Thermal-Tab™ and Thermal-Ribbon Sensors

Fast and accurate surface sensing

Overview

Mod-tronic's Thermal-Tab and Thermal-Ribbon sensors can be installed virtually anywhere for accurate temperature sensing and fast response in aerospace, medical, and industrial devices. These thin, flexible RTDs and thermocouples are surface or pressure sensitive mounted to be non-invasive and track rapidly changing conditions in both point and averaging configurations. Our Thermal-Ribbon sensors are made with polyimide, silicone rubber, and other high performing insulation and can be waterproof constructed for continuous immersion.

Options include stainless steel braid over leadwires to prevent abrasion damage and pressure-sensitive adhesive for easier mounting (smooth surfaces only). See pages 36-44 for optional 4 to 20 mA temperature transmitters and other instruments.

Install these compact sensors anywhere for accurate point sensing and fast response. All Thermal-Tab modules use a thin-film RTD element. All Thermal-Ribbon models conform to EN60751 Class B tolerance when ordered with a PD platinum element.

- Non-invasive pipe measurement for heated pipes or chiller lines.
- Fast response surface sensing in aerospace, medical and industrial devices
- Rugged lamination construction
- Polyimide, silicone rubber or Mylar™ insulation
- All models are RoHS compliant

Specifications

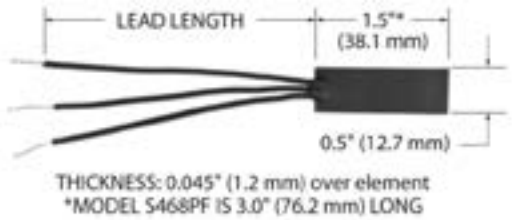
Body material: Silicone rubber with polyimide backing.

Temperature range:

RTD: -62 to 200°C (-80 to 392°F).
Thermistor: -45.5 to 135°C (-50 to 275°F).

Leadwires: AWG 24, silicone rubber.

Moisture resistance: Meets MIL-STD-202, Method 104, Test Condition B.



THICKNESS: 0.045" (1.2 mm) over element
*MODEL S468PF IS 3.0" (76.2 mm) LONG

Model numbers

Element		TCR	Outside air sensors
RTDs			
Platinum	100 Ω +/-0.1% at 0°C	0.00391	**S464PB**
Platinum	100 Ω +/-0.1% at 0°C (Meets EN60751, Class B)	0.00385	**S467PD**
Platinum	1000 Ω +/-0.1% at 0°C	0.00385	**S468PF**
Nickel-iron	1000 Ω +/-0.12% at 70°F	0.00527	**S462FC**
Nickel-iron	2000 Ω +/-0.12% at 70°F	0.00527	**S463FC**
HW	3000 Ω at -30.2°C	0.00262	**S100001PX**
Thermistors		R_{25}/R_{125}	
Thermistor	2,252 Ω at +/-1% at 25°C	29.2	**TS436TA**
Thermistor	10,000 Ω at +/-1% at 25°C	23.5	**TS437TB**

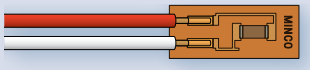
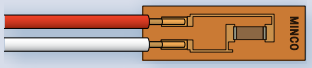
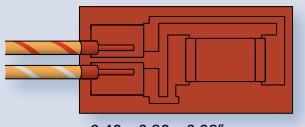
Specification and order options

S467PD	Model number from table
Z	**Number of leads:** Y = 2 leads Z = 3 leads (RTD only) YS = 2 leads, stainless steel braid ZS = 3 leads, stainless steel braid (RTD only)
36	**Lead length in inches:** *Specify in 0.1" increments (Ex: 60 = 6.0 inches)*
A	**Adhesive backing:** A = No adhesive backing B = Pressure-sensitive adhesive
S467PDZ36A = Sample part number	

Thermal-Tab and Thermal-Ribbon Sensors

Surface sensing eliminates the need for a thermowell

Thermal-Tab Specifications

Dimensions W x L x T_{max}	Element options	Insulation	Temperature range	Leadwires	Time constant	Features	Model
 0.20 x 0.50 x 0.08" (5 x 12 x 2 mm)	PD, PF	Polyimide with elastomer cover coat	-50 to 155°C -58 to 311°F	AWG 26, PTFE insulated	0.8 sec	Stocked for immediate shipment	**S665**
 0.20 x 0.60 x 0.08" (5 x 15 x 2 mm)	PD, PF, PW, PS	Polyimide	-50 to 200°C -58 to 392°F	AWG 26, PTFE or polyimide insulated	1.0 sec	Platinum models in stock	**S17624**
 0.20 x 0.60 x 0.08" (5 x 15 x 2 mm)	PD, PF	Polyimide fim	-50 to 260°C -58 to 500°F	AWG 26, PTFE or polyimide insulated	0.4 sec	Highest temperature capability	**S100820**
 0.20 x 0.60 x 0.12" (5 x 15 x 3 mm)	PD, PF	Silicone rubber with elastomer cover and foil backing	-50 to 155°C -58 to 311°F	AWG 24, silicone insulated	1.3 sec	Waterproof; suitable for continuous immersion	**S667**
 0.40 x 0.80 x 0.08" (10 x 20 x 2 mm)	PD, PF	Silicone rubber	-50 to 220°C -58 to 428°F	AWG 26, PTFE or polyimide insulated	1.5 sec	High temperature rating, available with a wide range of element options	**S100721**

Sensing Elements

Sensing Element Specifications		Code
Platinum (0.00385 TCR) *(EN60751, Class B)*	100 Ω ±0.12% at 0°C	PD
Platinum (0.00385 TCR)	1000 Ω ±0.12% at 0°C	PF
Platinum (0.00375 TCR)	1000 Ω ±01.2% at 0°C	PW
Platinum (0.00385 TCR)	10k Ω ±0.12% at 0°C	PS

Specification and order options

S17624	Model number from table
PD	Sensing element from table
Z	**Number of leads:** Y = 2 leads Z = 3 leads (N/A on S25, S38) X = 4 leads (N/A on S25, S38, or S665/S667)
T	T if S17624, S100721, S100820; Leave blank if S665 or S667
12	**Lead length in inches:** 12, 36, 120 are standard *S665/S667 = 60" max*
A	**Adhesive backing:** A = No adhesive backing B = Pressure-sensitive adhesive
Stop here for all models except S665 or S667. For models S665 and S667, add:	
C	**Compliancy:** C = RoHS Compliance
S665PDZ12AC = Sample part number	

Thermal-Tab & Thermal-Ribbon Alternatives

Thermistor and thermocouple alternatives to RTDs

Thermistor Thermal-Tab Sensors

Model TS665 and TS667 offer extremely sensitive NTC thermistors for applications with small temperature changes. Model TS667 also features waterproof construction, making it suitable for continuous immersion.

Specifications

Dimensions W x L x T_{max}	Element options	Insulation	Temperature range	Leadwires	Time constant*	Features	Model
 0.20 x 0.50 x 0.08" (5 x 12 x 2 mm)	TF, TK	Polyimide with elastomer cover coat	-50 to 125°C -58 to 257°F	AWG 26, PTFE insulated	0.8 sec	Small, low-cost	**TS665**
 0.20 x 0.60 x 0.12" (5 x 15 x 3 mm)		Silicone rubber with elastomer cover and foil backing		AWG 24, Silicone insulated	1.3 sec	Waterproof, suitable for continuous immersion	**TS667**

Sensing elements

Sensing element specifications	Code
NTC thermistor 50k Ω ±1% at 25°C	TF
NTC thermistor 10k Ω ±1% at 25°C	TK

Specification and order options

TS665	Model number from table
TF	**Sensing element from table**
Y	**Number of leads:** Y = 2 leads
40	**Lead length in inches:** 40" (60" max)
A	**Adhesive backing:** A = No adhesive B = Pressure-sensitive adhesive (PSA)
C	**Compliancy:** C: RoHS compliant
TS665TFY40AC = Sample part number	

Thermocouple Thermal-Ribbon Sensors

TC40 is a patch-style thermocouple that adheres to all types of surfaces for quick and easy mounting.

Specification

Dimensions $W \times L \times T_{max}$	**0.75 x 0.75 x 0.065" (19.1 x 19.1 x 1.7 mm)**
Junction type	E, J, K, or T
Insulation	Polyimide
Temp. range	-200 to 200°C (-328 to 392°F)
Leadwires	AWG 24, solid PTFE insulated
Time constant	0.6 sec.
Features	Surface mounting
Model	**TC40**

Specification and order options

TC40	Model number
J	**Junction type:** E, J, K, or T
T	**Covering over leadwires:** T: PTFE only S: Stainless steel braid
40	**Lead length in inches:** 40 and 240 are standard
A	**Adhesive backing:** A = No adhesive B = Pressure-sensitive adhesive (PSA)
TC40JT40A = Sample part number	

Thermal-Ribbon Installation Methods

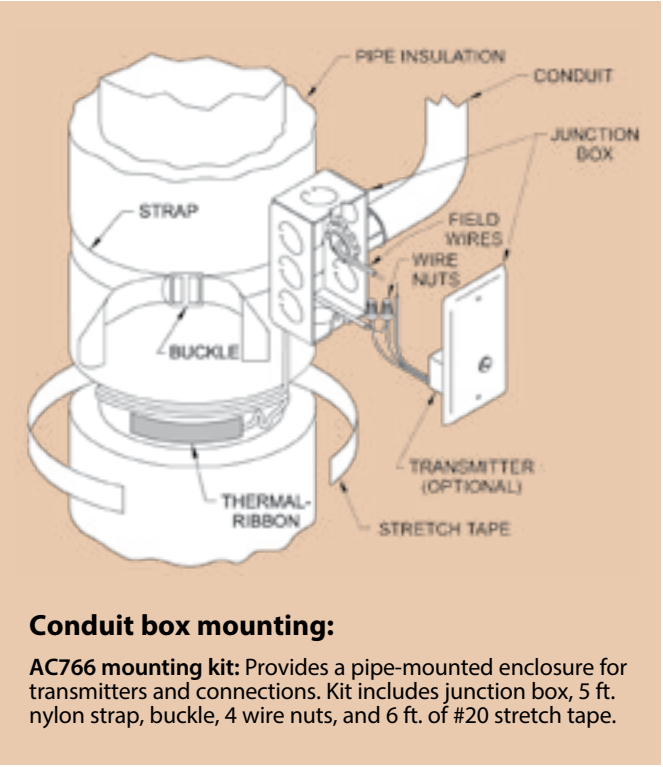
Perfect for non-immersive pipe sensing

Installation methods

Thermal-Ribbon sensors lend themselves to a variety of installation methods. You should avoid repeated bending during the installation process, and Thermal-Ribbons should not flex in use unless they are specifically designed to do so. Take care to secure leadwires so they do not pull against sensor bodies. Leadwires should be routed along the sensed surface a short distance so that they do not sink heat away from the sensing element. Listed below are some standard installation methods.

- **Pressure sensitive adhesive:** PSA (option B in part number) is the simplest mounting method, but it is restricted to flat surfaces and temperatures below 177°C (350°F). PSA is usually factory applied to the mounting surface of the Thermal-Ribbon. To install, just remove the backing paper and press in place.
- **#20 stretch tape**: High temperature silicone rubber tape for mounting Thermal-Ribbons to pipes or other cylinders as shown above. It comes in 1" wide rolls, 6 or 36 feet long.
- **#6 RTV cement**: Room temperature vulcanizing cement for mounting silicone rubber Thermal-Ribbons to flat or curved surfaces. It is available in 3 oz. (89 ml) tubes. Contact Mod-tronic for other adhesives usable with Kapton™ or Mylar™ Thermal-Ribbons.
- **Shrink bands**: Minco shrink bands are pre-stretched plastic strips with adhesive at both ends. Use them to mount Thermal-Ribbons to cylinders. Simply wrap the band around the sensor and cylinder, secure the ends, and heat to shrink in place. To order, specify band width and cylinder diameter.
- **#21 Polyimide tape**: High temperature tape with silicone-based adhesive. Useful for quick mounting of Thermal-Ribbon or Thermal-Tab sensors to flat surfaces. Makes a strong but removable bond to most smooth and clean surfaces. Maximum operating temperature is 150°C. 0.5 inch wide x 108 ft. long roll.

For further information on how to use these sensors, reference our white paper "Sensing Fluid Temperature with Thermal-Ribbons", available on Mod-tronic.com.



Conduit box mounting:

AC766 mounting kit: Provides a pipe-mounted enclosure for transmitters and connections. Kit includes junction box, 5 ft. nylon strap, buckle, 4 wire nuts, and 6 ft. of #20 stretch tape.