THERMAL PROTECTION DEVICES

RESISTANCE TEMPERATURE DETECTORS (RTD'S)

Resistance temperature detectors offer several advantages over other types of winding temperature sensors. Because the resistance of the RTD has a lineal rise in relation to temperature, the exact temperature of the winding is known at all times. Therefore the trip temperature is not determined at the time the sensors are installed, allowing the controller to be set to the optimum trip temperature for the application. RTD overheat control systems offer the flexibility to adjust the trip temperatures in the field, avoiding nuisance trips. Some controllers can be set to sound an alarm at one temperature, then shut down the motor at a higher temperature.

Essex Brownell stocks two types of winding RTD to allow flexibility in installation:

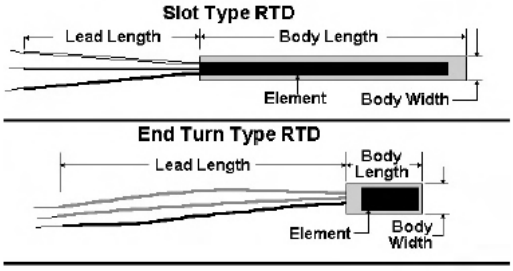
Slot Type:

The slot type RTD is a flat, laminated "stick" RTD designed to fit in the slot between stator windings to monitor temperature rise and prevent overheating. The sensing elements are through most of the body length to provide an average temperature reading, eliminating the possibility of missing a localized hot spot.

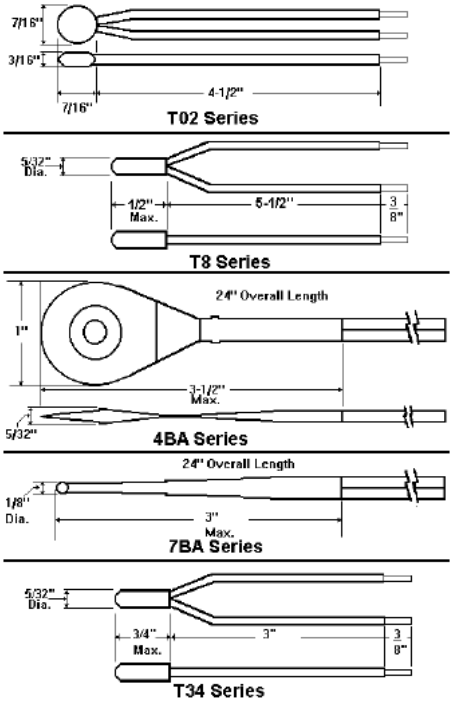
Class H temperature rating.

End Turn Type:

The sensing element is laminated between KAPTON* film to provide flexibility and Class H temperature rating. Designed to mount in the end turns instead of the slot. Use it for small motors and retrofit applications.



TYPE	SENSOR DIMENSIONS THICKNESS(IN.)	WIDTH(IN.)	LENGTH(IN.)	LEADS GA. X LENGTH	ELEMENT TYPE 100Ω PLATINUM	10Ω COPPER	120Ω NICKEL
Slot	.078	.260	10	18 x 72"	RTD-H-S11	RTD-H-S3	RTD-H-S4
Slot	.030	.260	10	22 x 72"	RTD-S-S11-030	RTD-H-S3-030	RTD-H-S4-030
End Turn	.020	.500	1-1/4	26 x 72"	RTD-H-S11-ET	RTD-H-S3-ET	RTD-H-S4-ET



PTC THERMISTORS

PTC thermistors operate similarly to thermostats in that they have a specified trip temperature. The advantage of thermistors is that they are usually smaller in physical size and react to a temperature change quicker than thermostats. Many thermistor protection systems also offer a separate alarm circuit that will sound an alarm or light a light as the motor approaches overheat condition. The typical alarm sensor is 15° - 20°C below the rated motor shut down temperature. Thermistor controllers also offer fail safe protection because the controller checks for the sensors cold ohm rating to ensure that the thermistors are in operating condition. When choosing a replacement thermistor for an application, two primary specifications must be known.

1.) **Cold ohm rating.** This can be determined by taking an ohm reading on the sensor before the motor is burnt out. Remember, thermistors are usually connected in a series, make sure that the ohm reading is for only one thermistor or you can take the average of three thermistors connected in the series. By determining which controller is being used, you can also determine which thermistor to use.

2.) **Trip Temperature.** The trip temperature is usually indicated on the sensor. You can choose a temperature based on the original insulation class rating of the motor.

Insulation Class	A	B	F	H
Sensor Temp. Range	110°-120°C	130°-145°C	150°-165°C	150°-180°C
Most Common Sensor	120°C	135°C	160°C	180°C
Alarm Sensor Range	100°-105°C	115°-120°C	140°-145°C	160°-155°C

An important note to remember: just because the motor is being rewound with a higher temperature class insulation doesn't mean the motor is designed to handle the higher operating temperatures. Make sure the selection is based on the original temperature class rating of the motor. The last decision to make is which physical dimension to use. Most sensors are only offered in one style. Klixon offers sensor in two configurations, the bead type and the foil type.

THERMISTOR SELECTION CHART

THERMISTOR SERIES CONTROL MANUFACTURER	T8 SERIES MOTOGARD	4BA SERIES KLIXON	7BA SERIES KLIXON	T34H SERIES BROWN - BOVERI	T02 SERIES GUARDISTOR
Cold Ohm Resistance	150 - 500Ω	500 - 2500Ω	500 - 2500Ω	20 - 200Ω	10 - 60Ω
Part Number	T8###	4BA-###-1005	7BA-###-1005	T34H###	T02-##

Temperature ranges available H02 = 105°C, H05 = 125°C, H09 = 150°C, H13 = 170°C

Insert temperature to complete part number (i.e. T8155 = a T8 series thermistor that trips at 155°C)

* Kapton is a registered trademark of E.I. DuPont de Nemours.