

AccuTru ExL[™] Custom RTDs made with MI-Dry

Dedicated to those organizations that value improved temperature measurement for critical processes



About AccuTru's ExL RTDs

TYPES

Resistance Temperature Devices (RTDs) are an alternative to thermocouples for temperature measurement in the range from ambient to 600 or 700°C (1112—1282°F). The RTD uses a small element In the tip of the sensor that measures temperature by the change in the resistance of wire created by heat.

The element is most often a very small platinum wire wound to form a coil and encapsulated in some type of ceramic. At lower temperatures the element may be a "thin film" element, a small piece of polymer coated with a resistive material.

Thin films have the advantage of a faster response to changes in temperature as compared to the bulb type RTD but is limited to a low temperature range.

The primary advantage of the RTD over thermocouples is the accuracy of the reading. The error limits are much smaller as compared to thermocouples (.03 or .07 degrees at 100°C compared to 1.1 degrees C. However, the advantages are balanced by some limitations.

First, RTDs, as noted earlier, have a limited upper temperature range. Secondly, the RTDS are slower to respond to changes in temperature than are thermocouples so if you have a process where rapid response is required, you need to consider this factor. The third limitation with RTDs is that they are very susceptible to damage from vibration or being dropped. Lastly, is moisture is absorbed into the RTD, it will be impossible to obtain accurate temperature readings and the sensor must be removed from the process.

Thin film RTDs are manufactured using a hollow metal sheath. The element is attached to lead wires and inserted the length of the metal tube. Bulb type RTD's are most often manufactured using mineral insulated cable.

If you are using a hollow tube RTD and attempt to bend it or use a compression fitting on the tube, it will break, kink, or collapse, destroying the sensor. If you need to bend an RTD for your process, make certain that it is a mineral insulated cable style.

AccuTru's mineral insulated ExL RTDs are manufactured using our MI-Dry cable. This unique material provides a significantly higher insulation resistance at high temperatures. The higher insulation resistance reduces the risk o the RTD breaking down when at temperature. Further, the unique resistance to moisture that MI-Dry possesses, reduces the risk of sensor failure due to moisture adsorption.

MATERIALS

If economics are important to you, you can select among several different type of RTD elements, some more precise than others, and there are several types that use nickel or copper elements in place of platinum, although the accuracy of thee alternatives are an issue when compared to platinum. 316 stainless steel and Inconel 600 are the most commonly used sheath materials for RTDs. However, Accu-Tru's policy of addressing our customer's special needs allows you to request a broad assortment of standard or exotic sheath materials. Please contact us with your special request.

BENEFITS

As with any other sensors, RTDs can be manufactured to various standards. Many vendors, when manufacturing RTDs, pay little attention to detail and effective strategies to minimize sensor failure.

The use of MI-Dry mineral insulated cable allows us to build a sensor that reduces the risk of moisture damage and improves signal stability.

One of the issues related to RT D performance is failure due to vibration. AccuTru uses special techniques in the building of RTDs to reduce the risk of damage from vibration, providing longer life than conventional RTDs. It should be noted however, that severe vibration can still cause the RTD to fail.

If you are having problems with your RTD performance, we'll be pleased to work with you to select the proper

ACCUTRU RTD SPECIFICATIONS

All AccuTru RTDs use the 385 curve which meets IEC751 tolerances. All RTDs are manufactured using wire wound bulbs. Thin film RTDs are available upon request.

Section 4 Index

Custom Metal Sheath RTD's



Section 4 Index

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Custom Metal Sheath Remote Mount RTD's



Section 4 Index **Custom Metal Sheath** RTD's Model Page R19 Bayonet w/ Lead Wire 4-19 R20 Bayonet w/ SS Flex Armor 4-20 R21 Bayonet w/ SS Flex Armor and Button Tip 4-21 ✓ GTAW R22 Welded Hex Nipple 4-22 and Head Hex Nipple w/ Spring Loading R23 4-23 and Head R24 \supset Nipple w/ Spring Loading 4-24 and Head For more information call: 800-594-5737 • e-mail: team1@accutru.com • website www.accutru.com

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AccuTru Sensor Technologies Section 4 Index **RTD** Assemblies Model Page Nipple-Union-Nipple w/ Spring 4-25 R25 Loading and Head **Requirements/Options** 4-A Head Options 4-B





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MODEL R12

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SS Flex Armor w/ Plug/Jack and Spring Loaded Hex Plug





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MODEL R23

Spring Loaded Hex Nipple Fitting and Head







Section 4

RTD Requirements/Options

Options	Code	
NIST Traceable Calibration (Customer to Specify Points) 90° Bend (Specify "X" and "Y", See Figure 4-A1) Certified Drawing Optional Tip Sensitive RTD Magnetic Mounts (Contact Factory)	11 12 13 14 15	
TRANSITION OPTIONS In Line Transition (Single Element Only) 1/4" OD Transition to replace standard 3/8" OD Transition 5/16" OD Transition x 5/8" Long to replace standard High Temperature Epoxy (Rated to 311°F) Ultra High Temperature Epoxy (Rated to 600°F) High Temperature Cement Silver Braze Transition to Sensor to replace Crimp Note: Standard Epoxy Temperature Rating is 266°F	21 22 Sheath Minimum 23 Diameter Bend Radius "R" 24 (Inches) (Inches) 24 1/8 3/8 25 3/16 5/8 26 1/4 5/8 27 Note: Consult Factory prior to bending sheath closer than 2" from tip	711
CORD GRIP CONNECTORS 3/4" NPT Aluminum	Code 12 90° Bend Option Specify "X" and "Y" Dimensions 31 Figure 4-A1	
CONNECTOR OPTIONS Hollow Pins on Connector to replace Solid Pins Braze Adaptor to replace Tube Adaptor on Connector	41 42	
TAGS SS Tag to replace Paper Tag	51	
FITTINGS Oil Seal Fitting 1/2" NPT x 1/2" NPT	61	
HEAD AND TERMINAL BLOCKS 1/2" NPT Conduit Connection 3/4" NPT Process Side Connection	71 72	



Section 4

RTD Head Options All Head Connections are 1/2" NPT Instrument x 3/4" NPT Conduit

Head	Description Pa	art Number	
	General Purpose Screw Cover with SS Chain Supplied with ceramic terminal block. (Consult Factory for Sensor's over 1/4" OD) Aluminum Stainless Steel	A1G S2G	
	General Purpose NEMA 4X Screw Cover with SS Chain Supplied with ceramic terminal block. Aluminum Cast Iron Stainless Steel	A3R I3R S3R	
	General Purpose Economical Screw Cover with SS Chain Supplied with ceramic terminal block. Aluminum Poly/White, FDA Approved Nylon/Gray	A4G P4G N4G	
	General Purpose Clamp Cover Supplied with ceramic terminal block. Aluminum	A8G	
	General Purpose Heavy Duty Screw Cover with SS Chain Supplied with ceramic terminal block. Aluminum Cast Iron Cast Iron (Gasket for NEMA 4, Ground Screw)	A9G 19G 19H	
	Explosion Proof - FM/CSA Class I, Div. 1, Gr. B,C, & D, Class II, Div. 2 Gr. E,F,&G (Se Screw Cover with SS Chain Supplied with ceramic terminal block. Phenolic Blocks availab Aluminum, NEMA 4 Stainless Steel, NEMA 4X	ee Note 1) ble. A1P S2X	
Soood and a second	Large Explosion Proof Class I, Div. 1, Gr. B,C, & D, Class II, Div. 2 Gr. E,F,&G (Se No Chain Supplied with phenolic or nylon barrier terminal strip. Aluminum, NEMA 4 Cast Iron Body/ Aluminum Cover, NEMA 4	ee Note 1) A6E I6E	
	In Group "B" Atmospheres, all conduit runs must have a sealing fitting(not supplied) field installed adjacent to the enclosure		
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