Bearing Temperature Sensor
Incoming Inspection Criteria

This Engineering Instruction describes the recommended inspections and tests to determine if a new bearing temperature sensor meets specifications as received.

1.0 Continuity Test: Use a multimeter (set on the lowest "Ohms" range) to measure the resistance between the leadwires.

For RTDs (Resistance Temperature Detectors), the room temperature resistance of the element (measured between Red and White, or Blue and Yellow leadwires) varies between 10 ohms (for copper RTDs) and 220 ohms (for 200 ohm platinum RTDs). See chart below for approximate room temperature resistance for common RTD types. For RTDs with 3 leadwires (or 6 in the case of dual elements), the reading between the common leadwires (White to White or Yellow to Yellow) usually is less than 5 ohms.

RTD Resistance at Room Temperature

RTD Type	Minco Code	Resistance at Room Temperature (approximate)
10Ω Copper	CA	10Ω
100Ω Platinum	PA, PB, PD, PE	110Ω
120Ω Nickel	NA	140Ω
200Ω Platinum	PN	220Ω
1000Ω Platinum	PF	1100Ω

For T/Cs (Thermocouples), the resistance depends on the wire size and length per the table below.

Thermocouple Wire Resistance, Ohms per 2 Lead Foot at Room Temperature

Wire Size (AWG #)	Type E Purple - Red	Type J White - Red	Type K Yellow - Red	Type T Blue - Red
18	.45	.22	.37	.19
20	.71	.36	.59	.30
24	1.78	.88	1.49	.75
26	2.84	1.40	2.38	1.20
30	7.17	3.55	5.98	3.04

2.0 Insulation Test: There are two options for testing insulation resistance.

2.1 Megohm Meter Test: Set megohm meter measuring voltage to 100 volts DC and the resistance to the 10 megohm scale. Measure the insulation resistance between any leadwire and the sensor case (or the bearing, if the sensor is already installed in it). If the sensor leadwires have stainless steel braid, also measure between any leadwire and the braid (Note: Make sure that the stainless steel braid does not touch the stripped portion of the leadwire when performing this test). Sensor should read 10 megohms minimum. Caution should be taken when megohm meter is energized, it can deliver a substantial electrical shock.

2.2 Multimeter Test: If a megohm meter is not available the insulation can be tested using a standard multimeter. Set multimeter on the highest "Ohms" range and measure the insulation resistance between any leadwire and the sensor case (or the bearing, if the sensor is already installed in it). If the sensor leadwires have stainless steel braid, also measure between any leadwire and the braid (Note: Make sure that the stainless steel braid does not touch the stripped portion of the leadwire when performing this test). Replace the sensor if the insulation resistance measures less than 10 megohms.

Note: The insulation test cannot be done on a T/C sensor which has a grounded junction. If you are uncertain whether the T/C is grounded, check the instruction manual for the monitoring instrument, and/or the wiring schematic.

3.0 Visual and Mechanical Inspection: Carefully pull the entire length of the sensor leadwires through your fingers to detect any damage (cuts, nicks, crushing, etc.) to the Teflon insulation and fraying of the stainless steel braid (when used). If the braid has broken strands, they can pierce the Teflon insulation, causing an electrical short-circuits. Replace the sensor if the Teflon is damaged or if the stainless steel braid has broken strands or shows signs of fraying.

If not already installed in the bearing, inspect the path by which the sensor leadwires exit the bearing housing. Deburr all sharp metal edges to prevent damaging the sensor leadwires or fraying of the braid. Secure the sensor leadwires so they cannot loosen and rub against the bearing or housing during normal equipment operation. Where the leadwires are bent around a corner, provide enough wire length so the leadwires do not rub against the bearing or housing leadwire during normal operation. Do not pinch the leadwires because this could damage the Teflon insulation.

Request the following Engineering Instructions for the Suggested Installation Procedure Of Temperature Detectors In:

EI164 Sleeve Bearing Case Style A, Babbitt Method
EI167 Thrust Bearing Case Style A, Babbitt Method
EI180 Thrust Bearing Case Style B, Babbitt Method
EI181 Thrust Bearing Case Style B, Spring And Ring Method
EI184 Bearing Shoe Case Style C And D, Potting Method

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