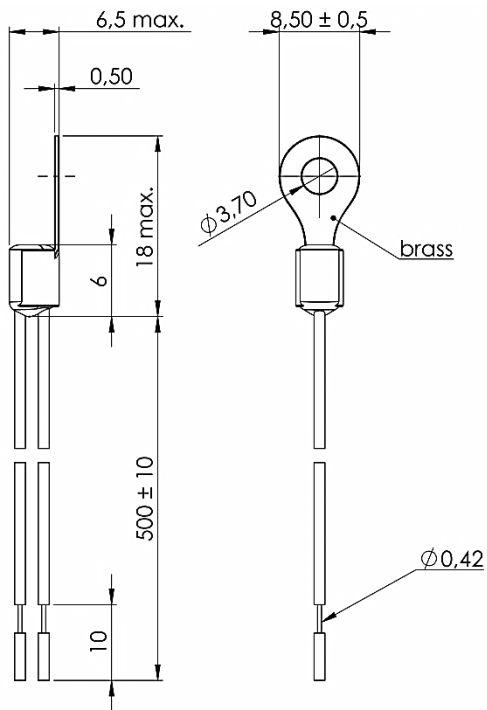
Shrink tube housing,
e.g. for monitoring winding

Screw-in-sensors in alu housing:

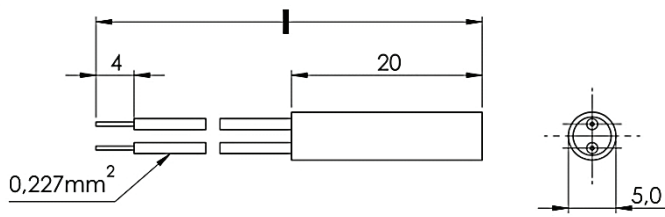
AL-M3/SW8 and AL-M4/SW10



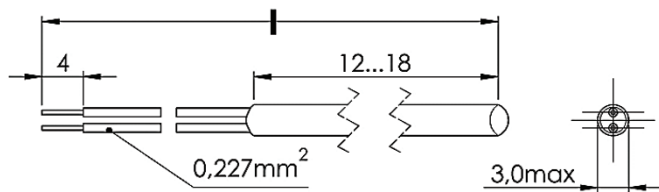
PTC-thermistor in cable shoe surface sensor



PTC-thermistor in stainless steel housing



PTC-thermistor in ceramics or brass housing



Packaging

- Stock items as are usually sold individually (see item list)
- Special executions, versions for non-standard temperatures, request MOQ.

Technical data

- Minimal size heat shrink tubing for mounting in windings, etc.
- Threaded version for installation in motor bearings, etc.
- Mounted in ring cable shoes for screw attachment to the heat sink, etc.
- Mounted in metal tubing (steel, brass, ceramic) for plug-in installation and temperature measurement of bearing

Technical base data

Typical resistance-temperature characteristic

The advantage of PTC-thermistors is demonstrated by the very steep curve as shown in the graph. This graph shows the relationship between temperature and resistance. The characteristic of the curve demonstrates the accuracy of the PTC's. The increase in the resistance from the switching point onwards is exponential. The DIN-standards relevant to these products cover the temperature range from +60°C to +180°C and are DIN 44081 and 44082.

Installation instructions for electric motors

It is important that the sensors are inserted in the stator coils, nearest to the rotor before impregnating the windings.

The sensors should be tested prior to the impregnation of the rotor, winding temperatures must not exceed 175°C for sensors with ROT 160°C or 185°C for sensors with ROT 170°C.

If impregnating agents or impregnating varnishes are used, that are not chemically neutral, the resistivity of the sensors has to be tested by the user.

The sensor must be inserted in the middle of the end coils, ensuring that they are completely surrounded by the windings.

Hollow space and trapped air influence the heat transmission.

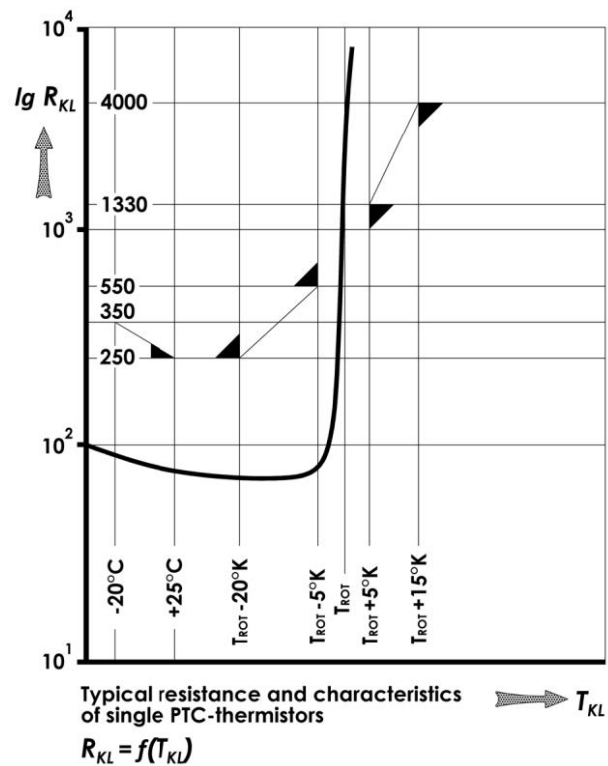
One sensor must be inserted into each leg of the windings with the leads parallel to the coil conductors.

The mounting of several sensors has to be done in series. The leads must be connected to a terminal block on the terminal board, to ensure that they are separate from the winding terminals.

Tension and other mechanical stresses must be avoided when installing sensors.

Please avoid loops in the leads to avoid possibly occurring interfering voltage.

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Technical data PTC standard items

ROT (Rated Operation Temperature).

Mechanical	Value/Description	Unit
Diameter PTC-pellet ca	2t 2.5	mm
Heat shrink tube Kynar length ca	11	mm
Wiring standard (multi-stranded silver-plated copper with insul. PTFE)	26	AWG
Wiring alternative (special) (multi-stranded silver-plated copper with insul. PTFE)	24	AWG
Wire length standard (connection wire)	500	mm
Wire length standard between PTC pellets (double/triple)	200	mm
End seal connection wire	Semi-stripped	-
Thermal		
Temperature ROT acc. DIN 44081 and DIN 44082 (in steps of 10°C)	60 - 180	°C
Temperature ROT acc. DIN 44081 and DIN 44082	145. 155	°C
Colour coded connection wires*	44081. 44082	DIN
Temperature ROT outside DIN norms	190 - 210	UL 94
Temperature tolerance for ROT = 60 -- 160°C	+/- 5	°C
Temperature tolerance for ROT = 70 -- 180°C	+/- 7	°C
Time for switch over	< 3	s
Storage temperature	-25 - +65	°C
Electrical		
Insulation (dielectric strength)	2.5	kVac eff.
Max working voltage	25	V
Max measuring voltage (for resistance check)	2.5	V
Resistance PTC at room temp. (x number series connected PTCs) (for correct measurement values with bridge sensor, for example Wheatstone), take into account max measuring voltage across each PTC (Resistance can be as low as 30Ω)	250	Ω (max)
Resistance per PTC from -20°C to ROT --20°C	250	Ω (max)
Resistance per PTC at ROT --5°C (take into account temp. tolerance)	550	Ω (max)
Resistance per PTC at ROT +5°C (take into account temp. tolerance)	1330	Ω (min)
Resistance per PTC at ROT +15°C (take into account temp. tolerance)	4000	Ω (min)
Resistance wiring ca (AWG26) at +20°C	133	Ω/km
Resistance wiring ca (AWG24) at +20°C	82.7	Ω/km

Colour code connection wires acc. to DIN 44081 and DIN 44082

Colours for connecting wires for temperatures 190 - 210°C not standardized.

Temperature °C		
60	White	Grey
70	White	Brown
80	White	White
90	Green	Green
100	Red	Red
110	Brown	Brown
120	Grey	Grey
130	Blue	Blue
140	White	Blue
145	White	Black
150	Black	Black
155	Blue	Black
160	Blue	Red
170	White	Green
180	Black	Grey

Item number	Designation	Colour code wires	Switch-over temp (ROT) °C	Wire length (ca mm) Connection between PTC		Insulation (kV)	In stock (normal)
	Single variant						
125928	Termistor Single EKL 100	red/red	100	500	-	2.5	x
125927	Termistor Single EKL 100	red/red	100	500	-	1.5	x
125929	Termistor Single EKL 110	brown/brown	110	500	-	2.5	x
125930	Termistor Single EKL 120	grey/grey	120	500	-	2.5	x
125931	Termistor Single EKL 130	blue/blue	130	500	-	2.5	x
125932	Termistor Single EKL 140	white/blue	140	500	-	2.5	x
125933	Termistor Single EKL 145	white/black	145	500	-	2.5	x
125934	Termistor Single EKL 150	black/black	150	500	-	2.5	x
125935	Termistor Single EKL 155	blue/black	155	500	-	2.5	x
127042	Termistor Single EKL 155 L = 400mm	blue/black	155	400	-	2.5	x
125936	Termistor Single EKL 160	blue/red	160	500	-	2.5	x
125937	Termistor Single EKL 170	white/green	170	500	-	2.5	x
125938	Termistor Single EKL 180	white/red	180	500	-	2.5	x
125939	Termistor Single EKL 190	black/grey* or black/brown*	190	500	-	2.5	x
	Triple variant						
125940	Termistor Triple DKL 070	white/brown	70	500	200	2.5	x
125941	Termistor Triple DKL 080	white/white	80	500	200	2.5	x
125942	Termistor Triple DKL 090	green/green	90	500	200	2.5	x
125943	Termistor Triple DKL 100	red/red	100	500	200	2.5	x
125944	Termistor Triple DKL 110	brown/brown	110	500	200	2.5	x
125945	Termistor Triple DKL 120	grey/grey	120	500	200	2.5	x
125946	Termistor Triple DKL 130	blue/blue	130	500	200	2.5	x
125947	Termistor Triple DKL 140	white/blue	140	500	200	2.5	x
125948	Termistor Triple DKL 145	white/black	145	500	200	2.5	x
125949	Termistor Triple DKL 150	black/black	150	400	200	2.5	x
125950	Termistor Triple DKL 155	blue/black	155	500	200	2.5	x
125951	Termistor Triple DKL 160	blue/red	160	500	200	2.5	x
125955	Termistor Triple DKL 165	green/black	165	500	200	2.5	x
125952	Termistor Triple DKL 170	white/green	170	600	400	2.5	x
125953	Termistor Triple DKL 180	white/red	180	500	200	2.5	x
125954	Termistor Triple DKL 190	black/brown*	190	600	400	2.5	

* Colour code not standardized

How to contact BEVI

Contact details for all countries are continually updated on our website.
Please visit www.bevi.com to access the information direct.

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