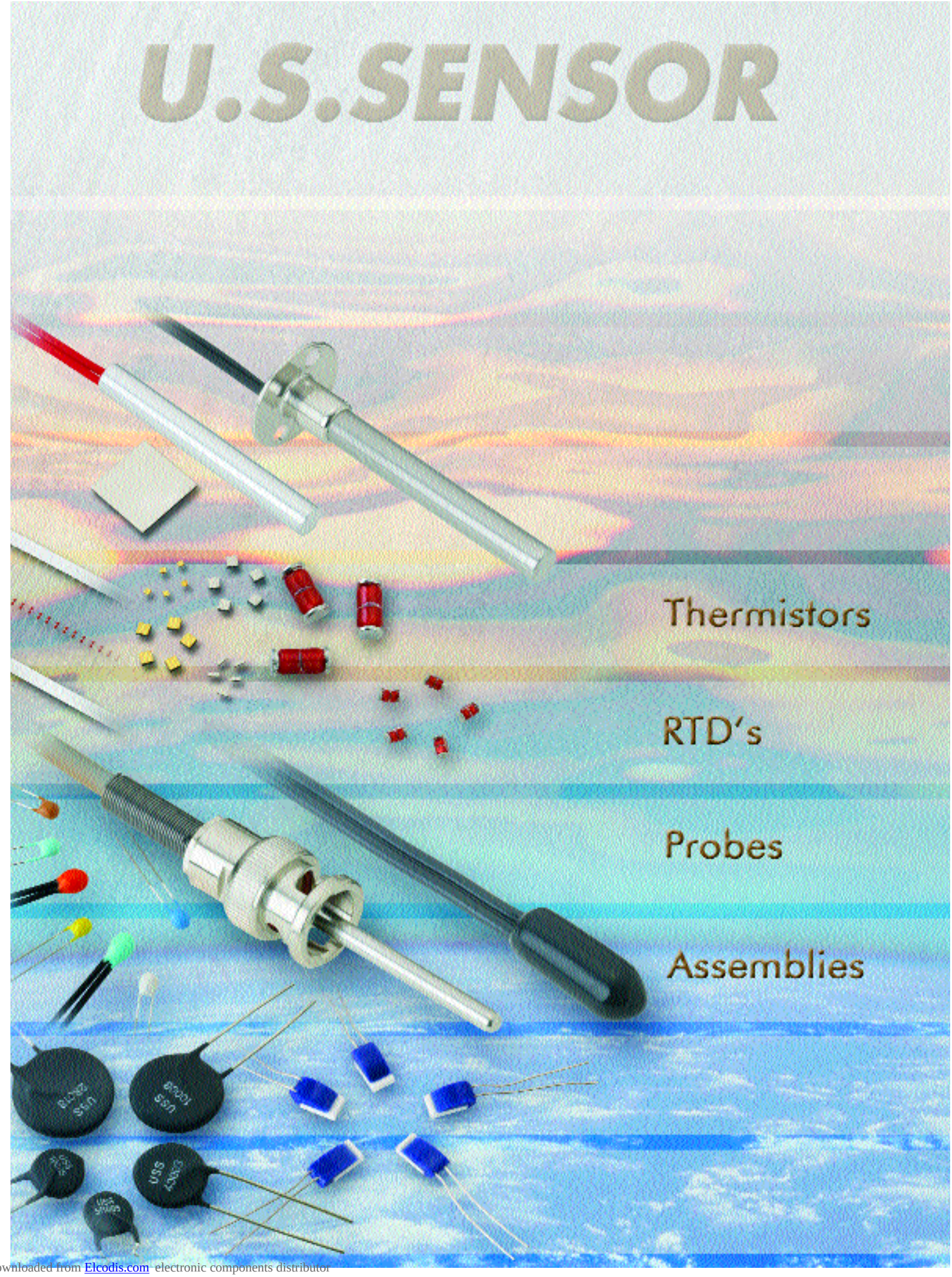
U.S.SENSOR



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U.S. SENSOR Corp.
1832 West Collins Avenue, Orange, CA 92867 • Tel. (714) 639-1000 • Fax (714) 639-1220 • www.ussensor.com

Mission Statement

Our mission is "Total Quality Commitment" by continuing to build:

A partnership with our employees by promoting team effort, communication and empowering them to do their best, and by creating an outstanding work environment through innovative SPC concepts and methods which, by our company's success, fosters self-advancement.

A partnership with our customers and sales representatives by providing expert engineering and sales support as well as on-time delivery of thermistors, probes and assemblies which exceed their quality and performance requirements.

A partnership with our vendors by clearly communicating our high expectations of service and product quality thereby insuring our ability to provide the same to our customers.

A partnership with our community by providing employment opportunities and by being responsive to important civic issues.

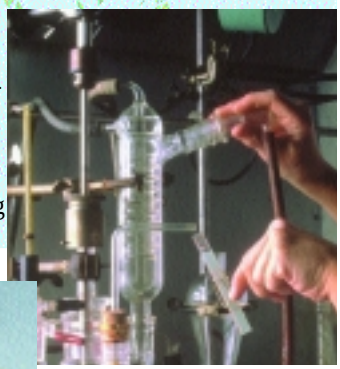
"Our goal is to be the best thermistor manufacturer in the world with a strong commitment to meeting or exceeding customer requirements, and continually improving the effectiveness of the quality management system.

–U.S. Sensor Corp.

Company Overview

U.S. Sensor Corp.

U.S. Sensor is a world class manufacturer of an extensive variety of the highest quality thermistors as well as thermistor probes and assemblies. The company's products include NTC and PTC thermistors which are produced using proprietary state of the art processing techniques. Customers worldwide use U.S. Sensor thermistors in their most demanding applications.



Leading Edge Technology

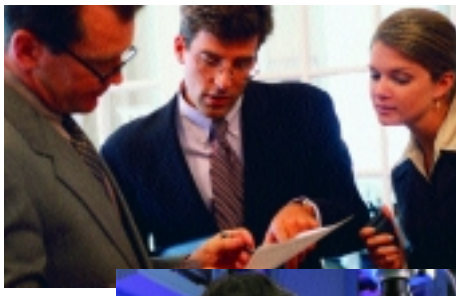
To assure that U.S. Sensor maintains its competitive position in the marketplace and continues to provide products which exceed its customers specified requirements, the company continues to make substantial investments in the most advanced component manufacturing equipment as well as in research and development of innovative products and manufacturing processes.

Products Designed From The Ground Up

U.S. Sensor manufactures thermistors by preparing precise formulations of powdered transition metal oxides "doped" with stabilizing agents. These compounds are combined with binder materials and processed using proprietary techniques resulting in superior quality components and assemblies.

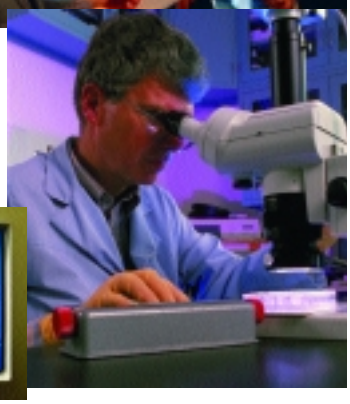
Application Engineering

U.S. Sensor's application engineering personnel are highly trained professionals who will assist you to select a standard thermistor or RTD, or design a special device for your most exacting requirement. Whether your application requires a simple component, a probe assembly or a complex network which will exhibit non-standard resistance temperature characteristics particularly suited to your requirements, our application engineering personnel will be most helpful. U.S. Sensor personnel have been designing unique devices for the most demanding applications for more than thirty years.



Quality

SPC (statistical process control) techniques are used throughout the manufacturing processes in an endless loop of quality improvement. Total Quality Management is our pledge.



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General Information

NTC and PTC Thermistors

Definition

Thermistors are thermally sensitive resistors whose prime function is to exhibit a large, predictable and precise change in electrical resistance when subjected to a corresponding change in body temperature. Negative Temperature Coefficient (NTC) thermistors exhibit a decrease in electrical resistance when subjected to an increase in body temperature and Positive Temperature Coefficient (PTC) thermistors exhibit an increase in electrical resistance when subjected to an increase in body temperature. U.S. Sensor produces thermistors capable of operating over the temperature range of -100˚ to over +600˚F. Because of their very predictable characteristics and their excellent long term stability, thermistors are generally accepted to be the most advantageous sensor for many applications including temperature measurement and control.

Since the negative temperature coefficient of silver sulphide was first observed by Michael Faraday in 1833, there has been a continual improvement in thermistor technology. The most important characteristic of a thermistor is, without question, its extremely high temperature coefficient of resistance. Modern thermistor technology results in the production of devices with extremely precise resistance versus temperature characteristics, making them the most advantageous sensor for a wide variety of applications.

A thermistor's change in electrical resistance due to a corresponding temperature change is evident whether the thermistor's body temperature is changed as a result of conduction or radiation from the surrounding environment or due to "self heating" brought about by power dissipation within the device.

When a thermistor is used in a circuit where the power dissipated within the device is not sufficient to cause "self heating", the thermistor's body temperature will follow that of the environment. Thermistors are not "self heated" for use in applications such as temperature measurement, temperature control or temperature compensation.

When a thermistor is used in a circuit where the power dissipated within the device is sufficient to cause "self heating", the thermistor's body temperature will be dependent upon the thermal conductivity of its environment as well as its temperature. Thermistors are "self heated" for use in applications such as liquid level detection, air flow detection and thermal conductivity measurement.

Manufacturing Processes

U.S. Sensor manufactures thermistors using sophisticated state of the art processing techniques. Their excellent long term stability coupled with precision interchangeability and low cost makes them ideally suited for temperature sensing applications. The devices are available in a wide variety of styles designed to suit countless circuit requirements.

NTC Manufacturing Processes

NTC thermistors are manufactured using homogeneous compounds of various metal oxides including Manganese, Nickel, Cobalt and Copper. The powdered metal oxides, along with stabilizing agents and organic binders, are combined into exact formulations which will exhibit certain electrical characteristics upon completion of the manufacturing processes. Dependent upon the particular application for which the devices are to be used, the oxide/binder formulation is formed into any number of shapes including chips, discs, wafers and bars.

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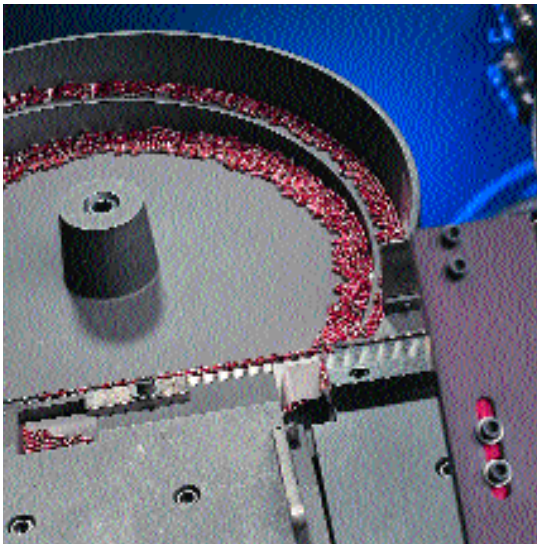

Chips

Precision interchangeable thermistors used for temperature measurement and control as well as glass encapsulated and surface mount devices typically utilize a small chip thermistor sensing element. A slurry, consisting of the metal oxide compounds and special organic binders, is “cast” onto a flat surface to exacting dimensions. The thickness of the “cast tape” can be as thin as 0.001" or as thick as 0.050" depending upon the application. The “cast tape” ware is “blanked” into wafers or substrates of a suitable size. The “green” wafers are sintered at high temperature and electroded with silver or other electrode materials.

The electroded wafers are diced into the exact size dictated by the particular application. A typical wafer will yield from 2,000 to 20,000 devices depending upon the size of the chips required.

The chips are tested electrically, lead wires are attached, resistance trimming is performed if necessary and an encapsulant is applied. In some applications the “unleaded” bare chip can be used “as is”. Chips can also be encapsulated in a hermetically sealed (DO-35 or DO-41) style leaded glass package or into a “MELF” style surface mount package.

Discs

For production of large disc thermistors as well as power thermistors, those devices used primarily for inrush current limiting in switching mode power supplies, discs ranging in size from 0.200" diameter to over 1.000" diameter are formed from the oxide/binder formulation using a tableting press. Precise quantities of powder are automatically metered into a die cavity and compacted into a shape which conforms to the specified dimensional characteristics. This process results in uniform density throughout the device as well as uniform electrical characteristics throughout the production run. The “green” discs are then subjected to a high temperature sintering process which will result in the device achieving the desired resistance versus temperature characteristics. The “sintered” discs are then metallized. A thick film silver electrode material is applied to the “flats” of the discs and fired to allow for subsequent electrical contact to the device. Testing of the thermistor’s electrical characteristics is performed to confirm that the devices conform to the desired resistance versus temperature characteristic. Lead wires are attached using specially formulated solder and an encapsulant of epoxy or silicone resin is usually applied to the device for environmental protection.

Silicon PTC Manufacturing Processes

Silicon PTC thermistors are manufactured using the positive temperature coefficient of specially doped single crystal silicon. The ingot is grown and doped to precise specifications and sliced into thin wafers. An electrode is applied to the flat surfaces of the wafers which are subsequently diced into small chips. The chips are then sealed in DO-35 (Diode Style) or LL-34 (Surface Mount) packages and electrically tested to confirm that they meet their specified resistance temperature characteristics.

Probes And Assemblies

Most of the standard thermistors and RTD’s listed in the U.S. Sensor catalog are available mounted in special probe housings designed for sensing temperature under the most demanding environmental conditions. U.S. Sensor’s standard probe housings range in size from less than 0.020" diameter to over 0.375" diameter and are constructed from various materials including stainless steel, aluminum, epoxy, polyimide and PVC, just to name a few. Detailed descriptions of some of U.S. Sensor’s standard probe housings are presented in this catalog.

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Thermistor Markets and Applications

Consumer Electronics

Air conditioners
Audio amplifiers
Cellular telephones
Clothes dryers
Computer power supplies
Dishwashers
Electric blanket controls
Electric water heaters
Electronic thermometers
Fire detectors
Home weather stations
Oven temperature controls
Pool and spa controls
Rechargeable battery packs
Refrigerator and freezer temperature controls
Small appliance controls
Solar collector controls
Thermostats
Toasters
Washing machines

Automotive

Audio amplifiers
Automatic climate controls
Coolant sensors
Electric coolant fan temperature controls
Emission controls
Engine block temperature sensors
Engine oil temperature sensors
Intake air temperature sensors
Oil level sensors
Outside air temperature sensors
Transmission oil temperature sensors
Water level sensors

Medical Electronics

Blood analysis equipment
Blood dialysis equipment
Blood oxygenator equipment
Clinical fever thermometers
Esophageal tubes
Infant incubators
Internal body temperature monitors
Internal temperature sensors
Intravenous injection temperature regulators
Myocardial probes
Respiration rate measurement equipment
Skin temperature monitors
Thermodilution catheter probes

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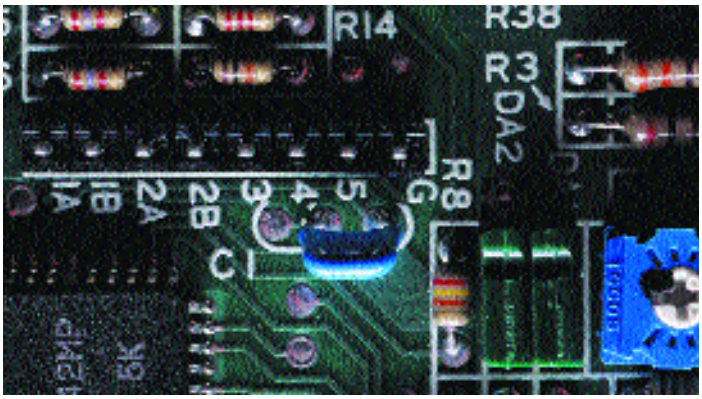


Industrial Electronics

Commercial vending machines
Crystal ovens
Fluid flow measurement
Gas flow indicators
HVAC equipment
Industrial process controls
Liquid level indicators
Microwave power measurement
Photographic processing equipment
Plastic laminating equipment
Solar energy equipment
Thermal conductivity measurement (diamond testers etc.)
Thermocouple compensation
Thermoplastic molding equipment
Thermostats
Water purification equipment
Welding equipment

Military And Aerospace

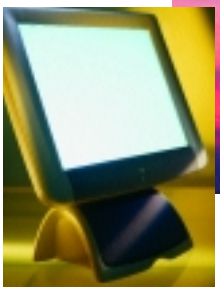
Aircraft temperature
Bathythermography
Fire control equipment
Missiles and spacecraft temperature
Oscillator compensation
Physiological monitoring
Satellites

Food Handling And Processing

Coffee makers
Deep fryers
Fast food processing
Perishable shipping
Temperature controlled food storage systems
Thermometers for use in food preparation

Communication And Instrumentation

Amplifier over temperature sensing
Cellular telephones
Copper coil winding temperature compensation
Oscillator temperature compensation
Rechargeable battery packs
Transistor gain stabilization
Transistor temperature compensation



Computer

Power supplies (inrush current limiting)
Uninterruptible power supplies
(over temperature sensing)

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Terminology

Zero-Power Resistance (R_T)
The zero-power resistance is the dc resistance value of a thermistor measured at a specified temperature with power dissipated by the thermistor low enough that any further decrease in power will result in not more than 0.1 % (or one-tenth of the specified measurement tolerance, whichever is smaller) change in resistance.

Resistance Ratio Characteristic
The resistance ratio characteristic identifies the ratio of the zero-power resistance of a thermistor measured at 25˚C to that resistance measured at 125˚C.

Zero-Power Temperature Coefficient Of Resistance (alpha α_T)
Zero-power coefficient of resistance is the ratio at the specified temperature (T) of the rate of change of zero-power resistance with temperature to the zero-power resistance of the thermistor.

$$\alpha_T = \frac{1}{R_T} \frac{(D\ R_T)}{(D\ T)}$$

Negative Temperature Coefficient (NTC)
An NTC thermistor is one in which the zero-power resistance decreases with an increase in body temperature.

Positive Temperature Coefficient (PTC)
A PTC thermistor is one in which the zero-power resistance increases with an increase in body temperature.

Maximum Operating Temperature
The maximum operating temperature of a thermistor is the maximum body temperature at which the thermistor will operate for an extended period of time with acceptable stability of its characteristics. This temperature can be the result of internal or external heating, or both, and should not exceed the maximum value specified.

Maximum Power Rating
The maximum power rating of a thermistor is the maximum power which a thermistor will dissipate for an extended period of time with acceptable stability of its characteristics.

Dissipation Constant
The dissipation constant is the ratio, (expressed in milliwatts per degree C) at a specified ambient temperature, of a change in power dissipation in a thermistor to the resultant body temperature change.

Thermal Time Constant
The thermal time constant is the time required for a thermistor to change 63.2 % of the total difference between its initial and final body temperature when subjected to a step function change in temperature under zero-power conditions.

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Resistance-Temperature Characteristic

The resistance-temperature characteristic is the relationship between the zero-power resistance of a thermistor and its body temperature.

The Steinhart-Hart equation is an empirical expression that is the best mathematical expression of the resistance versus temperature characteristics of an NTC thermistor. The calculation for determining the constants A_0, A_1, A_2, and A_3 is quite lengthy. Contact U.S. Sensor's application engineering department for assistance.

$$L_n (R_T) = A_0 + \frac{A_1}{T} + \frac{A_2}{T^3} + \frac{A_3}{T^5}$$

T= Temperature (expressed in degrees Kelvin)
R= Resistance (in Ohms)

Temperature-Wattage Characteristics

The temperature-wattage characteristic of a thermistor is the relationship at a specified ambient temperature between a thermistor temperature and the applied steady-state wattage.

Current-Time Characteristic

The current-time characteristic is the relationship at a specified ambient temperature between the current through a thermistor and time, upon application or interruption of voltage to it.

Stability

The stability of a thermistor is the ability of a thermistor to retain specified characteristics after being subjected to designated environmental or electrical test conditions.

Beta (°K), (expressed in degrees Kelvin)

The material constant of a thermistor. Unless otherwise specified, Beta is derived from thermistor resistance measurements obtained at 0° and 50°C.

$$\text{Beta} = \frac{\text{Log}_{10} \frac{(R_0T_1)}{(R_0T_2)}}{\left(\frac{1}{T_1} - \frac{1}{T_2}\right) \text{Log e}}$$

R_0T_1 is the zero-power resistance at absolute temperature T_1.
R_0T_2 is the zero-power resistance at absolute temperature T_2.
e is the naperian base 2.71828.
T_1 is temperature 1, expressed in degrees Kelvin.
T_2 is temperature 2, expressed in degrees Kelvin.

Maximum Steady State Current (I_{max})

For power thermistors, the maximum continuous steady state current, either DC or RMS AC, which the device is capable of passing. The maximum steady state current for U.S. Sensor power thermistors is determined assuming a maximum operating ambient temperature of 65°C. If a specific application requires ambient temperature operation above 65°C, custom designed devices are available.

Resistance At Maximum Current (RI_{max})

For power thermistors, the approximate resistance of the device under maximum steady state current conditions.

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Ultra
Precision Interchangeable Thermistors

0.05ºC Accuracy

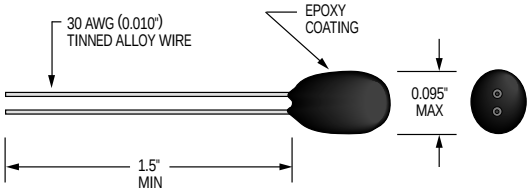
U.S. Sensor's ultra precision interchangeable thermistors are highly accurate, stable devices designed specifically for temperature sensing and control applications. They are particularly suited for uses where their precision interchangeability eliminates the necessity for costly individual circuit calibration.

Features

- High accuracy
- Fast thermal response
- Long life
- R/T Curve-matched
- Epoxy encapsulated
- High stability
- Small size

Options

- Special lead materials and lengths
- Special encapsulants or probe housings
- Non-standard resistance values and tolerances

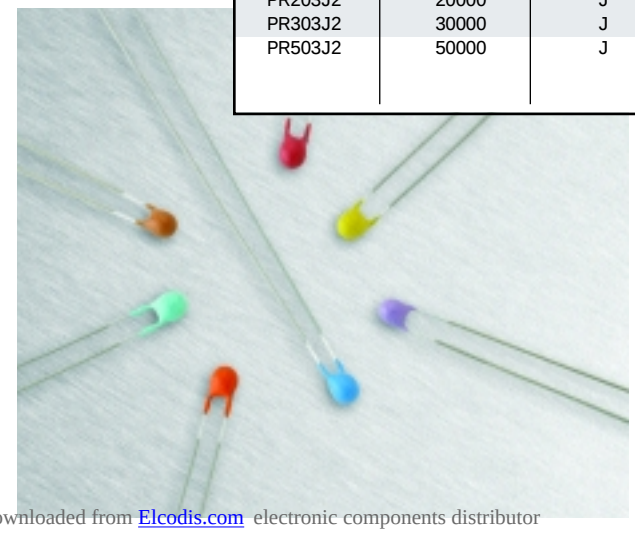


Specifications

- Thermal time constant: 1 second max. in a well stirred oil bath, 10 seconds max. in still air
- Dissipation constant: 1 mW/˚C
- Maximum power rating: 30 mW at 25˚C derated to 1 mW at 125˚C
- Interchangeability tolerance of ±0.05˚C from 0-50˚C
- Operating temperature: -55˚C to +80˚C
- Storage and operation temperatures for best long term stability: -55˚ to +50˚C

Ultra Precision Interchangeable Thermistors

Part Number (±0.05˚C 0-50˚C)	Resistance Ω @ 25˚C	R-T Curve (See Pg. 40-43)	Beta (˚K) 0-50˚C
PR222J2	2252	J	3890
PR302J2	3000	J	3890
PR502J2	5000	J	3890
PR103J2	10000	J	3890
PR203J2	20000	J	3890
PR303J2	30000	J	3890
PR503J2	50000	J	3890



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Standard
Precision Interchangeable Thermistors

0.1ºC and 0.2ºC Accuracy

U.S. Sensor's standard precision interchangeable thermistors are low cost, highly accurate, stable devices designed specifically for temperature sensing and control applications. They are particularly suited for uses where their precision interchangeability eliminates the necessity for costly individual circuit calibration.

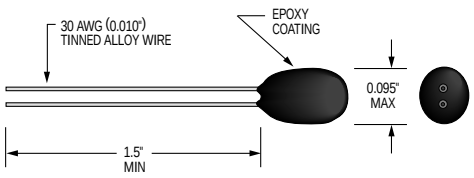
Features

- High accuracy
- Fast thermal response
- Low cost
- Small size
- Epoxy encapsulated
- High stability
- Long life
- R/T Curve-matched

Options

- Special lead materials and lengths
- Special encapsulants or probe housings
- Non-standard resistance values and tolerances

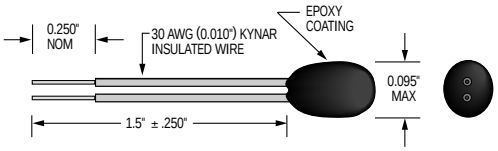
"PS" & "PT" SERIES



Specifications

- Thermal time constant: 1 second max. in a well stirred oil bath, 10 seconds max. in still air
- Dissipation constant: 1 mW/˚C
- Maximum power rating: 30 mW at 25˚C derated to 1 mW at 125˚C
- Interchangeability tolerance of ±0.1˚C or ±0.2˚C from 0-70˚C
- Operating temperature: PS and PT series -80˚C to +150˚C, KS and KT series -80˚C to +135˚C
- Storage and operation temperatures for best long term stability: KT and PT series = -80˚ to +120˚C, KS and PS series = -80˚ to +75˚C

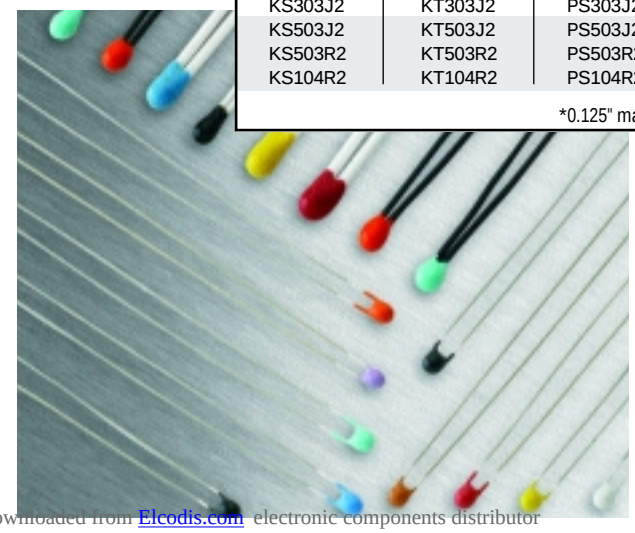
"KS" & "KT" SERIES



Standard Precision Interchangeable Thermistors

Part Number (±0.1˚C 0-70˚C)	Part Number (±0.2˚C 0-70˚C)	Part Number (±0.1˚C 0-70˚C)	Part Number (±0.2˚C 0-70˚C)	Resistance Ω @ 25˚C	R-T Curve (See Pg. 40-43)	Beta (˚K) 0-50˚C
Insulated Leads	Insulated Leads	Bare Leads	Bare Leads			
KS102J2	KT102J2	PS102J2	PT102J2	1000*	J	3890
KS222J2	KT222J2	PS222J2	PT222J2	2252	J	3890
KS302J2	KT302J2	PS302J2	PT302J2	3000	J	3890
KS502J2	KT502J2	PS502J2	PT502J2	5000	J	3890
KS602J2	KT602J2	PS602J2	PT602J2	6000	J	3890
KS103G2	KT103G2	PS103G2	PT103G2	10000	G	3575
KS103J2	KT103J2	PS103J2	PT103J2	10000	J	3890
KS203J2	KT203J2	PS203J2	PT203J2	20000	J	3890
KS303J2	KT303J2	PS303J2	PT303J2	30000	J	3890
KS503J2	KT503J2	PS503J2	PT503J2	50000	J	3890
KS503R2	KT503R2	PS503R2	PT503R2	50000	R	4140
KS104R2	KT104R2	PS104R2	PT104R2	100000	R	4140

*0.125" maximum diameter over epoxy coating



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Precision
Interchangeable Thermistors

0.5ºC and 1.0ºC Accuracy

U.S. Sensor's precision interchangeable thermistors are low cost, highly accurate, stable devices designed specifically for temperature sensing and control applications. They are particularly suited for uses where their precision interchangeability eliminates the necessity for costly individual circuit calibration.

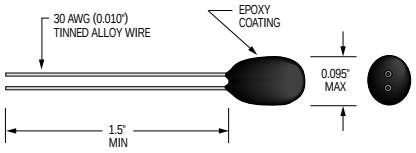
Features

- High accuracy
- Fast thermal response
- Low cost
- Small size
- Epoxy encapsulated
- High stability
- Long life
- R/T Curve-matched

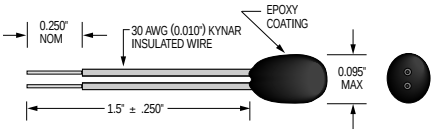
Options

- Special lead materials and lengths
- Special encapsulants or probe housings
- Non-standard resistance values and tolerances

"PW" & "PX" SERIES



"KW" & "KX" SERIES



Specifications

- Thermal time constant: 1 second max. in a well stirred oil bath, 10 seconds max. in still air
- Dissipation constant: 1 mW/˚C
- Maximum power rating: 30 mW at 25˚C derated to 1 mW at 125˚C
- Interchangeability tolerance of ±0.5˚C or ±1.0˚C from 0-70˚C
- Operating temperature: KW and KX series -80˚C to +135˚C, PW and PX series -80˚C to +150˚C
- Storage and operation temperatures for best long term stability: -80˚C to +120˚C

Precision Interchangeable Thermistors

Part Number (±0.5˚C 0-70˚C)	Part Number (±1.0˚C 0-70˚C)	Part Number (±0.5˚C 0-70˚C)	Part Number (±1.0˚C 0-70˚C)	Resistance Ω @ 25˚C	R-T Curve (See Pg. 40-43)	Beta (˚K) 0-50˚C
Insulated Leads	Insulated Leads	Bare Leads	Bare Leads			
KW102J2	KX102J2	PW102J2	PX102J2	1000*	J	3890
KW222J2	KX222J2	PW222J2	PX222J2	2252	J	3890
KW302J2	KX302J2	PW302J2	PX302J2	3000	J	3890
KW502J2	KX502J2	PW502J2	PX502J2	5000	J	3890
KW602J2	KX602J2	PW602J2	PX602J2	6000	J	3890
KW103G2	KX103G2	PW103G2	PX103G2	10000	G	3575
KW103J2	KX103J2	PW103J2	PX103J2	10000	J	3890
KW203J2	KX203J2	PW203J2	PX203J2	20000	J	3890
KW303J2	KX303J2	PW303J2	PX303J2	30000	J	3890
KW503J2	KX503J2	PW503J2	PX503J2	50000	J	3890
KW503R2	KX503R2	PW503R2	PX503R2	50000	R	4140
KW104R2	KX104R2	PW104R2	PX104R2	100000	R	4140

*0.125" maximum diameter over epoxy coating

U.S. SENSOR Corp.
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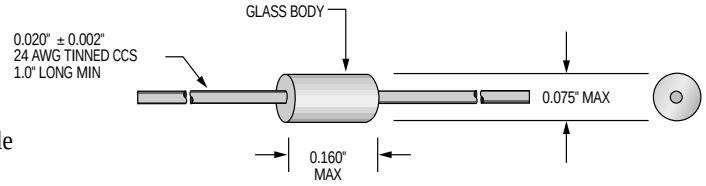
DO-35 Standard
Glass Encapsulated Thermistors

U.S. Sensor's low cost glass encapsulated thermistors are manufactured using super stable NTC chips which are hermetically sealed in a glass (DO-35 diode style) package. The result is a device which exhibits excellent long term reliability and stability even when subjected to severe environmental or thermal conditions. Their uniform dimensions and axial lead configuration make them especially suitable for use with automatic insertion equipment.

Features

- High temperature capability to 300˚C
- Hermetically sealed glass package
- Low cost
- High stability
- High voltage insulation
- Tinned CCS lead wires are solderable or weldable



Options

- Special Lead Forms
- Non-standard resistance values and tolerances
- Point matched at specified temperatures
- Tape and reel packaging

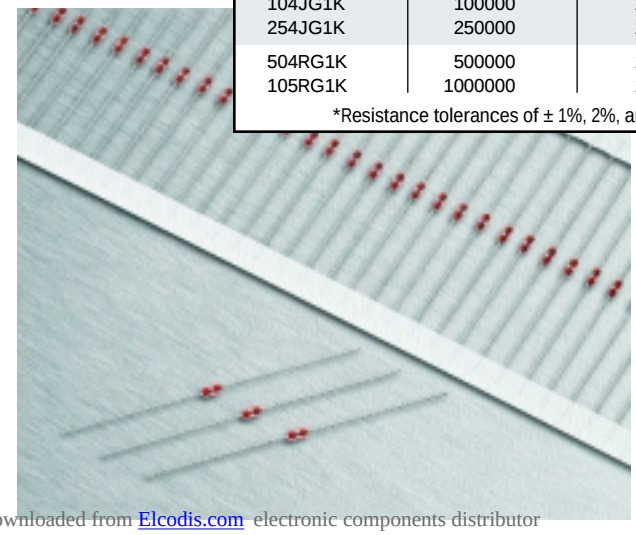
Specifications

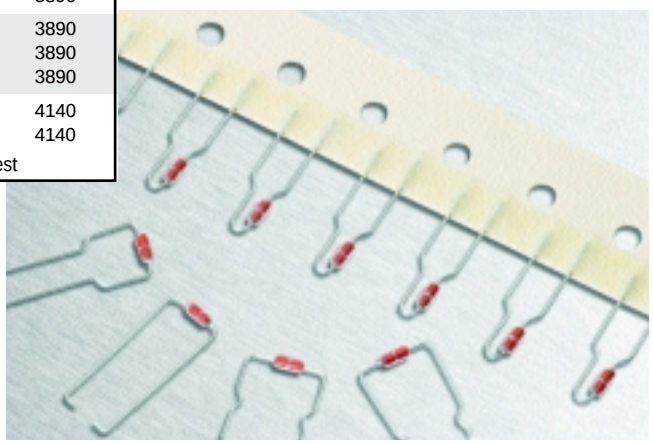
- Thermal time constant: 5 seconds (still air)
- Thermal time constant: 0.5 seconds (stirred liquid)
- Dissipation constant: 2 mW/˚C (still air)

DO-35 Standard Glass Encapsulated Thermistors

Part Number	Resistance Ω @ 25˚C	*Resistance Tol. ± %	R-T Curve (See Pg. 44-45)	Beta (˚K) 0-50˚C
252FG1K	2500	10	F	3420
502FG1K	5000	10	F	3420
822JG1K	8200	10	J	3890
103JG1K	10000	10	J	3890
123JG1K	12000	10	J	3890
203JG1K	20000	10	J	3890
253JG1K	25000	10	J	3890
303JG1K	30000	10	J	3890
503JG1K	50000	10	J	3890
753JG1K	75000	10	J	3890
104JG1K	100000	10	J	3890
254JG1K	250000	10	J	3890
504RG1K	500000	10	R	4140
105RG1K	1000000	10	R	4140

*Resistance tolerances of ± 1%, 2%, and 5% are available upon request





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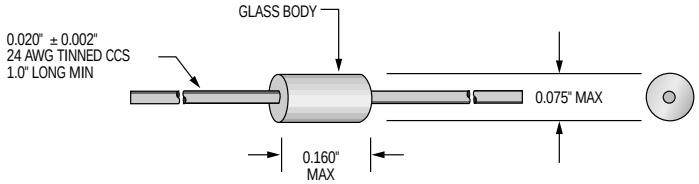
DO-35 *Interchangeable*
Glass Encapsulated Thermistors

U.S. Sensor's low cost interchangeable glass encapsulated thermistors are manufactured using super stable, precision NTC chips which are hermetically sealed in a glass (DO-35 diode style) package. The result is a device which exhibits excellent long term reliability and stability even when subjected to severe environmental or thermal conditions. Their uniform dimensions and axial lead configuration make them especially suitable for use with automatic insertion equipment.



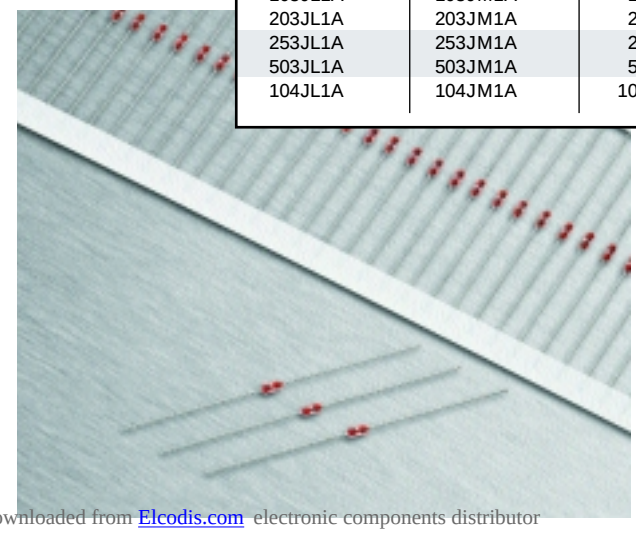
Features
- High temperature capability to 300˚C
- Hermetically sealed glass package
- Low cost
- High stability
- High voltage insulation
- Tinned CCS lead wires are solderable or weldable

Options
- Special Lead Forms
- Non-standard resistance values and tolerances
- Point matched at specified temperatures
- Tape and reel packaging

Specifications
- Thermal time constant: 5 seconds (still air)
- Thermal time constant: 0.5 seconds (stirred liquid)
- Dissipation constant: 2 mW/˚C (still air)

DO-35 Interchangeable Glass Encapsulated Thermistors

Part Number (± 0.5˚C 0-100˚C)	Part Number (± 1.0˚C 0-100˚C)	Resistance Ω @ 25˚C	R-T Curve (See Pg. 44-45)	Beta (˚K) 0-50˚C
103JL1A	103JM1A	10000	J	3890
203JL1A	203JM1A	20000	J	3890
253JL1A	253JM1A	25000	J	3890
503JL1A	503JM1A	50000	J	3890
104JL1A	104JM1A	100000	J	3890



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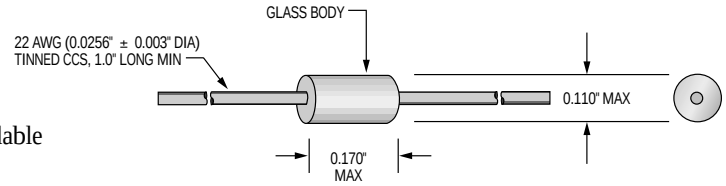
DO-41 Standard
Glass Encapsulated Thermistors

U.S. Sensor's low cost glass encapsulated thermistors are manufactured using super stable NTC chips which are hermetically sealed in a glass (DO-41 diode style) package. The result is a device which exhibits excellent long term reliability and stability even when subjected to severe environmental or thermal conditions. Their uniform dimensions and axial lead configuration make them especially suitable for use with automatic insertion equipment.

Features

- High temperature capability to 300˚C
- Hermetically sealed glass package
- Low cost
- High stability
- High voltage insulation
- Tinned CCS lead wires are solderable or weldable



Options

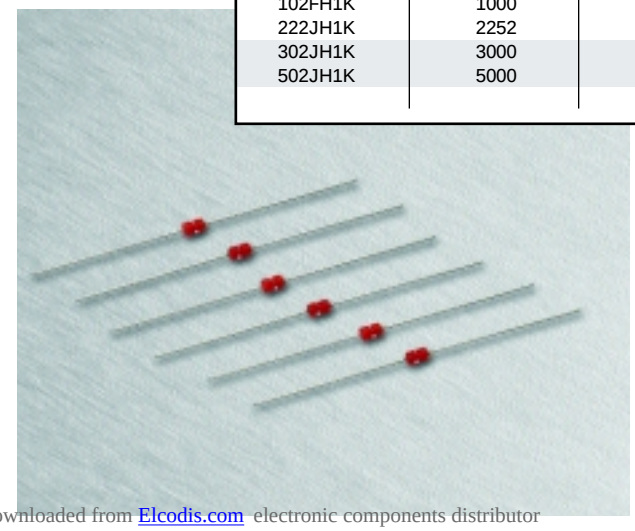
- Non-standard resistance values and tolerances
- Point matched at specified temperatures

Specifications

- Thermal time constant: 8 seconds max (still air)
- Thermal time constant: 2 seconds max (stirred liquid)
- Dissipation constant: 3 mW/˚C (still air)

DO-41 Standard
Glass Encapsulated Thermistors

Part Number	Resistance Ω @ 25˚C	Resistance Tol. ± %	R-T Curve (See Pg. 44-45)	Beta (˚K) 0-50˚C
102FH1K	1000	10	F	3420
222JH1K	2252	10	J	3890
302JH1K	3000	10	J	3890
502JH1K	5000	10	J	3890



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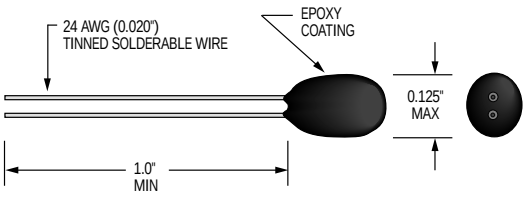
Standard
Leaded Epoxy Coated Thermistors

0.125" Maximum Body Diameter

U.S. Sensor's standard leaded epoxy coated thermistors are manufactured using the same state of the art manufacturing techniques as those used to produce U.S. Sensor's precision interchangeable devices. This results in devices with superior long term reliability characteristics, making them especially suitable for temperature measurement, temperature control and temperature compensation applications.

Features
- Low cost
- High stability
- Small size
- Epoxy encapsulated
- Fast thermal response



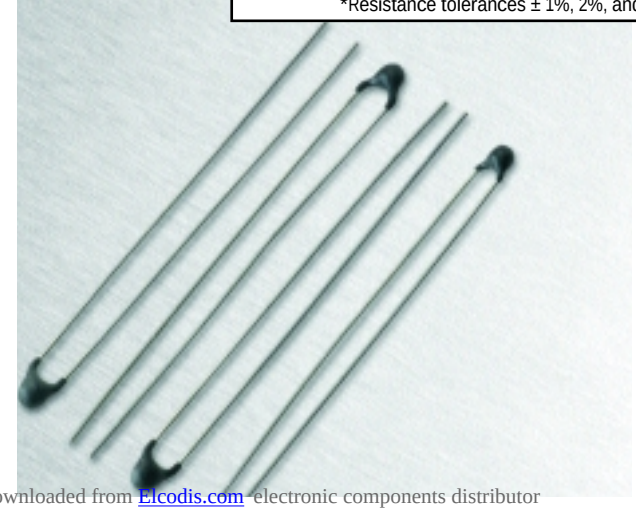
Options
- Special lead materials and lengths
- Special encapsulants or probe housings
- Non-standard resistance values and tolerances
- Point matched at specified temperatures

Specifications
- Thermal time constant: 2 seconds max. in a well stirred oil bath, 15 seconds max. in still air
- Dissipation constant: 3 mW/˚C

Standard Leaded Epoxy Coated Thermistors

Part Number	Resistance Ω @ 25˚C	*Resistance Tol. ± %	R-T Curve (See Pg. 44-45)	Beta (˚K) 0-50˚C	Max Operating Temp. ˚C
DC101B2K	100	10	B	2930	100
DC102F2K	1000	10	F	3420	150
DC222J2K	2252	10	J	3890	150
DC302J2K	3000	10	J	3890	150
DC502J2K	5000	10	J	3890	150
DC103G2K	10000	10	G	3575	150
DC103J2K	10000	10	J	3890	150
DC203J2K	20000	10	J	3890	150
DC303J2K	30000	10	J	3890	150
DC503J2K	50000	10	J	3890	150
DC104R2K	100000	10	R	4140	150

*Resistance tolerances ± 1%, 2%, and 5% are available upon request



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Miniature
Leaded Epoxy Coated Thermistors

0.095" Maximum Body Diameter

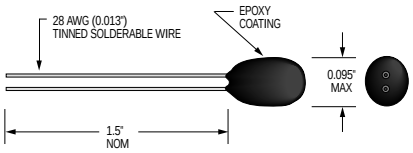
U.S. Sensor's miniature leaded epoxy coated thermistors are manufactured using the same state of the art manufacturing techniques as those used to produce U.S. Sensor's precision interchangeable devices. This results in devices with superior long term reliability characteristics especially suitable for temperature measurement, temperature control and temperature compensation applications.

Features
- Low cost
- High stability
- Epoxy encapsulated
- Small size
- Fast thermal response

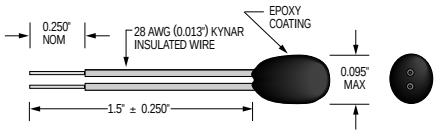
Options
- Special lead materials and lengths
- Special encapsulants or probe housings
- Non-standard resistance values and tolerances
- Point matched at specified temperatures

Specifications
- Thermal time constant: 1 second max. in a well stirred oil bath, 10 seconds max. in still air
- Dissipation constant: 1 mW/˚C
- Max. operating temperature: LC series 150˚C, KC series 135˚C, TC series 150˚C (R-T Curve "B" devices limited to 100˚C Max.)

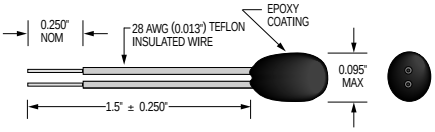
"LC" SERIES



"KC" SERIES



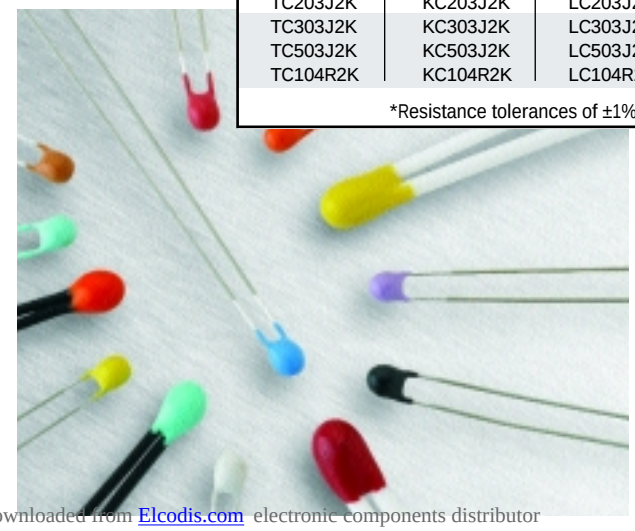
"TC" SERIES



Miniature Leaded Epoxy Coated Thermistors

Part Number	Part Number	Part Number	Resistance Ω @ 25˚C	Resistance Tol. ± %	R-T Curve (See Pg. 44-45)	Beta (˚K) 0-50˚C
Teflon Insulated Leads	Kynar Insulated Leads	Bare Leads				
TC101B2K	KC101B2K	LC101B2K	100	10	B	2930
TC102F2K	KC102F2K	LC102F2K	1000	10	F	3420
TC222J2K	KC222J2K	LC222J2K	2252	10	J	3890
TC302J2K	KC302J2K	LC302J2K	3000	10	J	3890
TC502J2K	KC502J2K	LC502J2K	5000	10	J	3890
TC103G2K	KC103G2K	LC103G2K	10000	10	G	3575
TC103J2K	KC103J2K	LC103J2K	10000	10	J	3890
TC203J2K	KC203J2K	LC203J2K	20000	10	J	3890
TC303J2K	KC303J2K	LC303J2K	30000	10	J	3890
TC503J2K	KC503J2K	LC503J2K	50000	10	J	3890
TC104R2K	KC104R2K	LC104R2K	100000	10	R	4140

*Resistance tolerances of ±1%, 2% and 5% are available upon request



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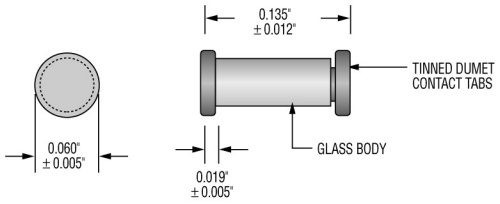
"MELF" Style
Surface Mount NTC Thermistors

LL-34 MiniMELF

U.S. Sensor's NTC LL-34 "MELF" style glass encapsulated surface mount thermistors are manufactured using super stable NTC chips which are hermetically sealed in a glass package. The result is an extremely reliable surface mount package which is capable of withstanding the most severe environmental conditions. Tape and reeling for use with automatic insertion equipment is available.

Features
- Surface mountable
- Hermetically sealed glass package
- Low cost
- High stability

Options
- Non-standard resistance values and tolerances
- Point matched at specified temperatures
- Tape and reel packaging



Specifications
- Thermal time constant: 8 seconds max
- Dissipation constant: 2 mW/°C
- Maximum operating temperature: 220°C

Surface Mount "LL-34 MiniMELF" Thermistors

Part Number	Resistance Ω @ 25°C	Resistance Tol. ± %	R-T Curve (See Pg. 44-45)	Beta (°K) 0-50°C
SM103J1K	10000	10	J	3890
SM153J1K	15000	10	J	3890
SM203J1K	20000	10	J	3890
SM253J1K	25000	10	J	3890
SM303J1K	30000	10	J	3890
SM403J1K	40000	10	J	3890
SM503J1K	50000	10	J	3890
SM104J1K	100000	10	J	3890
SM104R1K	100000	10	R	4140
SM254R1K	250000	10	R	4140
SM105R1K	1000000	10	R	4140

Surface Mount "LL-34 MiniMELF" Interchangeable Thermistors

Part Number (±0.5°C 0-50°C)	Part Number (±1.0°C 0-100°C)	Resistance Ω @ 25°C	R-T Curve (See Pg. 44-45)	Beta (°K) 0-50°C
HM103J1A	WM103J1A	10000	J	3890
HM153J1A	WM153J1A	15000	J	3890
HM203J1A	WM203J1A	20000	J	3890
HM503J1A	WM503J1A	50000	J	3890
HM104J1A	WM104J1A	100000	J	3890

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"MELF" Style
Surface Mount NTC Thermistors

LL-31 MicroMELF and LL-41 MELF

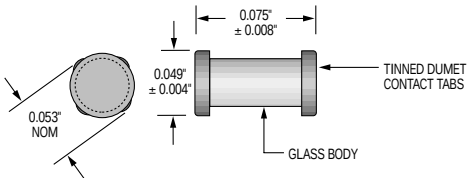
U.S. Sensor's NTC LL-31 and LL-41 "MELF" style glass encapsulated surface mount thermistors are manufactured using super stable NTC chips which are hermetically sealed in a glass package. The result is an extremely reliable surface mount package which is capable of withstanding the most severe environmental conditions. Tape and reeling for use with automatic insertion equipment is available.

Features
- Surface mountable
- Hermetically sealed glass package
- Low cost
- High stability
- Rated to 220˚C operating temperature

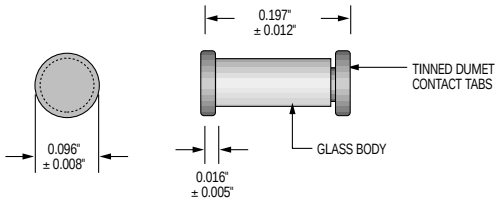
Options
- Non-standard resistance values and tolerances
- Point matched at specified temperatures
- Tape and reel packaging

Specifications
- Thermal time constant: LL-31 Series 5 seconds max, LL-41 series 8 seconds max
- Dissipation constant: LL-31 series 1 mW/ºC, LL-41 series 3 mW/ºC

"LL-31" SERIES



"LL-41" SERIES



Surface Mount "LL-31" MicroMELF Thermistors

Part Number	Resistance Ω @ 25˚C	Resistance Tol. ± %	R-T Curve (See Pg. 44-45)	Beta (˚K) 0-50˚C
MM302F1K	3000	10	F	3420
MM502F1K	5000	10	F	3420
MM103J1K	10000	10	J	3890
MM153J1K	15000	10	J	3890
MM203J1K	20000	10	J	3890
MM104R1K	100000	10	R	4140

Surface Mount "LL-41" MELF Thermistors

Part Number	Resistance Ω @ 25˚C	Resistance Tol. ± %	R-T Curve (See Pg. 44-45)	Beta (˚K) 0-50˚C
SB302J1K	3000	10	J	3890
SB502J1K	5000	10	J	3890

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Surface Mount
End-Banded Chip Thermistors

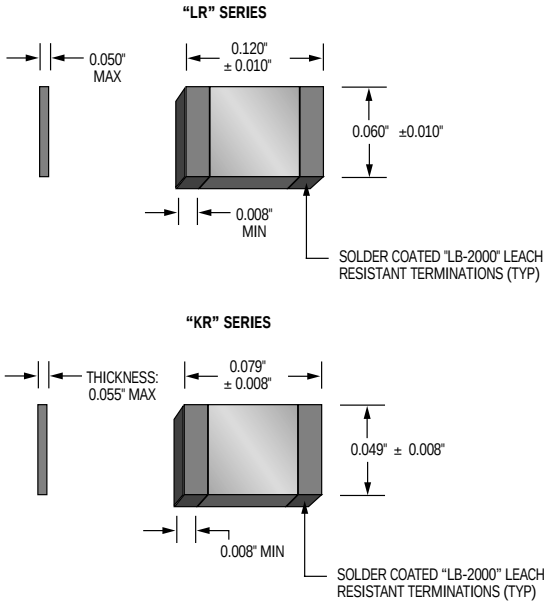
0805 and 1206 Style

U.S. Sensor's surface mount end-banded thermistor elements are designed for use on hybrid substrates, integrated circuits or printed circuit boards. They have a solder coated metallization which is suitable for various contact techniques including wire bond, epoxy or solder. Since they are manufactured using the most advanced equipment and technology available, their dimensional parameters are extremely uniform making the devices especially suitable for use with automatic handling and placement equipment.

Features
- Surface mountable
- Small size
- Low cost
- Rated to 150˚C operating temperature

Options
- Non-standard resistance values and tolerances
- Special electrode materials
- Special dimensions
- Tape and reel packaging
- Solder coated metallization

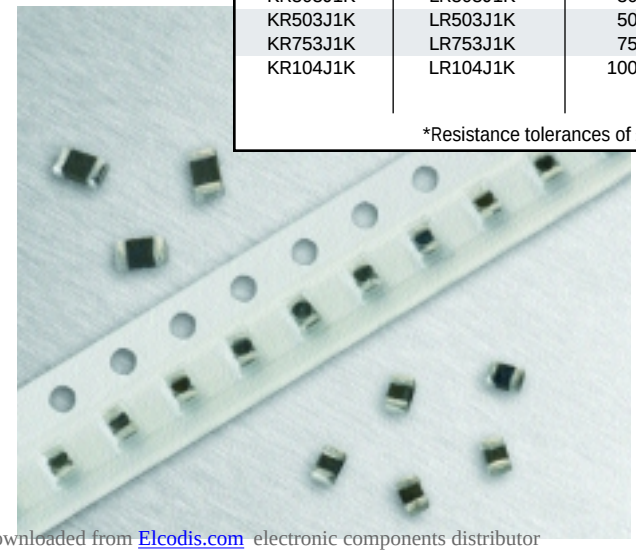
Specifications
- Thermal time constant: 10 seconds max.
- Dissipation constant: 1 mW/˚C



Surface Mount End-Banded Chip Thermistors

Part Number 0805 Series	Part Number 1206 Series	Resistance Ω @ 25˚C	*Resistance Tol. ± %	R-T Curve (See Pg. 44-45)	Beta (˚K) 0-50˚C
KR102B1K	LR102B1K	1000	10	B	2930
KR252B1K	LR252B1K	2500	10	B	2930
KR502F1K	LR502F1K	5000	10	F	3420
KR103F1K	LR103F1K	10000	10	F	3420
KR203F1K	LR203F1K	20000	10	F	3420
KR303J1K	LR303J1K	30000	10	J	3890
KR503J1K	LR503J1K	50000	10	J	3890
KR753J1K	LR753J1K	75000	10	J	3890
KR104J1K	LR104J1K	100000	10	J	3890

*Resistance tolerances of ±5%, 20% are available upon request



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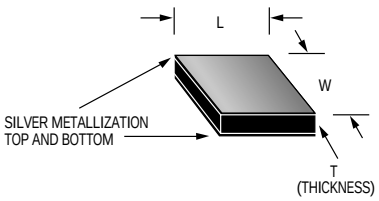
Leadless
Top/Bottom Terminated Chip Thermistors

U.S. Sensor's leadless chip thermistor elements are designed for use on hybrid substrates, integrated circuits or printed circuit boards. They have silver metallization on their top and bottom which is suitable for various contact techniques including wire bond, epoxy or solder. Since they are manufactured using the most advanced equipment and technology available, their dimensional parameters are extremely uniform, making the devices especially suitable for use with automatic handling and placement equipment.

Features
- Surface mountable
- Small size
- Very low profile
- Low cost
- Rapid response time
- Rated to 150˚C

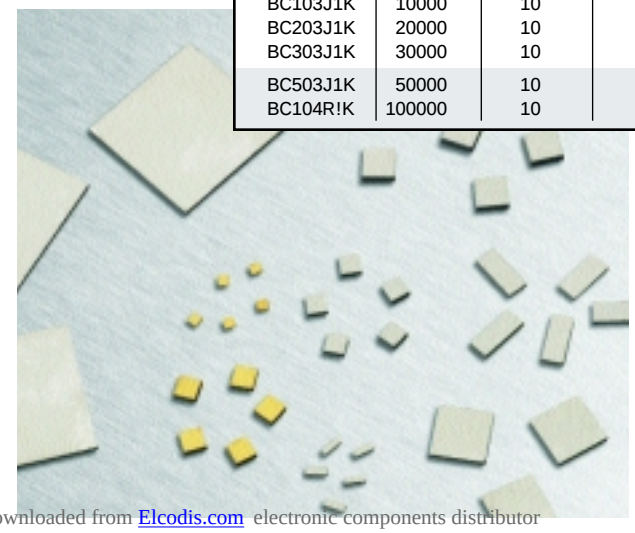
Options
- Non-standard resistance values and tolerances
- Special electrode materials (silver or gold)
- Special dimensions
- Tape and reel packaging

Specifications
- Thermal time constant: 2 seconds max.
- Dissipation constant: 1mW/˚C



Leadless Chip Thermistors

Part Number	Resistance Ω @ 25˚C	*Resistance Tol. ± %	R-T Curve (See Pg. 44-45)	Beta (˚K) 0-50˚C	Nominal Dimensions (Inches) Dim. "L"	Dim. "W"	Dim. "T"
BC101B1K	100	10	B	2930	0.060	0.060	0.015
BC501F1K	500	10	F	3420	0.075	0.075	0.015
BC102F1K	1000	10	F	3420	0.045	0.045	0.015
BC222J1K	2252	10	J	3890	0.070	0.070	0.010
BC302J1K	3000	10	J	3890	0.065	0.065	0.010
BC502J1K	5000	10	J	3890	0.055	0.055	0.015
BC103J1K	10000	10	J	3890	0.040	0.040	0.015
BC203J1K	20000	10	J	3890	0.030	0.030	0.015
BC303J1K	30000	10	J	3890	0.025	0.025	0.020
BC503J1K	50000	10	J	3890	0.020	0.020	0.020
BC104R!K	100000	10	R	4140	0.022	0.022	0.016



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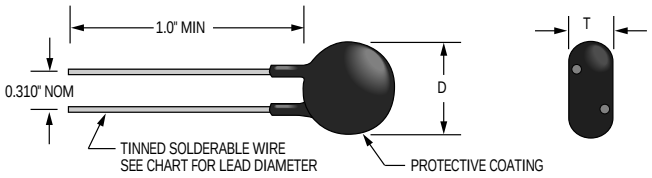
Inrush Current Limiting
Power Thermistors

U.S. Sensor's inrush current limiting power thermistors are specially formulated and processed NTC thermistors suitable for suppressing high inrush currents in switching power supplies and other applications where the high initial starting currents are undesirable. Their unique design enables them to handle extremely high current and voltage levels. In a typical power supply application, the device is used in series with the filter capacitors. Upon application of the initial voltage, the device, due to its relatively high resistance, limits the current flow to an acceptable level until the capacitors are charged. Thereafter, the device decreases in resistance substantially to a level where the voltage drop across it is negligible.

Maximum Steady State Current (I_{max})
For power thermistors, the maximum continuous steady state current, either DC or RMS AC, which the device is capable of passing. The maximum steady state current for U.S. Sensor power thermistors is determined assuming a maximum operating ambient temperature of 65˚C. If a specific application requires ambient temperature operation above 65˚C, custom designed devices are available.



Resistance At Maximum Current (RI_{max})
For power thermistors, the approximate resistance of the device under maximum steady state current conditions.

Inrush Current Limiting Power Thermistors

Part Number	R_0 Resistance @ 25˚C ± 20% Ω	I_{max} Max. Steady State Current (Amps)	RI_{max} Resis. @ Max. Current Ω	Dim. "D" (Max. Over Coating)	Dim. "T" (Max. Over Coating)	Lead Dia. (Nom.)
ST1R020B	1.0	20	0.015	0.900"	0.300"	0.040"
ST1R030B	1.0	30	0.015	1.250"	0.250"	0.040"
ST2R018B	2.0	18	0.030	0.900"	0350"	0.040"
ST2R503B	2.5	3	0.150	0.600"	0.250"	0.032"
ST2R507B	2.5	7	0.050	0.600"	0.250"	0.032"
ST2R509B	2.5	9	0.040	0.600"	0.250"	0.032"
ST2R510B	2.5	10	0.040	0.900"	0.300"	0.040"
ST2R515B	2.5	15	0.030	0.900"	0.300"	0.040"
ST5R002B	5.0	2	0.400	0.600"	0.250"	0.032"
ST5R005B	5.0	5	0.100	0.600"	0.250"	0.032"
ST5R007B	5.0	7	0.070	0.600"	0.250"	0.032"
ST7R004B	7.0	4	0.200	0.600"	0.300"	0.040"
ST10003B	10.0	3	0.200	0.450"	0.300"	0.032"
ST10005B	10.0	5	0.200	0.600"	0.350"	0.040"
ST10006B	10.0	6	0.150	0.600"	0.350"	0.040"
ST10010B	10.0	10	0.100	1.250"	0.300"	0.040"
ST20002B	20.0	2	0.600	0.500"	0.300"	0.032"
ST40002B	40.0	2	0.600	0.625"	0.250"	0.032"

The circuit diagram above demonstrates a typical method to limit inrush current at turn on in a power supply. Two or more inrush current limiting devices may be used in series or in separate legs of the supply circuit. The devices may not be used in parallel since one will tend to pass nearly all the current available. U.S. Sensor's inrush current limiters may be used in either the AC or DC portions of the circuit.

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Thin Film
Platinum RTD's

U.S. Sensor's thin film platinum resistance temperature detectors (Pt-RTD) consist of a thin film platinum deposited on a ceramic substrate. Thin film Pt-RTD's provide cost advantages when compared to wire wound Pt-RTD's because of their lower material cost factor.

Features

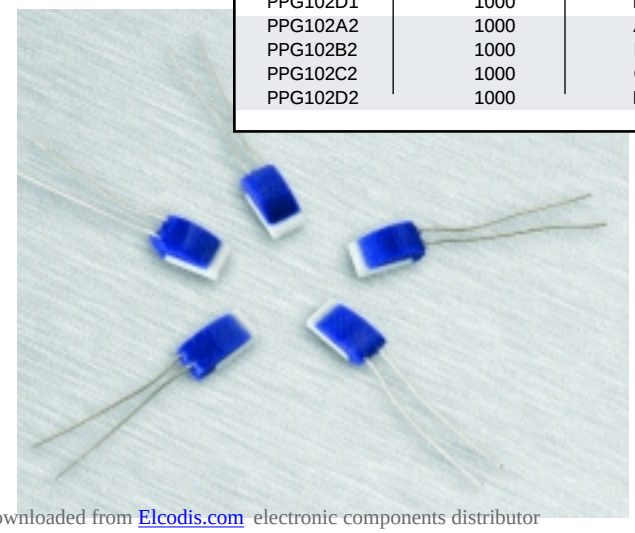
- Glass coated platinum element
- Virtually linear relationship between temperature and resistance
- Capable of withstanding temperatures ranging from -50˚C to +500˚C. Higher temperature ratings are available by special order
- High accuracy: Resistance and temperature deviation can be controlled to within ±0.06% and ±0.15˚C, a tolerance that corresponds to Class "A" of IEC 751 or 1/2 DIN of DIN 43760
- High Reliability: Capable of withstanding extreme environmental conditions
- Available in various probe configurations for specific applications
- Excellent stability even at high temperatures

Specifications

- Thermal time constant: 15 seconds max. (moving air)
- Dissipation constant: 2 mW/˚C (moving air)
- Maximum applied current: 1 mA

Thin Film Platinum RTD Elements

Part Number	Resistance Ω @ 0˚C	DIN 43760 Class	Resistance Tol. ± % @ 0˚C	Temp. Dev. ±˚C @ 0˚C	TCR ppm/˚C	Dim "W" (± 0.007")	Dim "L" (± 0.008")
PPG101A1	100	A	0.06	0.15	3850	0.067"	0.095"
PPG101B1	100	B	0.12	0.30	3850	0.067"	0.095"
PPG101C1	100	C	0.24	0.60	3850	0.067"	0.095"
PPG101D1	100	D	0.48	1.20	3850	0.067"	0.095"
PPG501A1	500	A	0.06	0.15	3850	0.079"	0.118"
PPG501B1	500	B	0.12	0.30	3850	0.079"	0.118"
PPG501C1	500	C	0.24	0.60	3850	0.079"	0.118"
PPG501D1	500	D	0.48	1.20	3850	0.079"	0.118"
PPG102A1	1000	A	0.06	0.15	3850	0.079"	0.118"
PPG102B1	1000	B	0.12	0.30	3850	0.079"	0.118"
PPG102C1	1000	C	0.24	0.60	3850	0.079"	0.118"
PPG102D1	1000	D	0.48	1.20	3850	0.079"	0.118"
PPG102A2	1000	A	0.06	0.15	3750	0.079"	0.118"
PPG102B2	1000	B	0.12	0.30	3750	0.079"	0.118"
PPG102C2	1000	C	0.24	0.60	3750	0.079"	0.118"
PPG102D2	1000	D	0.48	1.20	3750	0.079"	0.118"



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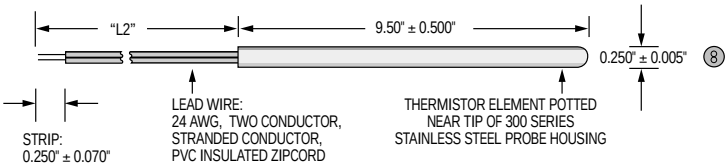
Calibrated
Thermistor Probes

U.S. Sensor's calibrated thermistor probes are manufactured with ultra high stability thermistor elements. This low cost high accuracy probe is provided with a NIST traceable calibration certificate with data points and a Resistance vs. Temperature (R/T) chart in 0.01˚C increments. The ultra high stability, precision, cost, and inherent ruggedness of this thermistor probe make it an excellent temperature standard for applications ranging from the metrology laboratory to the factory floor.

Features
- Excellent long term stability
- High accuracy
- Durable
- Low Cost
- NIST Traceability

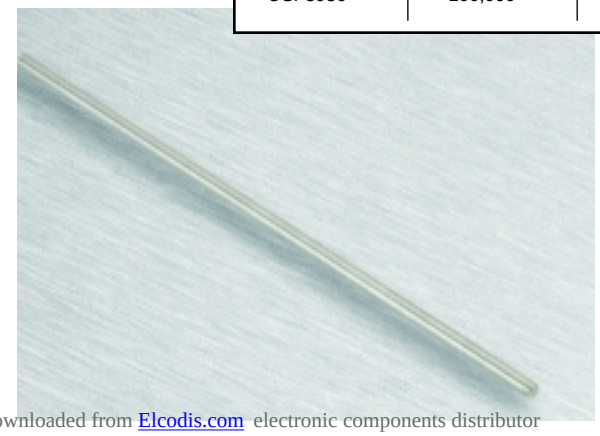


Options
- Custom temperature ranges
- Probe lengths and styles
- Fahrenheit calibration certificate

Specifications
- Accuracy: ±0.01˚C
- Typical Drift: less than 0.01˚C per year

Calibrated Thermistor Probes

Part Number	Nominal Resistance Ω @ 25˚C	Accuracy	Temperature Range
USP3021	10,000	0.01˚C	-20˚C to +70˚C
USP3986	100,000	0.01˚C	0 to +105˚C



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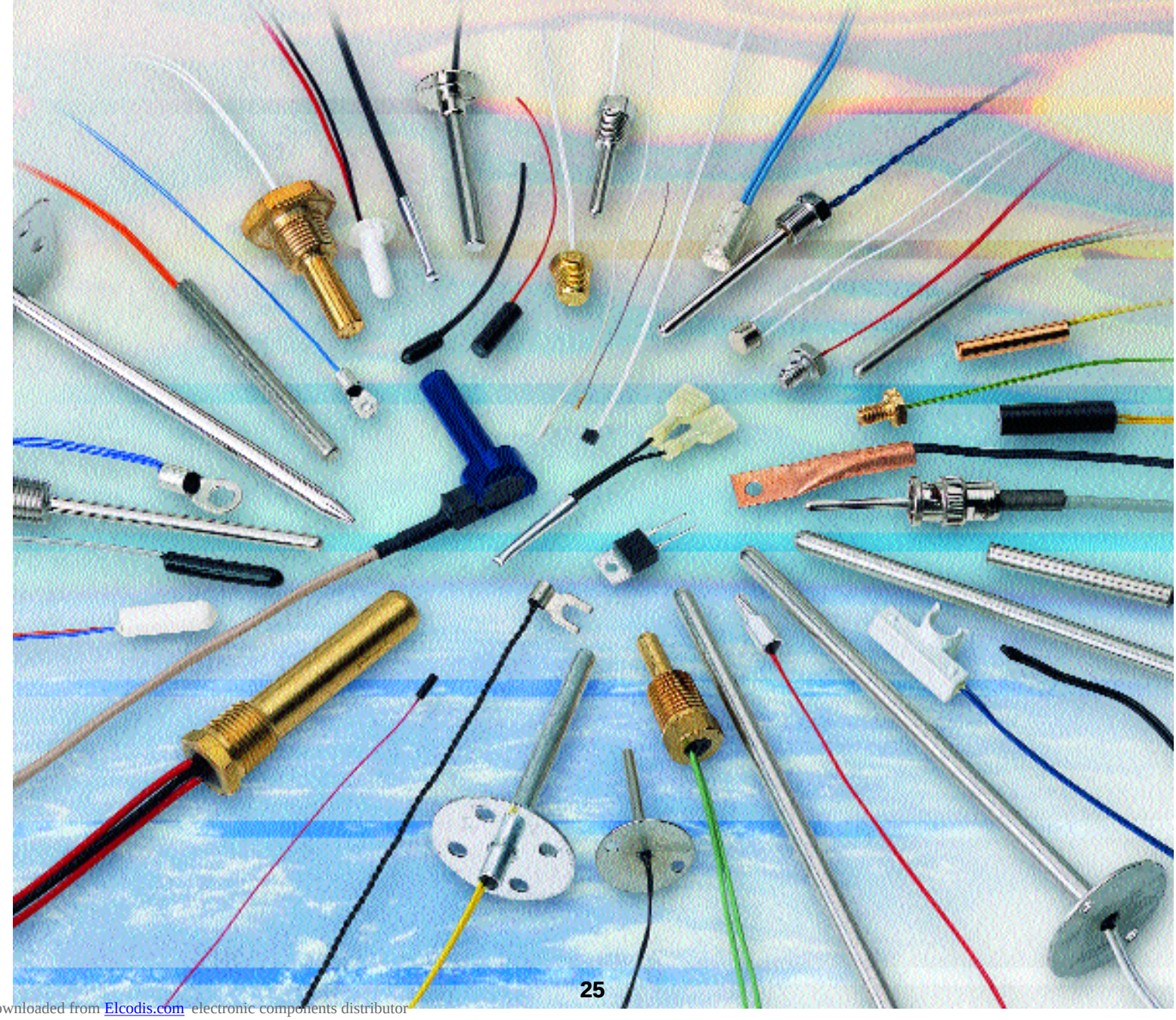
Thermistor and RTD Probe Assemblies

U.S. Sensor manufactures an extensive line of thermistor and RTD probes designed to meet the most demanding environmental applications. In most cases, the probe housings are available with various probe lengths as well as with a wide selection of lead wire materials and terminations.



Probe Assembly
Wire Termination Options

U.S. Sensor has automated equipment for attaching all major brands of wire terminals and connector housings. The photo below shows just a small sampling of our capabilities. Please contact U.S. Sensor's application engineering department for assistance in selecting the wire terminations for your application.

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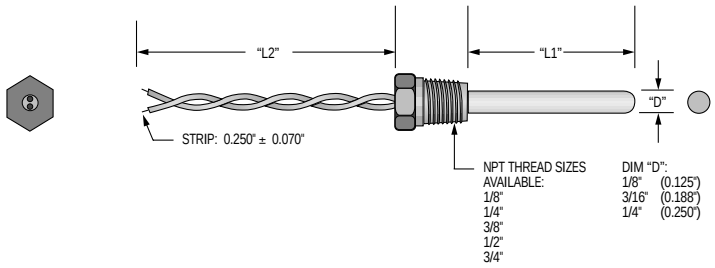
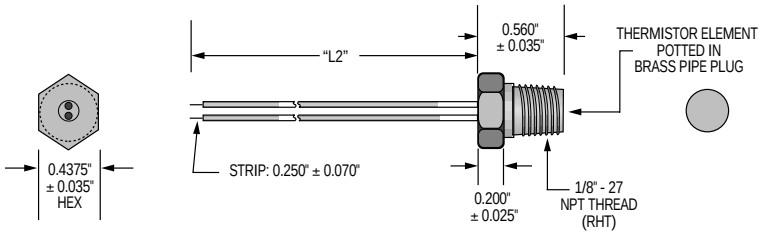
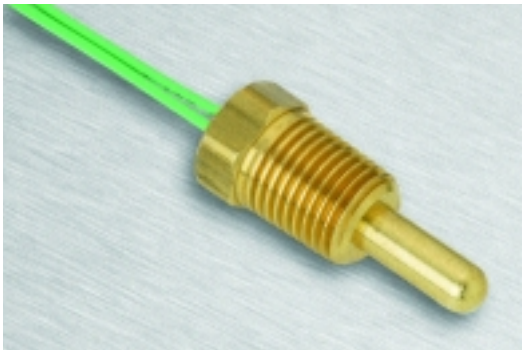
H2081 NPT Stainless Steel

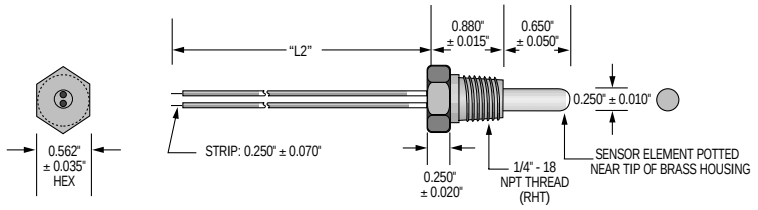


H3475 1/8" NPT Brass

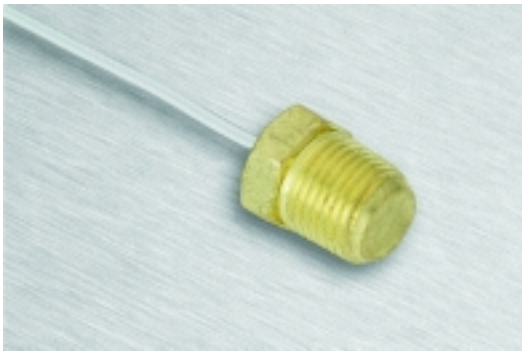


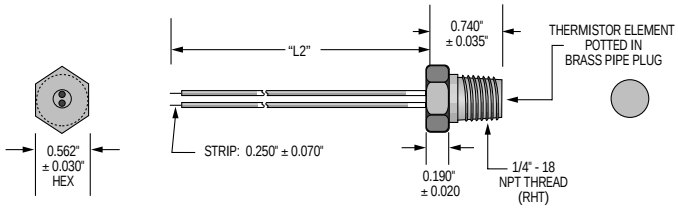
H2998 1/4" NPT Brass





H3476 1/4" NPT Brass





Dimensions "L1", "L2" and "D" are user selectable. Contact U.S. Sensor's application engineering department to design a probe assembly to best suit your use.

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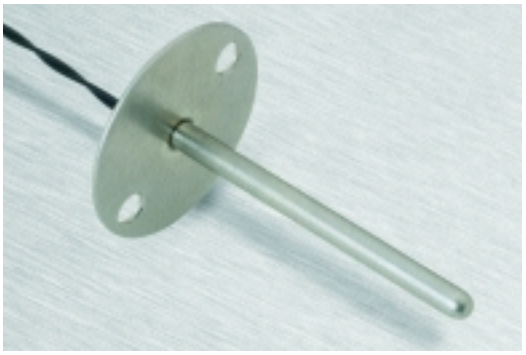
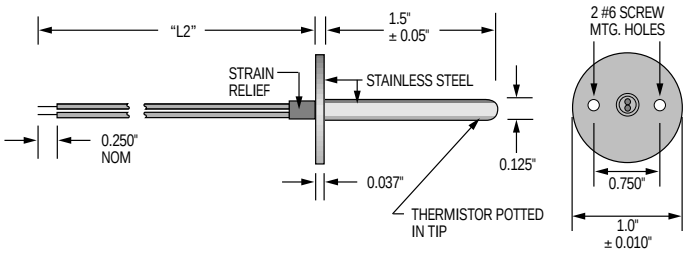
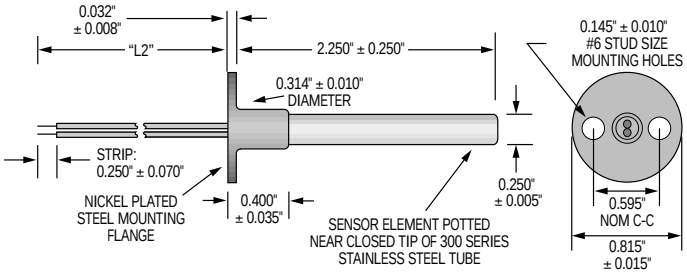
H1060 Stainless Steel, round flange

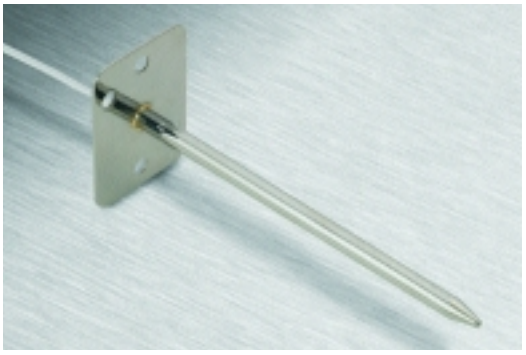


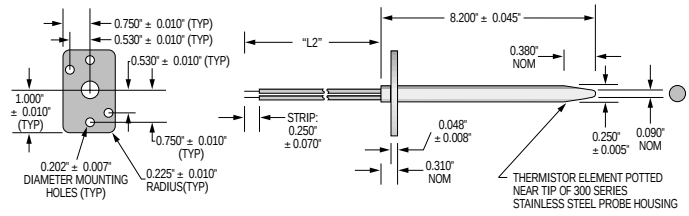


H3535 Stainless Steel, round flange

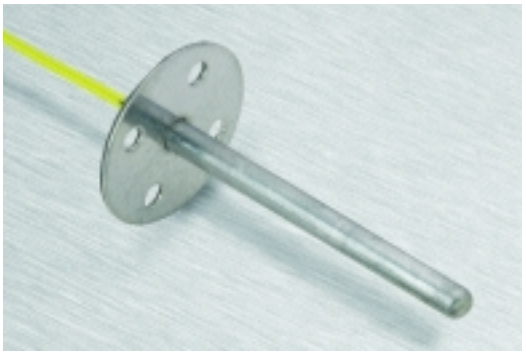


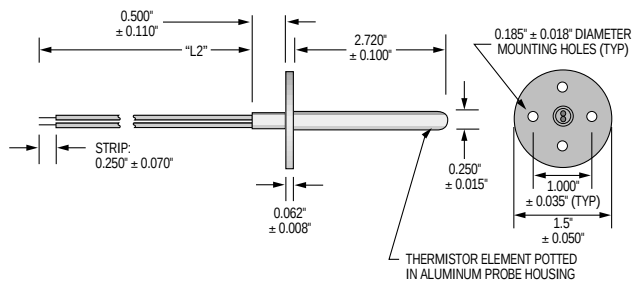
H3783 Stainless Steel, rectangle flange





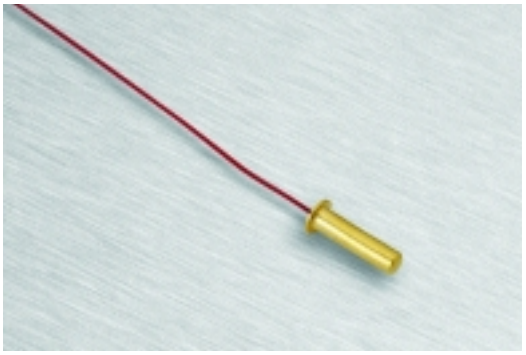
H3964 Stainless Steel, round flange

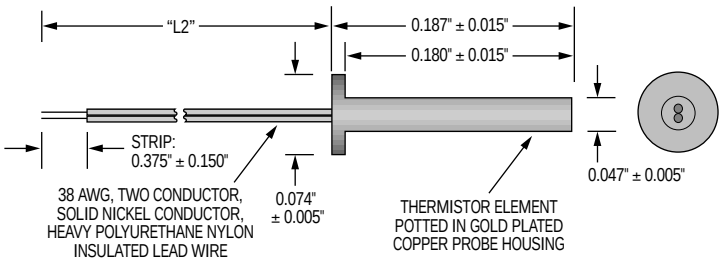




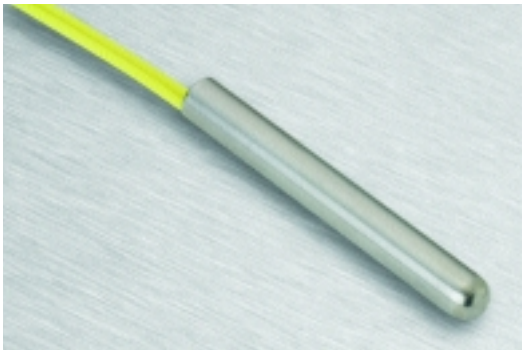
Dimensions "L1", "L2" and "D" are user selectable. Contact U.S. Sensor's application engineering department to design a probe assembly to best suit your use.

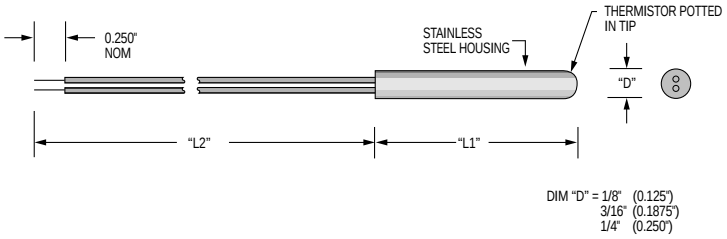
H3457 Fast response Micro-Probe



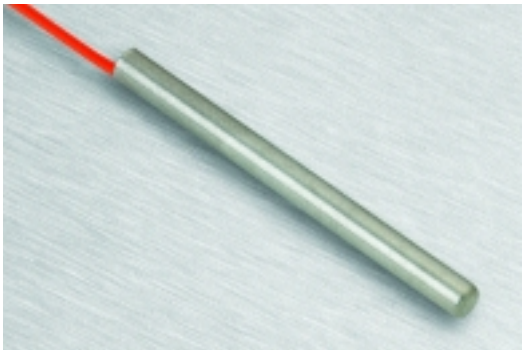


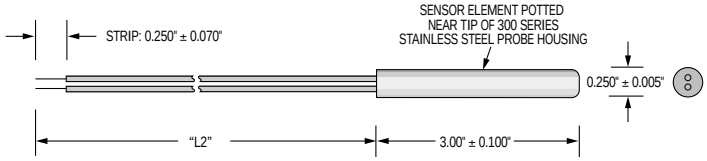
H2022 Stainless Steel



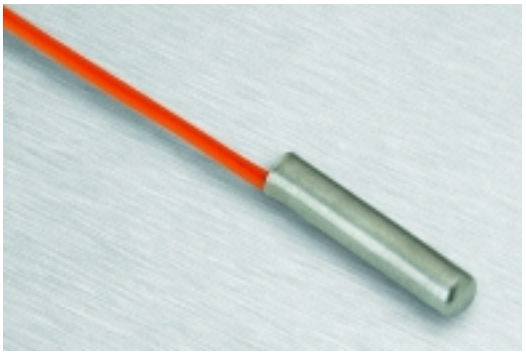


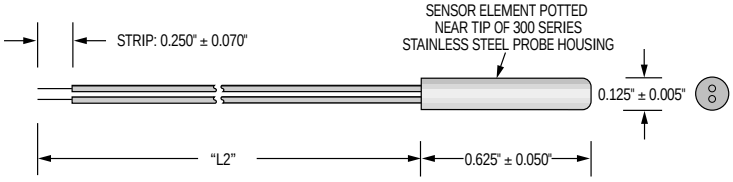
H2766 Stainless Steel





H3699 Stainless Steel





Dimensions "L1", "L2" and "D" are user selectable. Contact U.S. Sensor's application engineering department to design a probe assembly to best suit your use.

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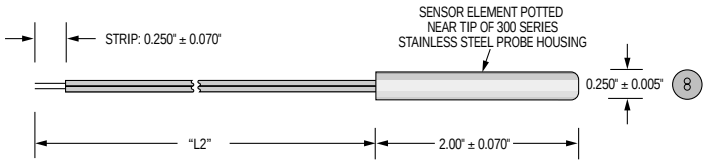
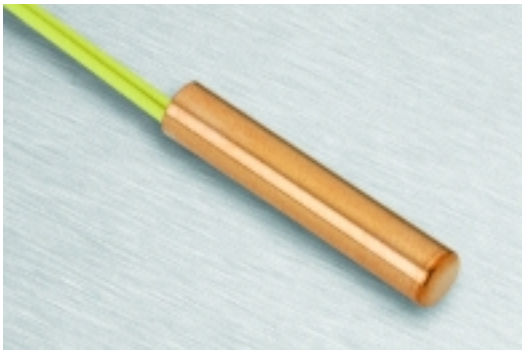
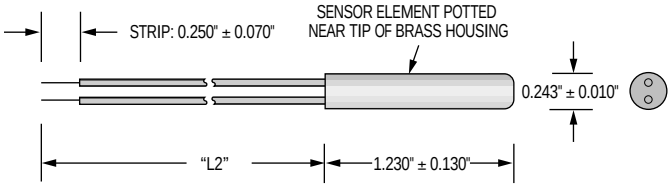
H3700 Stainless Steel

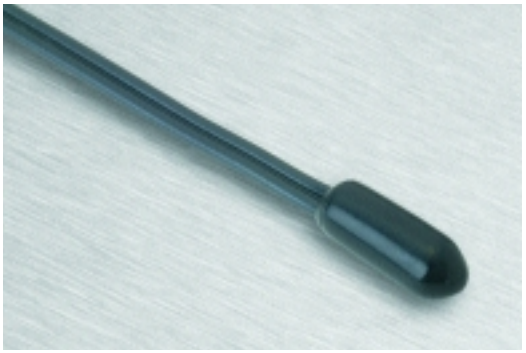


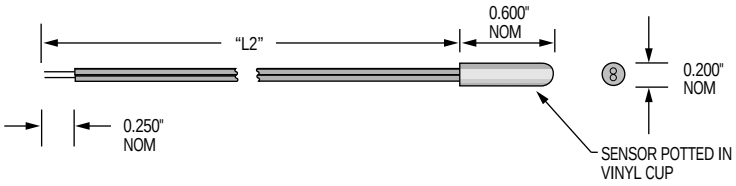
H3171 Brass



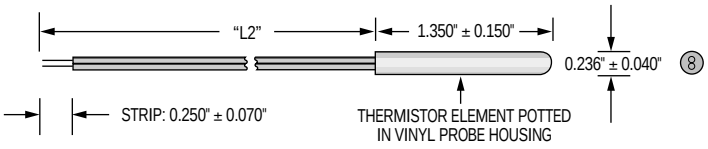


H0927 Vinyl





H3686 Vinyl



Dimensions "L1", "L2" and "D" are user selectable. Contact U.S. Sensor's application engineering department to design a probe assembly to best suit your use.

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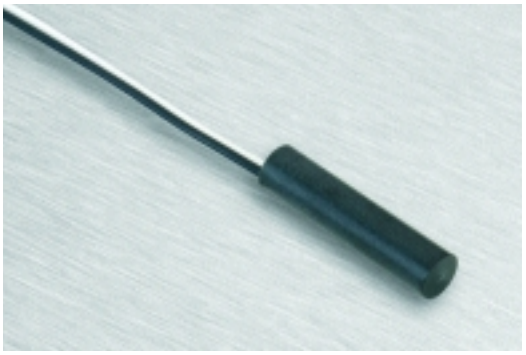
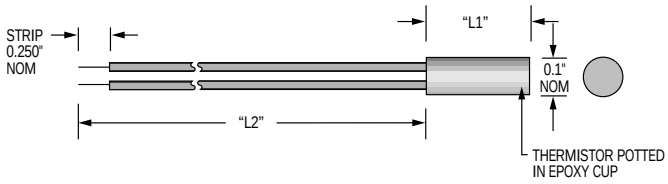
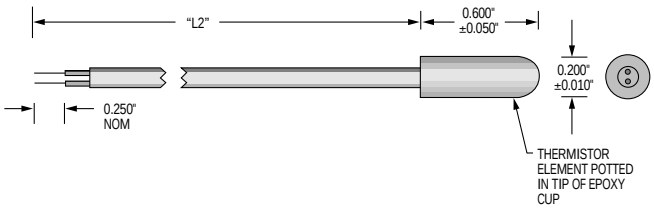
H0934 Epoxy

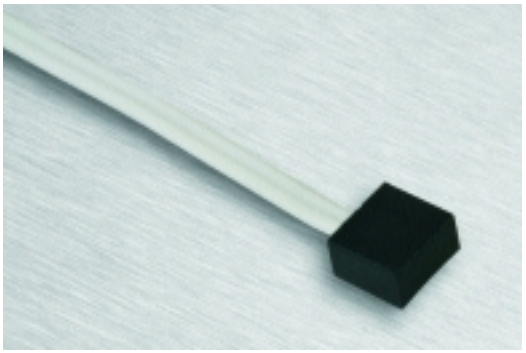


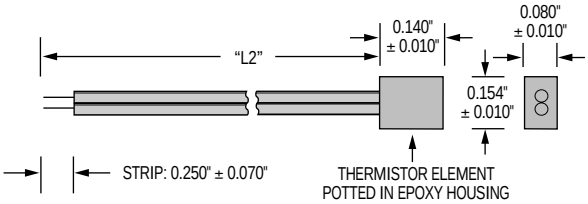


H1817 Epoxy

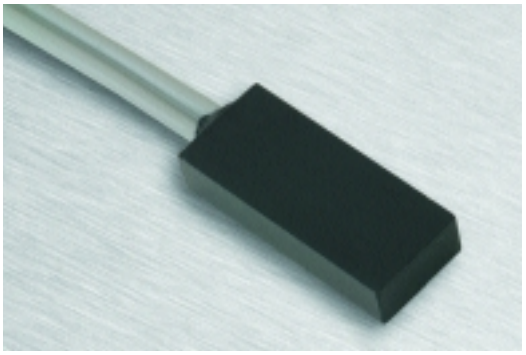


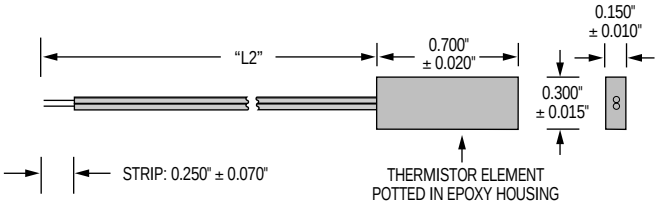
H2933 Epoxy





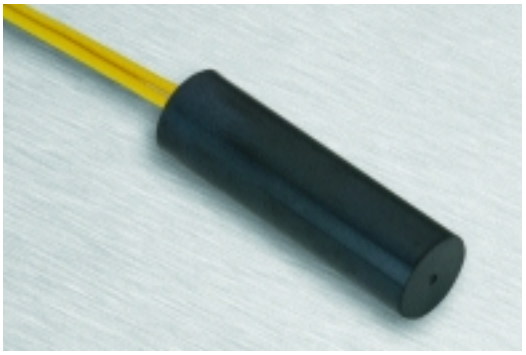
H3241 Epoxy

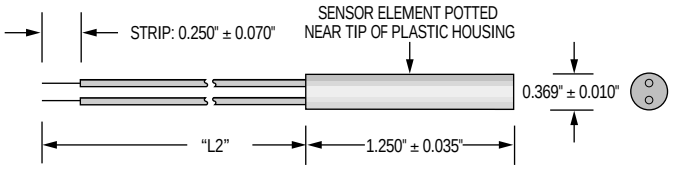




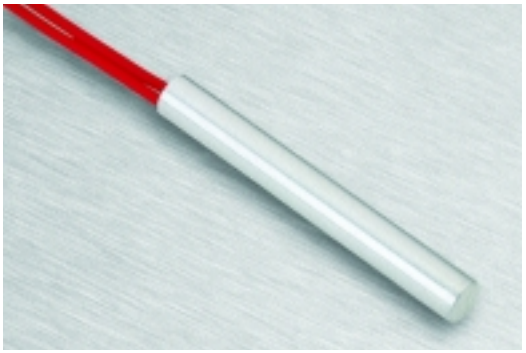
Dimensions "L1", "L2" and "D" are user selectable. Contact U.S. Sensor's application engineering department to design a probe assembly to best suit your use.

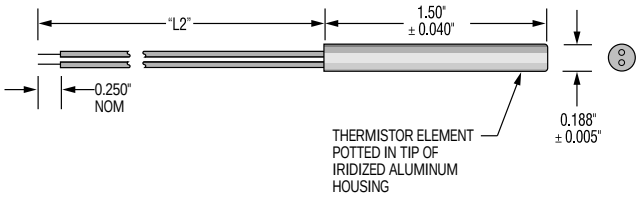
H3336 Plastic



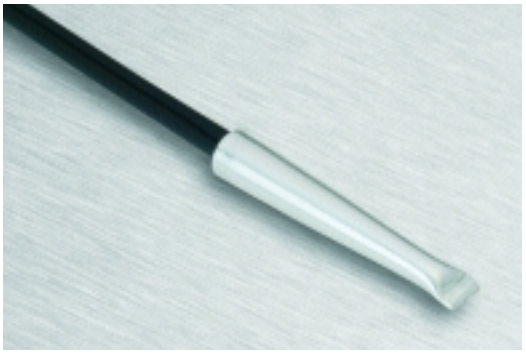


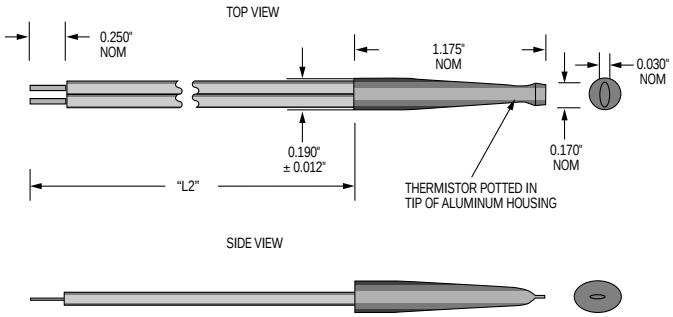
H1801 Aluminum



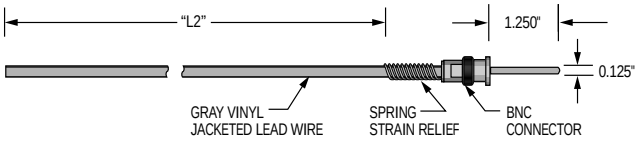


H2011 Pinched Aluminum



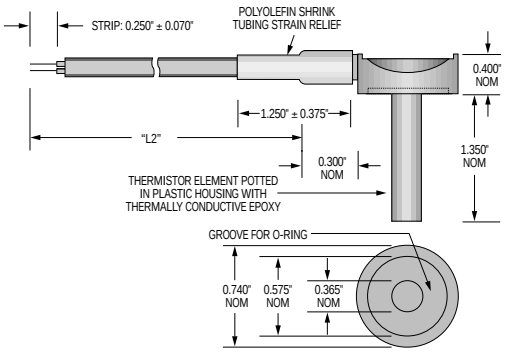


H2098 BNC Connector

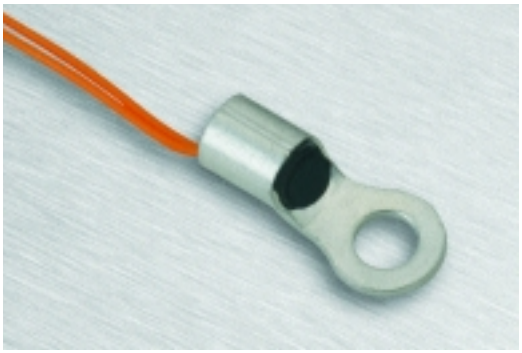


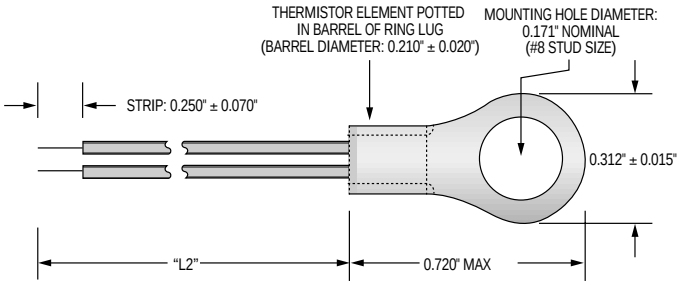
Dimensions "L1", "L2" and "D" are user selectable. Contact U.S. Sensor's application engineering department to design a probe assembly to best suit your use.

H3863 Plastic Housing

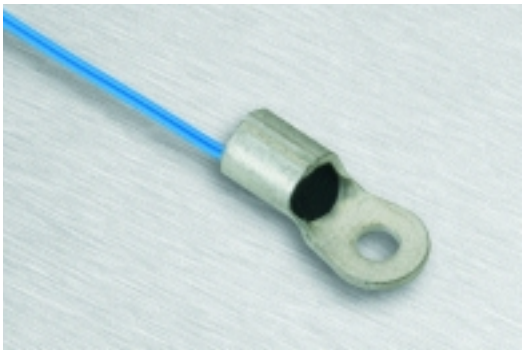


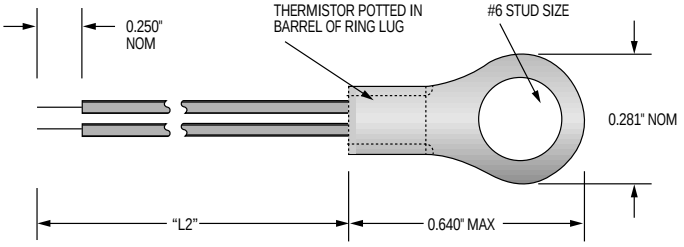
H2635 Ring Lug #8 Stud



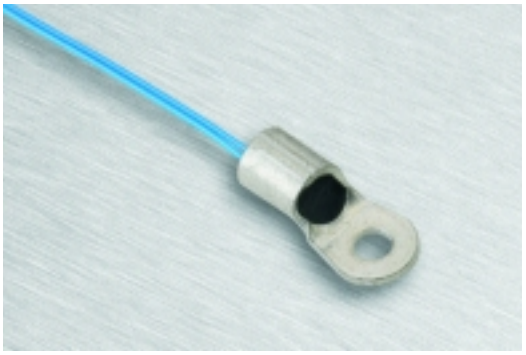


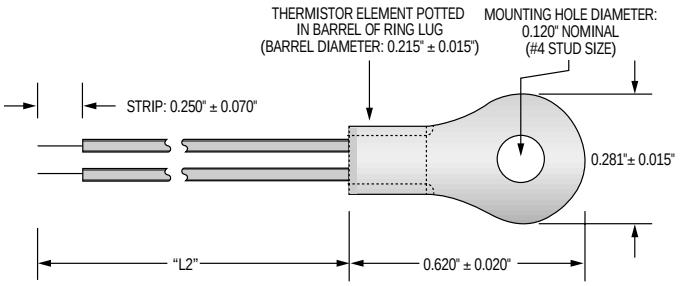
H1327 Ring Lug #6 Stud





H2946 Ring Lug #4 Stud





Dimensions "L1", "L2" and "D" are user selectable. Contact U.S. Sensor's application engineering department to design a probe assembly to best suit your use.

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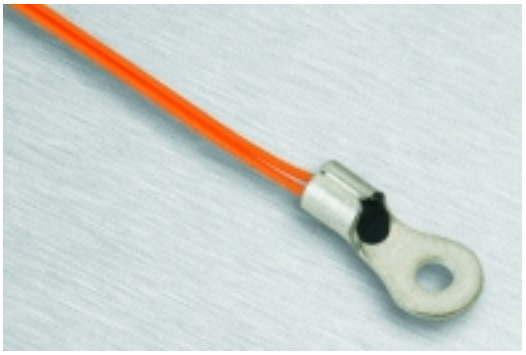
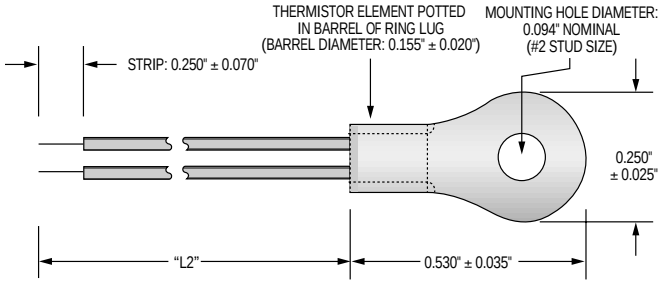
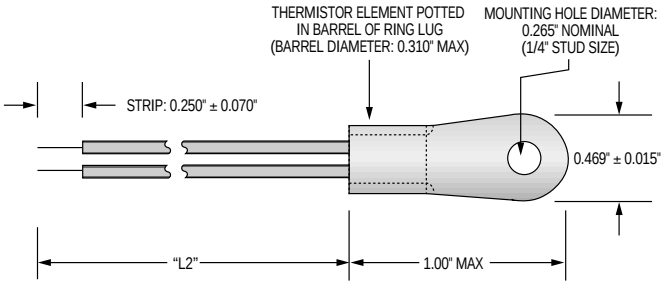
H3011 Ring Lug #2 Stud

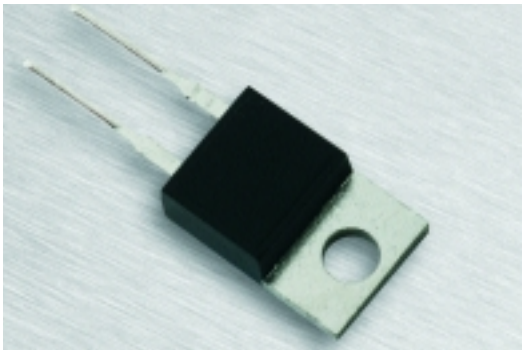


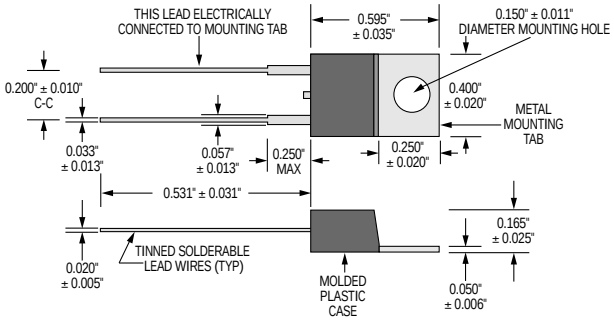


H3390 Ring Lug 1/4" Stud

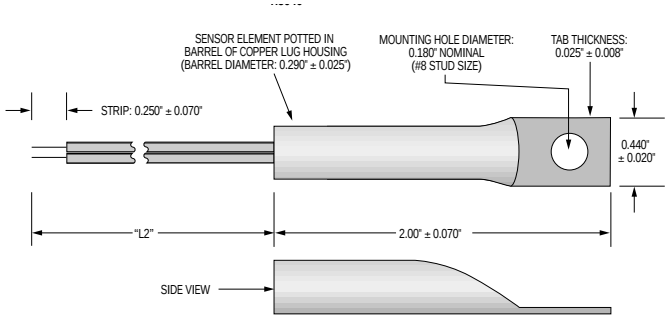


H0220 T0220 Package





H3646 Copper Lug



Dimensions "L1", "L2" and "D" are user selectable. Contact U.S. Sensor's application engineering department to design a probe assembly to best suit your use.

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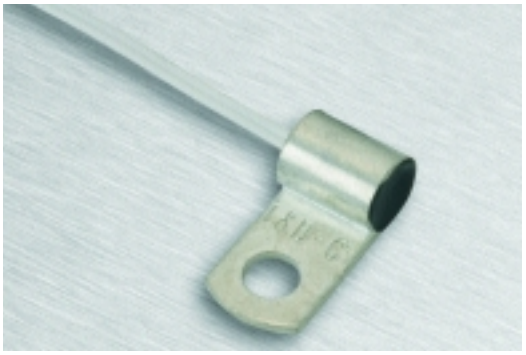
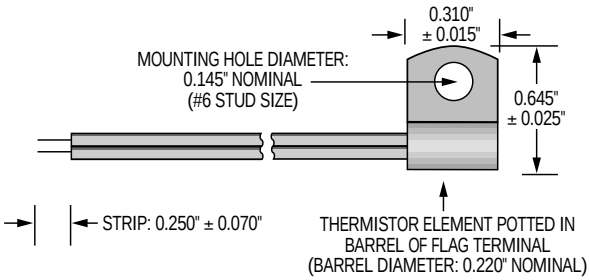
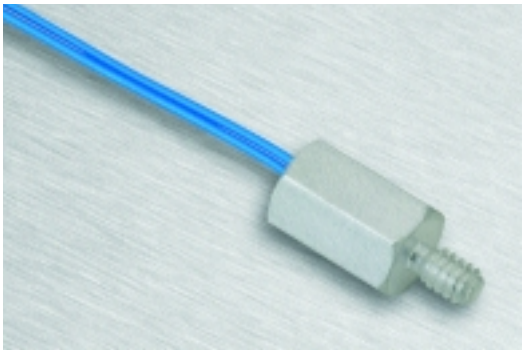
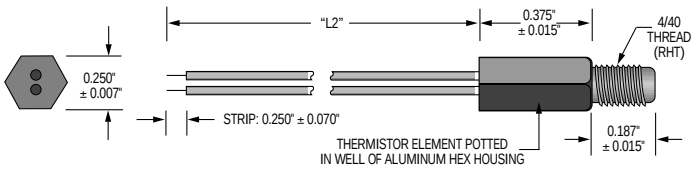
H2965 Flag Terminal #6 Stud



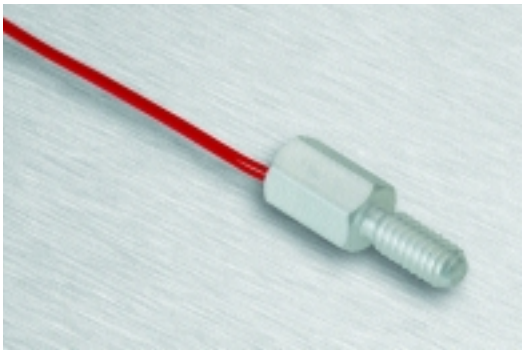


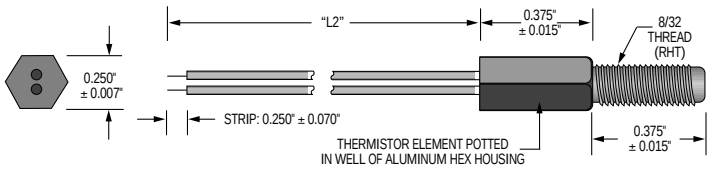
H3123 Aluminum Hex 4/40 Thread



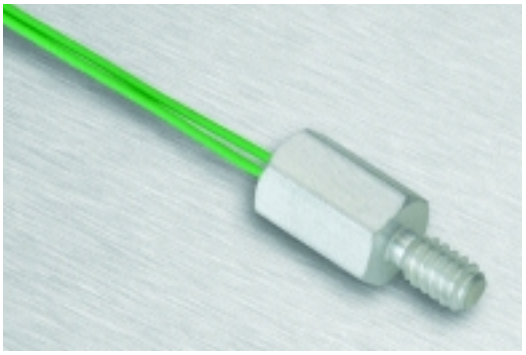


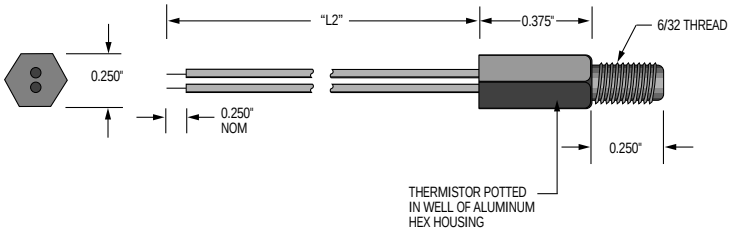
H2867 Aluminum Hex 8/32 Thread





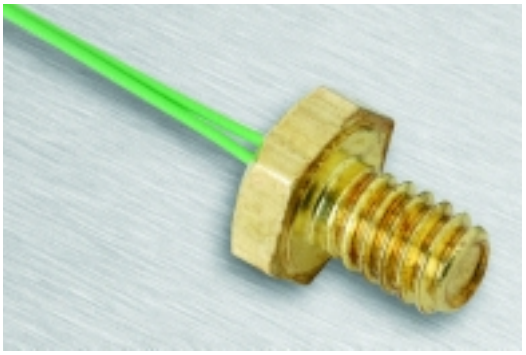
H1887 Aluminum Hex 6/32 Thread

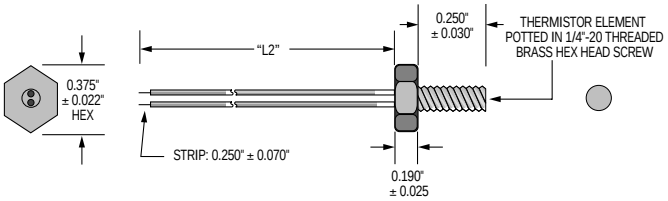




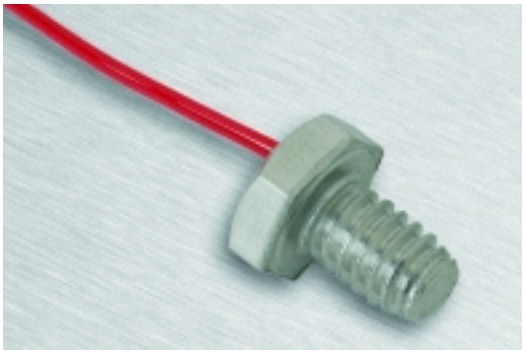
Dimensions "L1", "L2" and "D" are user selectable. Contact U.S. Sensor's application engineering department to design a probe assembly to best suit your use.

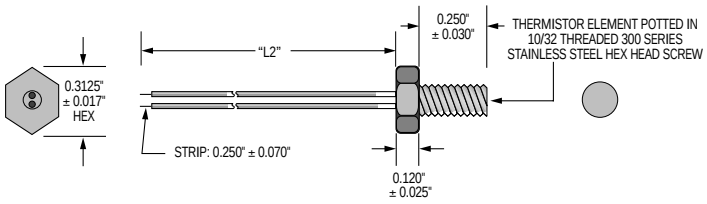
H3433 Brass Hex 1/4"



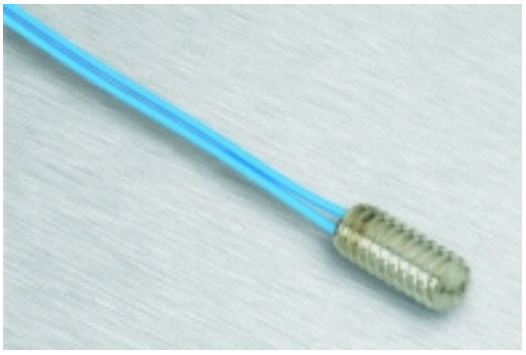


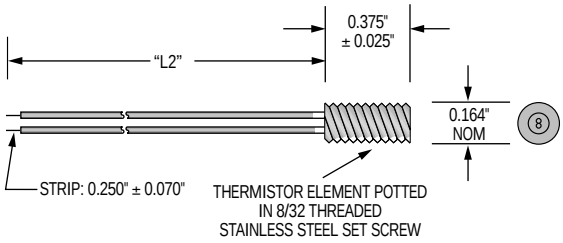
H3432 S/S Hex 10/32 Thread



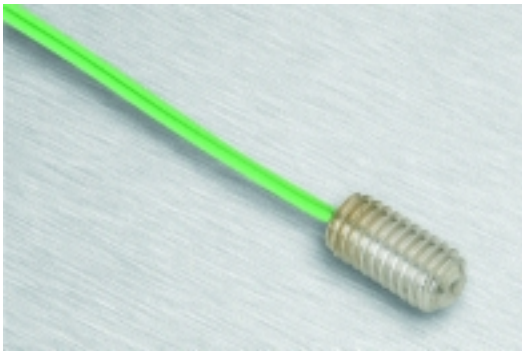


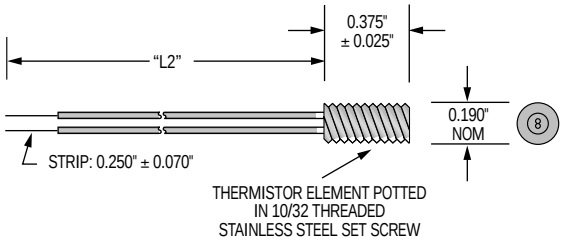
H3134 S/S Set Screw 8/32





H3135 S/S Set Screw 10/32





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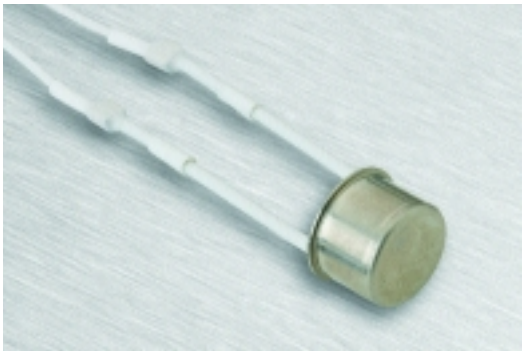
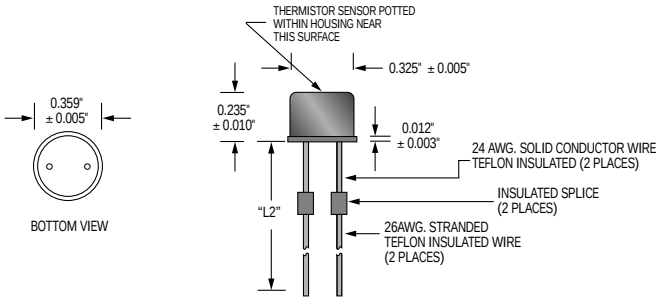
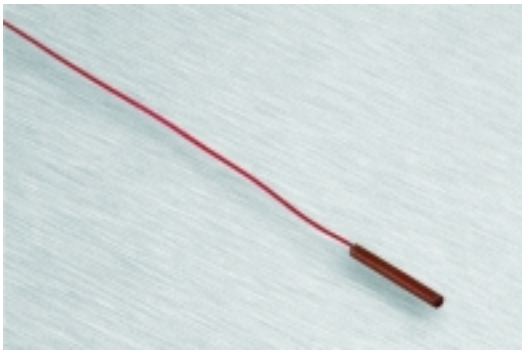
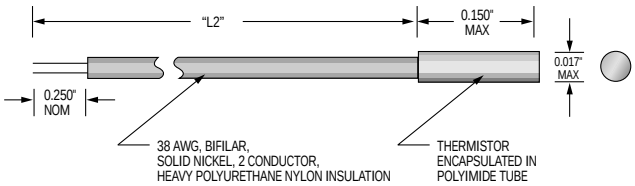
H1917 High Temperature



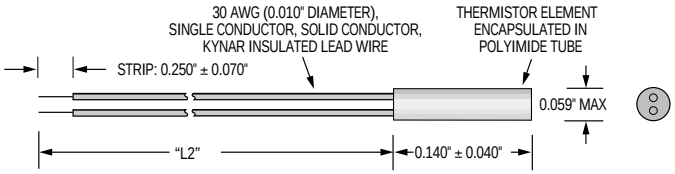


H1744 Polyimide 0.017" Diameter

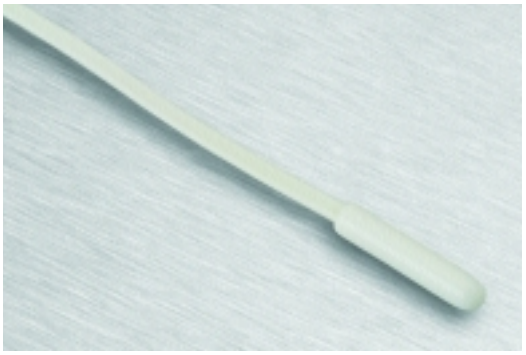


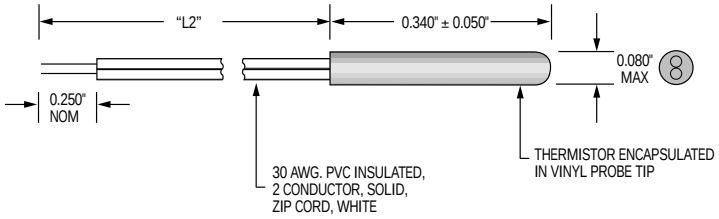


H3192 Polyimide 0.059" Diameter



H2010 Vinyl





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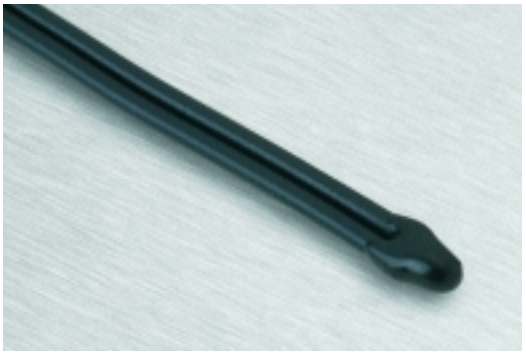
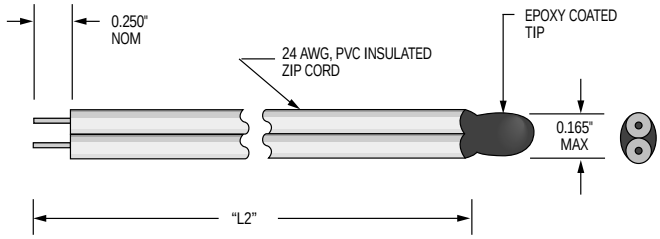
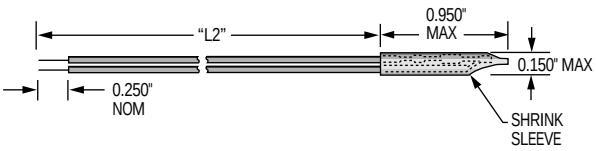
H1492 Epoxy Dip





H2049 Shrink Sleeve



Dimensions "L1", "L2" and "D" are user selectable. Contact U.S. Sensor's application engineering department to design a probe assembly to best suit your use.

In addition to the products pictured in the previous pages, U.S. Sensor manufactures numerous custom thermistor probes and assemblies. Please contact U.S. Sensor's engineering department for assistance in designing a temperature sensing probe best suited to your specific application.

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U.S.SENSOR

Thermistor Resistance Versus Temperature Conversion Tables

The following pages contain the resistance versus temperature tables for all U.S. Sensor standard catalog thermistors. U.S. Sensor manufactures numerous thermistors with non-standard characteristics to suit particular applications. If you require a "Custom" resistance versus temperature characteristic, please contact U.S. Sensor's application engineering department. All U.S. Sensor resistance versus temperature tables are available printed in degrees Fahrenheit or in degrees Celsius. In addition, tables covering extended temperature ranges are also available.

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Precision Interchangeable Thermistor Tables

1,000 Ω @ 25°C Curve "J"

Beta 0-50°C: 3890 | R Ratio R_0/R_{50}°C: 9.065

Temp. °C	R Ω	Temp. °C	R Ω	Temp. °C	R Ω
-55	96,385	14	1,647	83	114.1
-54	89,533	15	1,571	84	110.5
-53	83,213	16	1,500	85	107.1
-52	77,380	17	1,433	86	103.8
-51	71,993	18	1,368	87	100.6
-50	67,017	19	1,307	88	97.47
-49	62,416	20	1,249	89	94.49
-48	58,160	21	1,194	90	91.62
-47	54,222	22	1,142	91	88.85
-46	50,576	23	1,092	92	86.18
-45	47,198	24	1,045	93	83.60
-44	44,068	25	1,000	94	81.11
-43	41,165	26	957.3	95	78.70
-42	38,471	27	916.6	96	76.38
-41	35,971	28	877.8	97	74.14
-40	33,649	29	840.9	98	71.97
-39	31,491	30	805.7	99	69.88
-38	29,485	31	772.2	100	67.86
-37	27,620	32	740.2	101	65.87
-36	25,884	33	709.8	102	63.99
-35	24,268	34	680.8	103	62.17
-34	22,764	35	653.1	104	60.41
-33	21,361	36	626.7	105	58.71
-32	20,054	37	601.5	106	57.07
-31	18,835	38	577.4	107	55.48
-30	17,697	39	554.5	108	53.94
-29	16,636	40	532.6	109	52.46
-28	15,644	41	511.6	110	51.02
-27	14,718	42	491.6	111	49.63
-26	13,852	43	472.5	112	48.28
-25	13,042	44	454.2	113	46.98
-24	12,285	45	436.8	114	45.72
-23	11,576	46	420.1	115	44.50
-22	10,912	47	404.1	116	43.31
-21	10,290	48	388.8	117	42.17
-20	9,708	49	374.2	118	41.06
-19	9,162	50	360.2	119	39.98
-18	8,650	51	346.8	120	38.94
-17	8,170	52	333.9	121	37.93
-16	7,719	53	321.6	122	36.95
-15	7,296	54	309.9	123	36.00
-14	6,898	55	298.6	124	35.08
-13	6,525	56	287.8	125	34.19
-12	6,174	57	277.4	126	33.32
-11	5,844	58	267.4	127	32.48
-10	5,533	59	257.9	128	31.66
-9	5,241	60	248.8	129	30.87
-8	4,966	61	240.0	130	30.10
-7	4,707	62	231.6	131	29.36
-6	4,463	63	223.5	132	28.64
-5	4,233	64	215.7	133	27.93
-4	4,016	65	208.3	134	27.25
-3	3,812	66	201.1	135	26.59
-2	3,619	67	194.2	136	25.94
-1	3,437	68	187.6	137	25.32
0	3,265	69	181.3	138	24.71
1	3,103	70	175.2	139	24.12
2	2,950	71	169.3	140	23.54
3	2,805	72	163.7	141	22.99
4	2,669	73	158.3	142	22.44
5	2,540	74	153.1	143	21.92
6	2,417	75	148.0	144	21.40
7	2,302	76	143.2	145	20.90
8	2,192	77	138.6	146	20.42
9	2,089	78	134.1	147	19.95
10	1,990	79	129.8	148	19.49
11	1,897	80	125.6	149	19.04
12	1,809	81	121.6	150	18.60
13	1,726	82	117.8		

2,252 Ω @ 25°C Curve "J"

Beta 0-50°C: 3890 | R Ratio R_0/R_{50}°C: 9.065

Temp. °C	R Ω	Temp. °C	R Ω	Temp. °C	R Ω
-55	217,059	14	3,708	83	256.9
-54	201,629	15	3,539	84	248.9
-53	187,396	16	3,378	85	241.1
-52	174,260	17	3,226	86	233.7
-51	162,129	18	3,081	87	226.4
-50	150,921	19	2,944	88	219.5
-49	140,561	20	2,814	89	212.8
-48	130,977	21	2,690	90	206.3
-47	122,109	22	2,572	91	200.1
-46	113,898	23	2,460	92	194.1
-45	106,291	24	2,353	93	188.3
-44	99,241	25	2,252	94	182.7
-43	92,703	26	2,156	95	177.2
-42	86,637	27	2,064	96	172.0
-41	81,006	28	1,977	97	167.0
-40	75,777	29	1,894	98	162.1
-39	70,918	30	1,814	99	157.4
-38	66,401	31	1,739	100	152.8
-37	62,200	32	1,667	101	148.3
-36	58,292	33	1,598	102	144.1
-35	54,653	34	1,533	103	140.0
-34	51,264	35	1,471	104	136.0
-33	48,106	36	1,411	105	132.2
-32	45,162	37	1,355	106	128.5
-31	42,416	38	1,300	107	124.9
-30	39,855	39	1,249	108	121.5
-29	37,463	40	1,199	109	118.1
-28	35,230	41	1,152	110	114.9
-27	33,144	42	1,107	111	111.8
-26	31,194	43	1,064	112	108.7
-25	29,371	44	1,023	113	105.8
-24	27,665	45	983.6	114	103.0
-23	26,069	46	946.0	115	100.2
-22	24,574	47	910.0	116	97.54
-21	23,174	48	875.6	117	94.96
-20	21,862	49	842.6	118	92.46
-19	20,633	50	811.1	119	90.04
-18	19,480	51	780.9	120	87.69
-17	18,398	52	752.0	121	85.42
-16	17,383	53	724.3	122	83.21
-15	16,430	54	697.8	123	81.07
-14	15,535	55	672.4	124	79.00
-13	14,694	56	648.0	125	76.99
-12	13,903	57	624.7	126	75.04
-11	13,160	58	602.3	127	73.14
-10	12,461	59	580.8	128	71.31
-9	11,803	60	560.2	129	69.53
-8	11,183	61	540.5	130	67.80
-7	10,600	62	521.5	131	66.12
-6	10,051	63	503.3	132	64.49
-5	9,533	64	485.8	133	62.90
-4	9,045	65	469.0	134	61.37
-3	8,585	66	452.9	135	59.87
-2	8,151	67	437.4	136	58.42
-1	7,741	68	422.6	137	57.01
0	7,353	69	408.3	138	55.65
1	6,988	70	394.6	139	54.31
2	6,643	71	381.3	140	53.02
3	6,318	72	368.6	141	51.76
4	6,010	73	356.4	142	50.54
5	5,719	74	344.7	143	49.35
6	5,444	75	333.4	144	48.20
7	5,183	76	322.5	145	47.08
8	4,937	77	312.1	146	45.98
9	4,703	78	302.0	147	44.92
10	4,482	79	292.3	148	43.88
11	4,273	80	282.9	149	42.88
12	4,075	81	273.9	150	41.90
13	3,886	82	265.3		

3,000 Ω @ 25°C Curve "J"

Beta 0-50°C: 3890 | R Ratio R_0/R_{50}°C: 9.065

Temp. °C	R Ω	Temp. °C	R Ω	Temp. °C	R Ω
-55	289,155	14	4,940	83	342.3
-54	268,599	15	4,714	84	331.6
-53	249,639	16	4,501	85	321.2
-52	232,140	17	4,298	86	311.3
-51	215,980	18	4,105	87	301.7
-50	201,050	19	3,922	88	292.4
-49	187,248	20	3,748	89	283.5
-48	174,481	21	3,583	90	274.9
-47	162,667	22	3,426	91	266.6
-46	151,729	23	3,277	92	258.5
-45	141,595	24	3,135	93	250.8
-44	132,203	25	3,000	94	243.3
-43	123,494	26	2,872	95	236.1
-42	115,413	27	2,750	96	229.1
-41	107,912	28	2,633	97	222.4
-40	100,946	29	2,523	98	215.9
-39	94,473	30	2,417	99	209.6
-38	88,456	31	2,317	100	203.6
-37	82,860	32	2,221	101	197.6
-36	77,653	33	2,129	102	192.0
-35	72,805	34	2,042	103	186.5
-34	68,291	35	1,959	104	181.2
-33	64,084	36	1,880	105	176.1
-32	60,162	37	1,804	106	171.2
-31	56,505	38	1,732	107	166.4
-30	53,092	39	1,663	108	161.8
-29	49,907	40	1,598	109	157.4
-28	46,932	41	1,535	110	153.1
-27	44,153	42	1,475	111	148.9
-26	41,555	43	1,418	112	144.8
-25	39,126	44	1,363	113	140.9
-24	36,854	45	1,310	114	137.1
-23	34,727	46	1,260	115	133.5
-22	32,736	47	1,212	116	129.9
-21	30,871	48	1,166	117	126.5
-20	29,124	49	1,122	118	123.2
-19	27,486	50	1,080	119	119.9
-18	25,950	51	1,040	120	116.8
-17	24,509	52	1,002	121	113.8
-16	23,157	53	964.9	122	110.8
-15	21,887	54	929.6	123	108.0
-14	20,695	55	895.7	124	105.2
-13	19,574	56	863.3	125	102.6
-12	18,521	57	832.1	126	99.96
-11	17,531	58	802.3	127	97.44
-10	16,600	59	773.7	128	94.99
-9	15,723	60	746.3	129	92.62
-8	14,898	61	720.0	130	90.31
-7	14,121	62	694.7	131	88.08
-6	13,389	63	670.5	132	85.91
-5	12,699	64	647.2	133	83.80
-4	12,049	65	624.8	134	81.75
-3	11,436	66	603.4	135	79.76
-2	10,858	67	582.7	136	77.83
-1	10,312	68	562.9	137	75.95
0	9,795	69	543.9	138	74.13
1	9,309	70	525.6	139	72.36
2	8,850	71	508.0	140	70.63
3	8,416	72	491.1	141	68.96
4	8,006	73	474.8	142	67.33
5	7,619	74	459.2	143	65.75
6	7,252	75	444.1	144	64.21
7	6,905	76	429.6	145	62.71
8	6,577	77	415.7	146	61.25
9	6,266	78	402.3	147	59.84
10	5,971	79	389.4	148	58.46
11	5,692	80	376.9	149	57.12
12	5,428	81	364.9	150	55.81
13	5,177	82	353.4		

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Precision Interchangeable Thermistor Tables

5,000 Ω @ 25°C Curve "J"

Beta 0-50°C: 3890 | R Ratio R_0/R_{50}°C: 9.065

Temp. °C	R Ω	Temp. °C	R Ω	Temp. °C	R Ω
-55	481,925	14	8,233	83	570.4
-54	447,666	15	7,857	84	552.6
-53	416,065	16	7,501	85	535.4
-52	386,899	17	7,163	86	518.8
-51	359,967	18	6,842	87	502.8
-50	335,083	19	6,537	88	487.3
-49	312,079	20	6,247	89	472.5
-48	290,802	21	5,972	90	458.1
-47	271,112	22	5,710	91	444.3
-46	252,881	23	5,462	92	430.9
-45	235,992	24	5,225	93	418.0
-44	220,339	25	5,000	94	405.5
-43	205,823	26	4,786	95	393.5
-42	192,355	27	4,583	96	381.9
-41	179,854	28	4,389	97	370.7
-40	168,243	29	4,204	98	359.9
-39	157,456	30	4,028	99	349.4
-38	147,427	31	3,861	100	339.3
-37	138,100	32	3,701	101	329.4
-36	129,422	33	3,549	102	319.9
-35	121,342	34	3,404	103	310.8
-34	113,818	35	3,265	104	302.0
-33	106,807	36	3,133	105	293.5
-32	100,271	37	3,007	106	285.3
-31	94,175	38	2,887	107	277.4
-30	88,487	39	2,772	108	269.7
-29	83,178	40	2,663	109	262.3
-28	78,220	41	2,558	110	255.1
-27	73,588	42	2,458	111	248.1
-26	69,258	43	2,363	112	241.4
-25	65,210	44	2,271	113	234.9
-24	61,423	45	2,184	114	228.6
-23	57,879	46	2,100	115	222.5
-22	54,560	47	2,020	116	216.6
-21	51,452	48	1,944	117	210.8
-20	48,540	49	1,871	118	205.3
-19	45,810	50	1,801	119	199.9
-18	43,250	51	1,734	120	194.7
-17	40,849	52	1,670	121	189.6
-16	38,595	53	1,608	122	184.7
-15	36,479	54	1,549	123	180.0
-14	34,491	55	1,493	124	175.4
-13	32,624	56	1,439	125	170.9
-12	30,869	57	1,387	126	166.6
-11	29,218	58	1,337	127	162.4
-10	27,666	59	1,290	128	158.3
-9	26,205	60	1,244	129	154.4
-8	24,830	61	1,200	130	150.5
-7	23,535	62	1,158	131	146.8
-6	22,315	63	1,117	132	143.2
-5	21,166	64	1,079	133	139.7
-4	20,082	65	1,041	134	136.3
-3	19,060	66	1,006	135	132.9
-2	18,097	67	971.2	136	129.7
-1	17,187	68	938.2	137	126.6
0	16,325	69	906.5	138	123.5
1	15,515	70	876.0	139	120.6
2	14,750	71	846.7	140	117.7
3	14,027	72	818.5	141	114.9
4	13,344	73	791.4	142	112.2
5	12,698	74	765.3	143	109.6
6	12,087	75	740.2	144	107.0
7	11,508	76	716.1	145	104.5
8	10,961	77	692.8	146	102.1
9	10,443	78	670.5	147	99.73
10	9,952	79	648.9	148	97.43
11	9,487	80	628.2	149	95.20
12	9,047	81	608.2	150	93.02
13	8,629	82	589.0		

6,000 Ω @ 25°C Curve "J"

Beta 0-50°C: 3890 | R Ratio R_0/R_{50}°C: 9.065

Temp. °C	R Ω	Temp. °C	R Ω	Temp. °C	R Ω
-55	578,310	14	9,880	83	684.5
-54	537,199	15	9,429	84	663.1
-53	499,278	16	9,001	85	642.4
-52	464,279	17	8,595	86	622.5
-51	431,960	18	8,210	87	603.3
-50	402,100	19	7,844	88	584.8
-49	374,495	20	7,497	89	566.9
-48	348,963	21	7,166	90	549.7
-47	325,335	22	6,853	91	533.1
-46	303,458	23	6,554	92	517.1
-45	283,191	24	6,270	93	501.6
-44	264,407	25	6,000	94	486.6
-43	246,987	26	5,744	95	472.2
-42	230,826	27	5,499	96	458.3
-41	215,824	28	5,267	97	444.8
-40	201,892	29	5,045	98	431.8
-39	188,947	30	4,834	99	419.3
-38	176,913	31	4,633	100	407.2
-37	165,720	32	4,441	101	395.2
-36	155,306	33	4,259	102	383.9
-35	145,611	34	4,085	103	373.0
-34	136,581	35	3,919	104	362.5
-33	128,168	36	3,760	105	352.3
-32	120,325	37	3,609	106	342.4
-31	113,010	38	3,465	107	332.9
-30	106,185	39	3,327	108	323.6
-29	99,814	40	3,195	109	314.7
-28	93,864	41	3,070	110	306.1
-27	88,306	42	2,950	111	297.8
-26	83,110	43	2,835	112	289.7
-25	78,252	44	2,725	113	281.9
-24	73,707	45	2,621	114	274.3
-23	69,454	46	2,520	115	267.0
-22	65,472	47	2,424	116	259.9
-21	61,743	48	2,333	117	253.0
-20	58,248	49	2,245	118	246.3
-19	54,972	50	2,161	119	239.9
-18	51,900	51	2,081	120	233.6
-17	49,018	52	2,004	121	227.6
-16	46,314	53	1,930	122	221.7
-15	43,774	54	1,859	123	216.0
-14	41,390	55	1,791	124	210.5
-13	39,149	56	1,727	125	205.1
-12	37,042	57	1,664	126	199.9
-11	35,062	58	1,605	127	194.9
-10	33,199	59	1,547	128	190.0
-9	31,446	60	1,493	129	185.2
-8	29,796	61	1,440	130	180.6
-7	28,242	62	1,389	131	176.2
-6	26,778	63	1,341	132	171.8
-5	25,399	64	1,294	133	167.6
-4	24,099	65	1,250	134	163.5
-3	22,873	66	1,207	135	159.5
-2	21,716	67	1,165	136	155.7
-1	20,624	68	1,126	137	151.9
0	19,590	69	1,088	138	148.3
1	18,618	70	1,051	139	144.7
2	17,700	71	1,016	140	141.3
3	16,833	72	982.2	141	137.9
4	16,013	73	949.7	142	134.7
5	15,237	74	918.4	143	131.5
6	14,504	75	888.3	144	128.4
7	13,810	76	859.3	145	125.4
8	13,153	77	831.4	146	122.5
9	12,531	78	804.6	147	119.7
10	11,942	79	778.7	148	116.9
11	11,385	80	753.8	149	114.2
12	10,856	81	729.9	150	111.6
13	10,355	82	706.8		

10,000 Ω @ 25°C Curve "G"

Beta 0-50°C: 3575 | R Ratio R_0/R_{50}°C: 7.575

Temp. °C	R Ω	Temp. °C	R Ω	Temp. °C	R Ω
-55	607,800	14	15,791	83	1,332
-54	569,604	15	15,130	84	1,293
-53	534,036	16	14,501	85	1,255
-52	500,901	17	13,901	86	1,218
-51	470,019	18	13,329	87	1,183
-50	441,224	19	12,783	88	1,149
-49	414,363	20	12,263	89	1,116
-48	389,296	21	11,766	90	1,084
-47	365,893	22	11,293	91	1,053
-46	344,034	23	10,840	92	1,023
-45	323,609	24	10,409	93	994.2
-44	304,517	25	10,000	94	966.3
-43	286,662	26	9,602	95	939.3
-42	269,958	27	9,226	96	913.2
-41	254,324	28	8,866	97	887.9
-40	239,686	29	8,522	98	863.4
-39	225,976	30	8,194	99	839.7
-38	213,129	31	7,879	100	816.8
-37	201,087	32	7,579	101	794.6
-36	189,794	33	7,291	102	773.1
-35	179,200	34	7,016	103	752.3
-34	169,258	35	6,752	104	732.1
-33	159,925	36	6,500	105	712.6
-32	151,159	37	6,258	106	693.6
-31	142,924	38	6,027	107	675.3
-30	135,185	39	5,805	108	657.5
-29	127,908	40	5,592	109	640.3
-28	121,065	41	5,389	110	623.6
-27	114,626	42	5,194	111	607.4
-26	108,566	43	5,007	112	591.6
-25	102,861	44	4,827	113	576.4
-24	97,487	45	4,655	114	561.6
-23	92,425	46	4,490	115	547.3
-22	87,653	47	4,331	116	533.4
-21	83,155	48	4,179	117	519.9
-20	78,913	49	4,033	118	506.8
-19	74,910	50	3,893	119	494.1
-18	71,133	51	3,758	120	481.8
-17	67,568	52	3,629	121	469.8
-16	64,201	53	3,505	122	458.2
-15	61,020	54	3,385	123	446.9
-14	58,014	55	3,271	124	435.9
-13	55,174	56	3,160	125	425.3
-12	52,487	57	3,054	126	414.9
-11	49,947	58	2,952	127	404.9
-10	47,543	59	2,854	128	395.1
-9	45,268	60	2,760	129	385.6
-8	43,115	61	2,669	130	376.4
-7	41,076	62	2,582	131	367.4
-6	39,144	63	2,498	132	358.7
-5	37,313	64	2,417	133	350.3
-4	35,578	65	2,339	134	342.0
-3	33,934	66	2,264	135	334.0
-2	32,374	67	2,191	136	326.3
-1	30,894	68	2,122	137	318.7
0	29,490	69	2,055	138	311.3
1	28,155	70	1,990	139	304.2
2	26,888	71	1,928	140	297.2
3	25,685	72	1,868	141	290.4
4	24,543	73	1,810	142	283.8
5	23,457	74	1,754	143	277.4
6	22,425	75	1,700	144	271.2
7	21,444	76	1,648	145	265.1
8	20,512	77	1,598	146	259.2
9	19,624	78	1,550	147	253.4
10	18,780	79	1,503	148	247.8
11	17,977	80	1,458	149	242.3
12	17,212	81	1,414	150	237.0
13	16,484	82	1,372		

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Precision Interchangeable Thermistor Tables

10,000 Ω @ 25°C Curve "J"

Beta 0-50°C: 3890 | R Ratio R_0/R_{50}°C: 9.065

Temp. °C	R Ω	Temp. °C	R Ω	Temp. °C	R Ω
-55	963,849	14	16,466	83	1,141
-54	895,332	15	15,715	84	1,105
-53	832,130	16	15,002	85	1,071
-52	773,799	17	14,325	86	1,038
-51	719,934	18	13,683	87	1,006
-50	670,166	19	13,074	88	974.7
-49	624,159	20	12,494	89	944.9
-48	581,605	21	11,944	90	916.2
-47	542,225	22	11,421	91	888.5
-46	505,763	23	10,924	92	861.8
-45	471,985	24	10,451	93	836.0
-44	440,678	25	10,000	94	811.1
-43	411,646	26	9,573	95	787.0
-42	384,710	27	9,166	96	763.8
-41	359,707	28	8,778	97	741.4
-40	336,487	29	8,409	98	719.7
-39	314,911	30	8,057	99	698.8
-38	294,854	31	7,722	100	678.6
-37	276,201	32	7,402	101	658.7
-36	258,843	33	7,098	102	639.9
-35	242,685	34	6,808	103	621.7
-34	227,636	35	6,531	104	604.1
-33	213,613	36	6,267	105	587.1
-32	200,541	37	6,015	106	570.7
-31	188,350	38	5,774	107	554.8
-30	176,974	39	5,545	108	539.4
-29	166,356	40	5,326	109	524.6
-28	156,440	41	5,116	110	510.2
-27	147,176	42	4,916	111	496.3
-26	138,517	43	4,725	112	482.8
-25	130,420	44	4,542	113	469.8
-24	122,846	45	4,368	114	457.2
-23	115,757	46	4,201	115	445.0
-22	109,121	47	4,041	116	433.1
-21	102,905	48	3,888	117	421.7
-20	97,080	49	3,742	118	410.6
-19	91,620	50	3,602	119	399.8
-18	86,501	51	3,468	120	389.4
-17	81,697	52	3,339	121	379.3
-16	77,190	53	3,216	122	369.5
-15	72,957	54	3,099	123	360.0
-14	68,983	55	2,986	124	350.8
-13	65,248	56	2,878	125	341.9
-12	61,737	57	2,774	126	333.2
-11	58,437	58	2,674	127	324.8
-10	55,332	59	2,579	128	316.6
-9	52,410	60	2,488	129	308.7
-8	49,660	61	2,400	130	301.0
-7	47,070	62	2,316	131	293.6
-6	44,631	63	2,235	132	286.4
-5	42,332	64	2,157	133	279.3
-4	40,165	65	2,083	134	272.5
-3	38,121	66	2,011	135	265.9
-2	36,193	67	1,942	136	259.4
-1	34,374	68	1,876	137	253.2
0	32,650	69	1,813	138	247.1
1	31,030	70	1,752	139	241.2
2	29,500	71	1,693	140	235.4
3	28,054	72	1,637	141	229.9
4	26,688	73	1,583	142	224.4
5	25,395	74	1,531	143	219.2
6	24,173	75	1,480	144	214.0
7	23,017	76	1,432	145	209.0
8	21,922	77	1,386	146	204.2
9	20,886	78	1,341	147	199.5
10	19,904	79	1,298	148	194.9
11	18,974	80	1,256	149	190.4
12	18,093	81	1,216	150	186.0
13	17,258	82	1,178		

20,000 Ω @ 25°C Curve "J"

Beta 0-50°C: 3890 | R Ratio R_0/R_{50}°C: 9.065

Temp. °C	R Ω	Temp. °C	R Ω	Temp. °C	R Ω
-55	1,927,698	14	32,932	83	2,282
-54	1,790,663	15	31,429	84	2,210
-53	1,664,260	16	30,004	85	2,141
-52	1,547,598	17	28,651	86	2,075
-51	1,439,868	18	27,367	87	2,011
-50	1,340,332	19	26,147	88	1,949
-49	1,248,317	20	24,989	89	1,890
-48	1,163,210	21	23,888	90	1,832
-47	1,084,450	22	22,842	91	1,777
-46	1,011,525	23	21,847	92	1,724
-45	943,970	24	20,901	93	1,672
-44	881,355	25	20,000	94	1,622
-43	823,291	26	19,146	95	1,574
-42	769,420	27	18,331	96	1,528
-41	719,414	28	17,556	97	1,483
-40	672,973	29	16,817	98	1,439
-39	629,822	30	16,114	99	1,398
-38	589,709	31	15,444	100	1,357
-37	552,401	32	14,805	101	1,317
-36	517,687	33	14,196	102	1,280
-35	485,370	34	13,616	103	1,243
-34	455,271	35	13,062	104	1,208
-33	427,226	36	12,534	105	1,174
-32	401,082	37	12,030	106	1,141
-31	376,699	38	11,549	107	1,110
-30	353,949	39	11,090	108	1,079
-29	332,712	40	10,651	109	1,049
-28	312,880	41	10,233	110	1,020
-27	294,352	42	9,832	111	992.5
-26	277,034	43	9,450	112	965.6
-25	260,840	44	9,085	113	939.6
-24	245,691	45	8,735	114	914.3
-23	231,514	46	8,401	115	889.9
-22	218,241	47	8,082	116	866.2
-21	205,809	48	7,776	117	843.3
-20	194,160	49	7,483	118	821.1
-19	183,241	50	7,203	119	799.6
-18	173,001	51	6,935	120	778.8
-17	163,395	52	6,678	121	758.6
-16	154,379	53	6,433	122	739.0
-15	145,915	54	6,197	123	720.0
-14	137,965	55	5,971	124	701.6
-13	130,496	56	5,755	125	683.7
-12	123,475	57	5,548	126	666.4
-11	116,873	58	5,349	127	649.6
-10	110,663	59	5,158	128	633.3
-9	104,820	60	4,975	129	617.5
-8	99,320	61	4,800	130	602.1
-7	94,140	62	4,631	131	587.2
-6	89,261	63	4,470	132	572.7
-5	84,663	64	4,315	133	558.7
-4	80,329	65	4,166	134	545.0
-3	76,242	66	4,022	135	531.7
-2	72,387	67	3,885	136	518.9
-1	68,748	68	3,753	137	506.3
0	65,300	69	3,626	138	494.2
1	62,061	70	3,504	139	482.4
2	59,000	71	3,387	140	470.9
3	56,109	72	3,274	141	459.7
4	53,375	73	3,166	142	448.9
5	50,791	74	3,061	143	438.3
6	48,346	75	2,961	144	428.1
7	46,033	76	2,864	145	418.1
8	43,844	77	2,771	146	408.4
9	41,771	78	2,682	147	398.9
10	39,808	79	2,596	148	389.7
11	37,949	80	2,513	149	380.8
12	36,186	81	2,433	150	372.1
13	34,516	82	2,356		

30,000 Ω @ 25°C Curve "J"

Beta 0-50°C: 3890 | R Ratio R_0/R_{50}°C: 9.065

Temp. °C	R Ω	Temp. °C	R Ω	Temp. °C	R Ω
-55	2,891,548	14	49,398	83	3,423
-54	2,685,995	15	47,144	84	3,316
-53	2,496,389	16	45,006	85	3,212
-52	2,321,397	17	42,976	86	3,113
-51	2,159,802	18	41,050	87	3,017
-50	2,010,498	19	39,221	88	2,924
-49	1,872,476	20	37,483	89	2,835
-48	1,744,814	21	35,832	90	2,749
-47	1,626,674	22	34,263	91	2,666
-46	1,517,288	23	32,771	92	2,585
-45	1,415,955	24	31,352	93	2,508
-44	1,322,033	25	30,000	94	2,433
-43	1,234,937	26	28,719	95	2,361
-42	1,154,131	27	27,497	96	2,291
-41	1,079,122	28	26,333	97	2,224
-40	1,009,460	29	25,226	98	2,159
-39	944,734	30	24,171	99	2,096
-38	884,563	31	23,165	100	2,036
-37	828,602	32	22,207	101	1,976
-36	776,530	33	21,294	102	1,920
-35	728,055	34	20,423	103	1,865
-34	682,907	35	19,593	104	1,812
-33	640,839	36	18,801	105	1,761
-32	601,623	37	18,045	106	1,712
-31	565,049	38	17,323	107	1,664
-30	530,923	39	16,635	108	1,618
-29	499,069	40	15,977	109	1,574
-28	469,320	41	15,349	110	1,531
-27	441,528	42	14,749	111	1,489
-26	415,550	43	14,175	112	1,448
-25	391,260	44	13,627	113	1,409
-24	368,537	45	13,103	114	1,371
-23	347,271	46	12,602	115	1,335
-22	327,362	47	12,122	116	1,299
-21	308,714	48	11,664	117	1,265
-20	291,240	49	11,225	118	1,232
-19	274,861	50	10,805	119	1,199
-18	259,502	51	10,403	120	1,168
-17	245,092	52	10,018	121	1,138
-16	231,569	53	9,649	122	1,108
-15	218,872	54	9,296	123	1,080
-14	206,948	55	8,957	124	1,052
-13	195,743	56	8,633	125	1,026
-12	185,212	57	8,321	126	999.6
-11	175,310	58	8,023	127	974.4
-10	165,995	59	7,737	128	949.9
-9	157,230	60	7,463	129	926.2
-8	148,980	61	7,200	130	903.1
-7	141,210	62	6,947	131	880.8
-6	133,892	63	6,705	132	859.1
-5	126,995	64	6,472	133	838.0
-4	120,494	65	6,248	134	817.5
-3	114,363	66	6,034	135	797.6
-2	108,580	67	5,827	136	778.3
-1	103,122	68	5,629	137	759.5
0	97,950	69	5,439	138	741.3
1	93,091	70	5,256	139	723.6
2	88,501	71	5,080	140	706.3
3	84,163	72	4,911	141	689.6
4	80,063	73	4,748	142	673.3
5	76,186	74	4,592	143	657.5
6	72,519	75	4,441	144	642.1
7	69,050	76	4,296	145	627.1
8	65,766	77	4,157	146	612.5
9	62,657	78	4,023	147	598.4
10	59,712	79	3,894	148	584.6
11	56,923	80	3,769	149	571.2
12	54,279	81	3,649	150	558.1
13	51,774	82	3,534		

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Precision Interchangeable Thermistor Tables

50,000 Ω @ 25°C Curve "J"

Beta 0-50°C: 3890 | R Ratio R_0/R_{50}°C: 9.065

Temp. °C	R Ω	Temp. °C	R Ω	Temp. °C	R Ω
-55	4,819,246	14	82,329	83	5,704
-54	4,476,658	15	78,573	84	5,526
-53	4,160,649	16	75,010	85	5,354
-52	3,868,995	17	71,627	86	5,188
-51	3,599,670	18	68,417	87	5,028
-50	3,350,830	19	65,368	88	4,873
-49	3,120,793	20	62,471	89	4,725
-48	2,908,024	21	59,720	90	4,581
-47	2,711,124	22	57,104	91	4,443
-46	2,528,813	23	54,618	92	4,309
-45	2,359,924	24	52,253	93	4,180
-44	2,203,388	25	50,000	94	4,055
-43	2,058,229	26	47,864	95	3,935
-42	1,923,551	27	45,828	96	3,819
-41	1,798,536	28	43,889	97	3,707
-40	1,682,434	29	42,043	98	3,599
-39	1,574,556	30	40,284	99	3,494
-38	1,474,272	31	38,609	100	3,393
-37	1,381,003	32	37,012	101	3,294
-36	1,294,217	33	35,490	102	3,199
-35	1,213,425	34	34,039	103	3,108
-34	1,138,179	35	32,655	104	3,020
-33	1,068,065	36	31,335	105	2,935
-32	1,002,705	37	30,075	106	2,853
-31	941,748	38	28,872	107	2,774
-30	884,872	39	27,725	108	2,697
-29	831,781	40	26,628	109	2,623
-28	782,201	41	25,581	110	2,551
-27	735,879	42	24,581	111	2,481
-26	692,584	43	23,625	112	2,414
-25	652,100	44	22,712	113	2,349
-24	614,228	45	21,838	114	2,286
-23	578,786	46	21,003	115	2,225
-22	545,603	47	20,204	116	2,166
-21	514,523	48	19,440	117	2,108
-20	485,401	49	18,708	118	2,053
-19	458,102	50	18,008	119	1,999
-18	432,503	51	17,338	120	1,947
-17	408,487	52	16,696	121	1,896
-16	385,948	53	16,082	122	1,847
-15	364,787	54	15,493	123	1,800
-14	344,913	55	14,928	124	1,754
-13	326,239	56	14,388	125	1,709
-12	308,687	57	13,869	126	1,666
-11	292,183	58	13,372	127	1,624
-10	276,658	59	12,895	128	1,583
-9	262,050	60	12,438	129	1,544
-8	248,299	61	11,999	130	1,505
-7	235,350	62	11,578	131	1,468
-6	223,153	63	11,174	132	1,432
-5	211,658	64	10,786	133	1,397
-4	200,823	65	10,414	134	1,363
-3	190,605	66	10,056	135	1,329
-2	180,966	67	9,712	136	1,297
-1	171,871	68	9,382	137	1,266
0	163,250	69	9,065	138	1,235
1	155,151	70	8,760	139	1,206
2	147,501	71	8,467	140	1,177
3	140,272	72	8,185	141	1,149
4	133,439	73	7,914	142	1,122
5	126,977	74	7,653	143	1,096
6	120,866	75	7,402	144	1,070
7	115,083	76	7,161	145	1,045
8	109,610	77	6,928	146	1,021
9	104,428	78	6,705	147	997.3
10	99,520	79	6,489	148	974.3
11	94,871	80	6,282	149	952.0
12	90,466	81	6,082	150	930.2
13	86,289	82	5,890		

50,000 Ω @ 25°C Curve "R"

Beta 0-50°C: 4140 | R Ratio R_0/R_{50}°C: 10.437

Temp. °C	R Ω	Temp. °C	R Ω	Temp. °C	R Ω
-55	5,984,995	14	84,960	83	4,880
-54	5,547,622	15	80,853	84	4,715
-53	5,144,781	16	76,966	85	4,556
-52	4,773,558	17	73,287	86	4,404
-51	4,431,296	18	69,802	87	4,257
-50	4,115,579	19	66,502	88	4,116
-49	3,824,203	20	63,376	89	3,981
-48	3,555,159	21	60,413	90	3,850
-47	3,306,613	22	57,603	91	3,724
-46	3,076,892	23	54,940	92	3,603
-45	2,864,468	24	52,413	93	3,486
-44	2,667,946	25	50,000	94	3,374
-43	2,486,047	26	47,741	95	3,266
-42	2,317,606	27	45,581	96	3,162
-41	2,161,554	28	43,530	97	3,061
-40	2,016,913	29	41,582	98	2,965
-39	1,882,786	30	39,731	99	2,871
-38	1,758,354	31	37,972	100	2,781
-37	1,642,863	32	36,300	101	2,695
-36	1,535,622	33	34,710	102	2,611
-35	1,435,999	34	33,198	103	2,530
-34	1,343,411	35	31,760	104	2,453
-33	1,257,325	36	30,391	105	2,378
-32	1,177,247	37	29,088	106	2,305
-31	1,102,729	38	27,848	107	2,235
-30	1,033,353	39	26,667	108	2,168
-29	968,737	40	25,542	109	2,102
-28	908,531	41	24,470	110	2,039
-27	852,408	42	23,449	111	1,979
-26	800,072	43	22,475	112	1,920
-25	751,246	44	21,546	113	1,863
-24	705,677	45	20,661	114	1,808
-23	663,129	46	19,816	115	1,755
-22	623,388	47	19,011	116	1,704
-21	586,252	48	18,241	117	1,655
-20	551,538	49	17,507	118	1,607
-19	519,075	50	16,806	119	1,561
-18	488,706	51	16,137	120	1,516
-17	460,283	52	15,498	121	1,473
-16	433,673	53	14,887	122	1,431
-15	408,750	54	14,303	123	1,391
-14	385,398	55	13,745	124	1,352
-13	363,511	56	13,211	125	1,314
-12	342,989	57	12,701	126	1,277
-11	323,740	58	12,213	127	1,242
-10	305,678	59	11,746	128	1,207
-9	288,723	60	11,299	129	1,174
-8	272,803	61	10,872	130	1,142
-7	257,849	62	10,462	131	1,111
-6	243,797	63	10,070	132	1,081
-5	230,588	64	9,695	133	1,051
-4	218,168	65	9,335	134	1,023
-3	206,485	66	8,991	135	995.8
-2	195,491	67	8,661	136	969.2
-1	185,144	68	8,344	137	943.5
0	175,400	69	8,041	138	918.5
1	166,215	70	7,750	139	894.3
2	157,562	71	7,471	140	870.9
3	149,407	72	7,203	141	848.2
4	141,718	73	6,947	142	826.1
5	134,466	74	6,700	143	804.8
6	127,626	75	6,464	144	784.0
7	121,170	76	6,237	145	763.9
8	115,075	77	6,019	146	744.4
9	109,320	78	5,810	147	725.5
10	103,884	79	5,608	148	707.1
11	98,747	80	5,415	149	689.3
12	93,892	81	5,230	150	672.0
13	89,302	82	5,051		

100,000 Ω @ 25°C Curve "R"

Beta 0-50°C: 4140 | R Ratio R_0/R_{50}°C: 10.437

Temp. °C	R Ω	Temp. °C	R Ω	Temp. °C	R Ω
-55	11,969,990	14	169,921	83	9,760
-54	11,095,244	15	161,706	84	9,430
-53	10,289,563	16	153,932	85	9,113
-52	9,547,115	17	146,573	86	8,808
-51	8,862,592	18	139,605	87	8,515
-50	8,231,159	19	133,005	88	8,233
-49	7,648,407	20	126,751	89	7,961
-48	7,110,318	21	120,825	90	7,700
-47	6,613,226	22	115,207	91	7,448
-46	6,153,784	23	109,879	92	7,206
-45	5,728,937	24	104,826	93	6,973
-44	5,335,891	25	100,000	94	6,748
-43	4,972,095	26	95,481	95	6,532
-42	4,635,213	27	91,161	96	6,324
-41	4,323,108	28	87,060	97	6,123
-40	4,033,826	29	83,164	98	5,929
-39	3,765,573	30	79,462	99	5,743
-38	3,516,708	31	75,944	100	5,563
-37	3,285,725	32	72,600	101	5,390
-36	3,071,245	33	69,421	102	5,222
-35	2,871,998	34	66,397	103	5,061
-34	2,686,823	35	63,520	104	4,905
-33	2,514,649	36	60,783	105	4,755
-32	2,354,495	37	58,177	106	4,610
-31	2,205,457	38	55,696	107	4,470
-30	2,066,705	39	53,334	108	4,335
-29	1,937,475	40	51,084	109	4,205
-28	1,817,061	41	48,940	110	4,079
-27	1,704,817	42	46,897	111	3,957
-26	1,600,144	43	44,950	112	3,840
-25	1,502,492	44	43,093	113	3,726
-24	1,411,353	45	41,322	114	3,617
-23	1,326,259	46	39,633	115	3,511
-22	1,246,776	47	38,021	116	3,409
-21	1,172,505	48	36,483	117	3,310
-20	1,103,077	49	35,015	118	3,214
-19	1,038,151	50	33,613	119	3,122
-18	977,411	51	32,274	120	3,032
-17	920,566	52	30,995	121	2,946
-16	867,345	53	29,773	122	2,862
-15	817,500	54	28,606	123	2,781
-14	770,797	55	27,489	124	2,703
-13	727,023	56	26,422	125	2,628
-12	685,978	57	25,402	126	2,554
-11	647,480	58	24,426	127	2,483
-10	611,355	59	23,492	128	2,415
-9	577,447	60	22,598	129	2,348
-8	545,607	61	21,743	130	2,284
-7	515,698	62	20,925	131	2,222
-6	487,594	63	20,141	132	2,161
-5	461,177	64	19,390	133	2,103
-4	436,336	65	18,671	134	2,046
-3	412,970	66	17,982	135	1,992
-2	390,983	67	17,321	136	1,938
-1	370,287	68	16,688	137	1,887
0	350,800	69	16,082	138	1,837
1	332,431	70	15,500	139	1,789
2	315,124	71	14,942	140	1,742
3	298,813	72	14,407	141	1,696
4	283,436	73	13,893	142	1,652
5	268,933	74	13,401	143	1,610
6	255,251	75	12,928	144	1,568
7	242,339	76	12,474	145	1,528
8	230,151	77	12,038	146	1,489
9	218,641	78	11,619	147	1,451
10	207,768	79	11,217	148	1,414
11	197,495	80	10,831	149	1,379
12	187,785	81	10,459	150	1,344
13	178,604	82	10,103		

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Resistance-Temperature Conversion Tables (Standard Curves)

Curve Type	B	F	G	J	R
Beta 0-50˚C	2941	3420	3575	3890	4140
R Ratio R_0/R_{50}˚C	5.29	6.94	7.58	9.06	10.44
Temp. ˚C	R_T/R_{25}	R_T/R_{25}	R_T/R_{25}	R_T/R_{25}	R_T/R_{25}
-55	31.90	54.14	60.78	96.38	119.70
-54	30.16	50.78	56.96	89.53	110.95
-53	28.53	47.66	53.40	83.21	102.90
-52	27.00	44.74	50.09	77.38	95.47
-51	25.56	42.03	47.00	71.99	88.63
-50	24.22	39.49	44.12	67.02	82.31
-49	22.95	37.12	41.44	62.42	76.48
-48	21.76	34.91	38.93	58.16	71.10
-47	20.64	32.85	36.59	54.22	66.13
-46	19.59	30.92	34.40	50.58	61.54
-45	18.60	29.11	32.36	47.20	57.29
-44	17.67	27.43	30.45	44.07	53.36
-43	16.79	25.85	28.67	41.16	49.72
-42	15.96	24.37	27.00	38.47	46.35
-41	15.17	22.98	25.43	35.97	43.23
-40	14.43	21.68	23.97	33.65	40.34
-39	13.73	20.47	22.60	31.49	37.66
-38	13.07	19.33	21.31	29.49	35.17
-37	12.45	18.26	20.11	27.62	32.86
-36	11.86	17.25	18.98	25.88	30.71
-35	11.30	16.31	17.92	24.27	28.72
-34	10.77	15.42	16.93	22.76	26.87
-33	10.27	14.59	15.99	21.36	25.15
-32	9.794	13.81	15.12	20.05	23.54
-31	9.344	13.07	14.29	18.83	22.05
-30	8.917	12.38	13.52	17.70	20.67
-29	8.512	11.73	12.79	16.64	19.37
-28	8.127	11.12	12.11	15.64	18.17
-27	7.762	10.54	11.46	14.72	17.05
-26	7.416	10.00	10.86	13.85	16.00
-25	7.086	9.486	10.29	13.04	15.02
-24	6.773	9.003	9.749	12.28	14.11
-23	6.476	8.547	9.242	11.58	13.26
-22	6.193	8.117	8.765	10.91	12.47
-21	5.924	7.712	8.315	10.29	11.73
-20	5.668	7.329	7.891	9.708	11.03
-19	5.424	6.967	7.491	9.162	10.38
-18	5.192	6.626	7.113	8.650	9.774
-17	4.971	6.303	6.757	8.170	9.206
-16	4.761	5.998	6.420	7.719	8.673
-15	4.560	5.709	6.102	7.296	8.175
-14	4.369	5.436	5.801	6.898	7.708
-13	4.187	5.178	5.517	6.525	7.270
-12	4.013	4.933	5.249	6.174	6.860
-11	3.847	4.702	4.995	5.844	6.475
-10	3.689	4.482	4.754	5.533	6.114
-9	3.538	4.274	4.527	5.241	5.774
-8	3.394	4.077	4.311	4.966	5.456
-7	3.256	3.891	4.108	4.707	5.157
-6	3.125	3.714	3.914	4.463	4.876
-5	2.999	3.546	3.731	4.233	4.612
-4	2.879	3.386	3.558	4.016	4.363
-3	2.765	3.235	3.393	3.812	4.130
-2	2.655	3.091	3.237	3.619	3.910
-1	2.550	2.955	3.089	3.437	3.703
0	2.450	2.825	2.949	3.265	3.508

Curve Type	B	F	G	J	R
Beta 0-50˚C	2941	3420	3575	3890	4140
R Ratio R_0/R_{50}˚C	5.29	6.94	7.58	9.06	10.44
Temp. ˚C	R_T/R_{25}	R_T/R_{25}	R_T/R_{25}	R_T/R_{25}	R_T/R_{25}
0	2.450	2.825	2.949	3.265	3.508
1	2.357	2.702	2.816	3.103	3.324
2	2.268	2.585	2.689	2.950	3.151
3	2.183	2.473	2.569	2.805	2.988
4	2.101	2.367	2.454	2.669	2.834
5	2.023	2.266	2.346	2.540	2.689
6	1.949	2.171	2.243	2.417	2.553
7	1.878	2.079	2.144	2.302	2.423
8	1.810	1.992	2.051	2.192	2.302
9	1.744	1.909	1.962	2.089	2.186
10	1.682	1.830	1.878	1.990	2.078
11	1.622	1.755	1.798	1.897	1.975
12	1.565	1.683	1.721	1.809	1.878
13	1.510	1.615	1.648	1.726	1.786
14	1.457	1.550	1.579	1.647	1.699
15	1.406	1.487	1.513	1.571	1.617
16	1.358	1.428	1.450	1.500	1.539
17	1.311	1.371	1.390	1.433	1.466
18	1.267	1.317	1.333	1.368	1.396
19	1.224	1.265	1.278	1.307	1.330
20	1.183	1.216	1.226	1.249	1.268
21	1.143	1.169	1.177	1.194	1.208
22	1.105	1.124	1.129	1.142	1.152
23	1.069	1.081	1.084	1.092	1.099
24	1.034	1.039	1.041	1.045	1.048
25	1.000	1.000	1.000	1.000	1.000
26	0.9676	0.9624	0.9602	0.9573	0.9548
27	0.9364	0.9263	0.9226	0.9166	0.9116
28	0.9063	0.8917	0.8866	0.8778	0.8706
29	0.8775	0.8587	0.8522	0.8409	0.8316
30	0.8497	0.8270	0.8194	0.8057	0.7946
31	0.8229	0.7967	0.7879	0.7722	0.7594
32	0.7971	0.7677	0.7579	0.7402	0.7260
33	0.7723	0.7398	0.7291	0.7098	0.6942
34	0.7484	0.7132	0.7016	0.6808	0.6640
35	0.7253	0.6876	0.6752	0.6531	0.6352
36	0.7031	0.6631	0.6500	0.6267	0.6078
37	0.6817	0.6396	0.6258	0.6015	0.5818
38	0.6611	0.6170	0.6027	0.5774	0.5570
39	0.6411	0.5954	0.5805	0.5545	0.5333
40	0.6219	0.5747	0.5592	0.5326	0.5108
41	0.6034	0.5547	0.5389	0.5116	0.4894
42	0.5855	0.5356	0.5194	0.4916	0.4690
43	0.5683	0.5172	0.5007	0.4725	0.4495
44	0.5516	0.4996	0.4827	0.4542	0.4309
45	0.5355	0.4827	0.4655	0.4368	0.4132
46	0.5200	0.4664	0.4490	0.4201	0.3963
47	0.5050	0.4507	0.4331	0.4041	0.3802
48	0.4905	0.4357	0.4179	0.3888	0.3648
49	0.4765	0.4212	0.4033	0.3742	0.3501
50	0.4630	0.4073	0.3893	0.3602	0.3361

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Curve Type	B	F	G	J	R
Beta 0-50˚C	2941	3420	3575	3890	4140
R Ratio R_0/R_{50}˚C	5.29	6.94	7.58	9.06	10.44
Temp. ˚C	R_T/R_{25}	R_T/R_{25}	R_T/R_{25}	R_T/R_{25}	R_T/R_{25}
50	0.4630	0.4073	0.3893	0.3602	0.3361
51	0.4499	0.3940	0.3758	0.3468	0.3227
52	0.4373	0.3811	0.3629	0.3339	0.3100
53	0.4251	0.3687	0.3505	0.3216	0.2977
54	0.4133	0.3568	0.3385	0.3099	0.2861
55	0.4018	0.3453	0.3271	0.2986	0.2749
56	0.3908	0.3343	0.3160	0.2878	0.2642
57	0.3801	0.3237	0.3054	0.2774	0.2540
58	0.3697	0.3134	0.2952	0.2674	0.2443
59	0.3597	0.3036	0.2854	0.2579	0.2349
60	0.3500	0.2941	0.2760	0.2488	0.2260
61	0.3406	0.2849	0.2669	0.2400	0.2174
62	0.3315	0.2761	0.2582	0.2316	0.2092
63	0.3227	0.2676	0.2498	0.2235	0.2014
64	0.3142	0.2594	0.2417	0.2157	0.1939
65	0.3059	0.2515	0.2339	0.2083	0.1867
66	0.2979	0.2439	0.2264	0.2011	0.1798
67	0.2902	0.2365	0.2191	0.1942	0.1732
68	0.2826	0.2295	0.2122	0.1876	0.1669
69	0.2754	0.2226	0.2055	0.1813	0.1608
70	0.2683	0.2160	0.1990	0.1752	0.1550
71	0.2614	0.2096	0.1928	0.1693	0.1494
72	0.2548	0.2035	0.1868	0.1637	0.1441
73	0.2484	0.1975	0.1810	0.1583	0.1389
74	0.2421	0.1918	0.1754	0.1531	0.1340
75	0.2360	0.1862	0.1700	0.1480	0.1293
76	0.2302	0.1809	0.1648	0.1432	0.1247
77	0.2245	0.1757	0.1598	0.1386	0.1204
78	0.2189	0.1707	0.1550	0.1341	0.1162
79	0.2135	0.1659	0.1503	0.1298	0.1122
80	0.2083	0.1612	0.1458	0.1256	0.1083
81	0.2032	0.1567	0.1414	0.1216	0.1046
82	0.1983	0.1523	0.1372	0.1178	0.1010
83	0.1935	0.1481	0.1332	0.1141	0.09760
84	0.1889	0.1440	0.1293	0.1105	0.09430
85	0.1844	0.1400	0.1255	0.1071	0.09113
86	0.1800	0.1362	0.1218	0.1038	0.08808
87	0.1757	0.1325	0.1183	0.1006	0.08515
88	0.1716	0.1289	0.1149	0.09747	0.08233
89	0.1676	0.1254	0.1116	0.09449	0.07961
90	0.1637	0.1221	0.1084	0.09162	0.07700
91	0.1599	0.1188	0.1053	0.08885	0.07448
92	0.1562	0.1156	0.1023	0.08618	0.07206
93	0.1526	0.11259	0.09942	0.08360	0.06973
94	0.1491	0.10963	0.09663	0.08111	0.06748
95	0.1457	0.10676	0.09393	0.07870	0.06532
96	0.1424	0.10399	0.09132	0.07638	0.06324
97	0.1391	0.10129	0.08879	0.07414	0.06123
98	0.1360	0.09868	0.08634	0.07197	0.05929
99	0.1330	0.09615	0.08397	0.06988	0.05743
100	0.1300	0.09370	0.08168	0.06786	0.05563

Curve Type	B	F	G	J	R
Beta 0-50˚C	2941	3420	3575	3890	4140
R Ratio R_0/R_{50}˚C	5.29	6.94	7.58	9.06	10.44
Temp. ˚C	R_T/R_{25}	R_T/R_{25}	R_T/R_{25}	R_T/R_{25}	R_T/R_{25}
100	0.1300	0.09370	0.08168	0.06786	0.05563
101	0.1271	0.09131	0.07946	0.06587	0.05390
102	0.1244	0.08900	0.07731	0.06399	0.05222
103	0.1216	0.08676	0.07523	0.06217	0.05061
104	0.1190	0.08458	0.07321	0.06041	0.04905
105	0.1165	0.08247	0.07126	0.05871	0.04755
106	0.1140	0.08043	0.06936	0.05707	0.04610
107	0.1115	0.07844	0.06753	0.05548	0.04470
108	0.1092	0.07651	0.06575	0.05394	0.04335
109	0.1069	0.07464	0.06403	0.05246	0.04205
110	0.1046	0.07282	0.06236	0.05102	0.04079
111	0.1025	0.07106	0.06074	0.04963	0.03957
112	0.1003	0.06935	0.05916	0.04828	0.03840
113	0.09828	0.06768	0.05764	0.04698	0.03726
114	0.09626	0.06607	0.05616	0.04572	0.03617
115	0.09430	0.06450	0.05473	0.04450	0.03511
116	0.09239	0.06298	0.05334	0.04331	0.03409
117	0.09052	0.06149	0.05199	0.04217	0.03310
118	0.08870	0.06006	0.05068	0.04106	0.03214
119	0.08692	0.05866	0.04941	0.03998	0.03122
120	0.08519	0.05730	0.04818	0.03894	0.03032
121	0.08350	0.05598	0.04698	0.03793	0.02946
122	0.08186	0.05469	0.04582	0.03695	0.02862
123	0.08025	0.05344	0.04469	0.03600	0.02781
124	0.07868	0.05223	0.04359	0.03508	0.02703
125	0.07714	0.05104	0.04253	0.03419	0.02628
126	0.07565	0.04990	0.04149	0.03332	0.02554
127	0.07418	0.04878	0.04049	0.03248	0.02483
128	0.07276	0.04769	0.03951	0.03166	0.02415
129	0.07136	0.04663	0.03856	0.03087	0.02348
130	0.07000	0.04560	0.03764	0.03010	0.02284
131	0.06867	0.04460	0.03674	0.02936	0.02222
132	0.06737	0.04362	0.03587	0.02864	0.02161
133	0.06610	0.04267	0.03503	0.02793	0.02103
134	0.06485	0.04175	0.03420	0.02725	0.02046
135	0.06364	0.04084	0.03340	0.02659	0.01992
136	0.06245	0.03997	0.03263	0.02594	0.01938
137	0.06129	0.03911	0.03187	0.02532	0.01887
138	0.06016	0.03828	0.03113	0.02471	0.01837
139	0.05904	0.03747	0.03042	0.02412	0.01789
140	0.05796	0.03668	0.02972	0.02354	0.01742
141	0.05690	0.03591	0.02904	0.02299	0.01696
142	0.05586	0.03516	0.02838	0.02244	0.01652
143	0.05484	0.03443	0.02774	0.02192	0.01610
144	0.05384	0.03372	0.02712	0.02140	0.01568
145	0.05287	0.03302	0.02651	0.02090	0.01528
146	0.05192	0.03234	0.02592	0.02042	0.01489
147	0.05098	0.03168	0.02534	0.01995	0.01451
148	0.05007	0.03104	0.02478	0.01949	0.01414
149	0.04918	0.03041	0.02423	0.01904	0.01379
150	0.04830	0.02980	0.02370	0.01860	0.01344

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