

Instructions, ULT Rox™ Ruthenium Oxide RTD Installation, Model RX-102B-RS



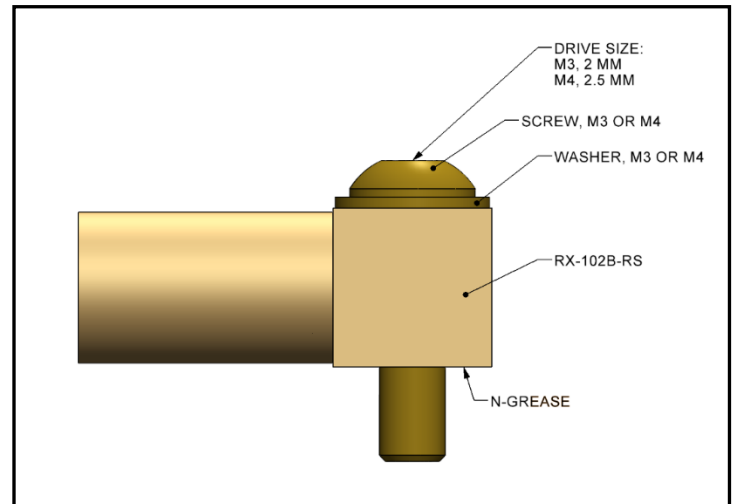
CAUTION: This temperature sensor is sensitive to electrostatic discharge (ESD). Use ESD precautionary procedures when handling, or making mechanical or electrical connections to this device in order to avoid performance degradation or loss of functionality.

CRITICAL INFORMATION

1. **MAX TEMPERATURE:** DO NOT heat the sensor above room temperature. This package is designed for handling below 300 K.
2. **INSTALLATION:** Improper installation may cause the device to not work properly. To replicate the calibration environment and optimize thermal conductivity, use a brass screw (included) and Apiezon® N grease. Adhering to the specified maximum torque values ensures optimal thermal contact without damaging the sensor package.

SENSOR MOUNTING

1. **MOUNTING HARDWARE:** The RX-102B-RS sensor is designed for screw mounting. The through hole will accommodate either a M3 or a M4 screw, provided. Alternatively sized fasteners and mounting hole sizes may be used if properly sized to the device through hole. Washers or spring washers should be used with the fastener to avoid damaging the surface of the sensor and distributing load upon tightening. The screws and threaded hole should be longer/deeper than 1.5X the fastener diameter to avoid stripping or damaging threads. When possible, mounting through holes are best to avoid entrapped air. Vented fasteners should be used otherwise.
2. **CLEAN:** Clean the mating surfaces on the sensor body and system with a solvent such as acetone followed by an isopropyl alcohol rinse. Allow the solvents to evaporate.
3. **APPLY GREASE:** Apply a small amount of Apiezon® N grease on the flat surface around the mounting hole on the sensor—this is the side that comes into contact with the system and not where the fastener goes. Use a minimum amount of grease with the goal being to increase contact surface by filling voids. Avoid an excess, which could become a thermal barrier.
4. **ATTACH:** Attach the device using the appropriate screw with washer:
 - Brass screws and flat washers (suggested):
 - Brass screws contract more than the copper device during cooling. This allows the device to stay in contact with the cold system and increase contact pressure. This replicates Lake Shore's calibration environment.
 - Dry threads
 - Minimum washer OD of 7 mm
 - 1-2 lb-in (0.11-.22 N-m) of torque
 - Stainless steel (SS) screws and spring washers (not suggested):
 - SS screws contract less than the copper device during cooling. This may create a condition where the sensor loses contact or has significantly reduced contact pressure with the cold surface. Lake Shore does not calibrate sensors using SS hardware. Use spring washers to help maintain contact and contact pressure.
 - Dry threads
 - Minimum spring washer OD of 7 mm
 - M3, 5-6 in-lbf (0.56-0.67N-m) of torque
 - M4, 10-12 in-lbf (1.12-1.35N-m) of torque



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HEAT SINKING/THERMAL ANCHORING

The sensor is wired in a two-lead configuration, each wire being 36 AWG (0.127 mm diameter) copper wire, insulated with heavy-build polyimide to an overall diameter of 0.152 mm (0.006 in), 40 cm (16 in) long. This length of wire is provided to allow thermal anchoring with a bobbin or something similar before transitioning to system wiring. There is no polarity for the device. While the device is built as a 2-lead device, it is calibrated with these leads attached to account for the wire. Transition to a 4-lead configuration at the end of the copper leads with your own wire.

1. HEAT SINKING SENSOR LEADS:

- a. Heat flow through the connecting leads can create an offset between the sensor and the true sample temperature. Only un-spool the amount of lead wire from the device for connecting the device.
- b. To minimize heat leak, avoid placing or connecting the sensor lead wire to a location with elevated temperatures.

2. HEAT SINKING 4-WIRE LEAD WIRE HARNESSSES:

- a. Use heat-sinking bobbins to minimize heat leak near the sensor and at other locations in the system.
- b. A minimum of five wraps of wire should be used on the bobbin. If space permits, additional wraps are recommended.
- c. To maintain good electrical isolation over many thermal cycles, IMI 7031 varnish may be used to improve the connection of the wire to the heat-sinking bobbin. Once IMI varnish is applied, the wires cannot be disturbed until all solvents evaporate and the varnish fully cures (typically 12 to 24 hours).

For complete product description and detailed specifications on the above accessories and instruments, consult the Lake Shore Temperature Measurement and Control Catalog, call (614) 891-2244, E-mail sales@lakeshore.com, or visit our web site at www.lakeshore.com.

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