HAZARDOUS ROOM SERIES TEMPERATURE TRANSMITTER

Installation & Operation Instructions

Phone: 1-888-967-5224
Website: workaci.com

GENERAL INFORMATION

The ACI Hazardous Room Sensor Transmitter is a single point wall mounted temperature sensor that is designed for use with electronic controllers in commercial and industrial heating and cooling building management systems. It is available with 4-20 mA with an optional voltage signal output of 1-5VDC or 2-10VDC signal to BAS or controller. All ACI/TT and TTM temperature transmitters can be powered from either an unregulated or regulated 8.5 to 32 VDC power supply. Hazardous Room sensors come standard with a heavy-duty Copper-Free Aluminum Connection Head that meets Class I, Division 1 & 2, Group A, B, C, D; Class II, Division 1, Groups E, F, G; Class II, Division 2, Group F & G; class III standards.

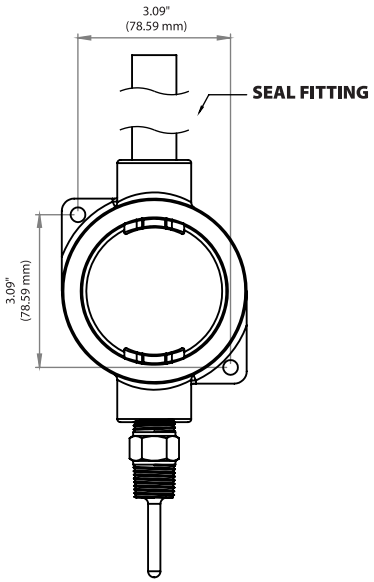
For optimal temperature measurement, follow these tips:

- Do not install on external walls.
- Do not install near heat sources. eg: lamps, radiators, direct sunlight, copiers, chimney walls, walls concealing hot-water pipes.
- Avoid air registers, diffusers, vents, and windows

ASSEMBLY INSTRUCTIONS

The enclosure and probe assembly are shipped separately. Insert the lead wires through the threaded hole on the explosion proof enclosure.

FIGURE 1: ENCLOSURE DIMENSIONS



Thread the probe fitting into the hole and fasten tightly with channel lock pliers/wrench.

Note: If a NIST certified sensor is ordered, the sensor probe serial number must be paired with the enclosure serial number.

MOUNTING INSTRUCTIONS

This product must be installed by a trained professional with knowledge of local codes and regulations. Before carrying out any work, ensure local regulations and site procedures are followed to maintain the overall certification of the sensor. The sensor should be mounted in an area where air circulation is well mixed and not blocked by obstructions.

For mounting on a wall, ACI recommends a height of 48-60" (1.2-1.5 m) off the ground and at least 1.5' (0.5 m) from the adjacent wall. Remove the cover from the housing by twisting off the cover. Attach the base directly to the wall. Mounting holes are located at the corners of the housing – see **FIGURE 1** (above). Seal fittings, intrinsically safe barriers, and explosion proof flex fittings **are not provided by ACI.**

Drill pilot holes for the mounting screws. Use the enclosure mounting holes as a guide, or use the dimensions listed in **FIGURE 1**(p. 1). A 1/2" NPT tapping is located at the top of the enclosure.

Refer to the wiring instructions (p 2) to make necessary connections. The housing is provided with Green ground screw if the housing requires an earth ground. After wiring, attach the cover to the base.

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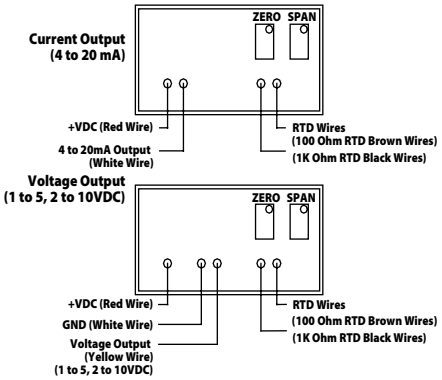
WIRING INSTRUCTIONS

PRECAUTIONS

- **Transmitter is powered by 24 VDC only.**
- **Remove power before wiring. NEVER connect or disconnect wiring with power applied.**
- **When removing the shield from the sensor end, make sure to properly trim the shield to prevent any chance of shorting.**
- **When using a shielded cable, ground the shield ONLY at the controller end. Grounding both ends can cause a ground loop.**
- **If the 24 VDC power is shared with devices that have coils such as relays, solenoids, or other inductors, each coil must have an MOV, DC Transorb, Transient Voltage Suppressor (ACI Part: 142583), or diode placed across the coil or inductor. The cathode, or banded side of the DC Transorb or diode, connects to the positive side of the power supply. Without these snubbers, coils produce very large voltage spikes when de-energizing that can cause malfunction or destruction of electronic circuits.**

FIGURE 2: WIRING DIAGRAMS



Open the cover of the enclosure. ACI recommends 16 to 26 AWG twisted pair wires or shielded cable for all transmitters. Twisted pair may be used for 2-wire current output transmitters or 3-wire for voltage output. Refer to **FIGURE 2** for wiring connections. The number of wires needed depends on the application. All wiring must comply with all local and National Electric Codes.

Note: All RTD's are supplied with (2) or (3) flying lead wires. ACI's transmitters are supplied with a 2 pole terminal block for RTD sensor connections. When wiring a 3 wire RTD, connect the (2) common wires (same color) together into the same terminal block.

All ACI TT and TTM temperature transmitters can be powered from either an unregulated or regulated 8.5 to 32VDC power supply. The TT and TTM DO NOT support an AC input. All TT and TTM temperature transmitters are reverse polarity protected. After wiring, attach the cover to the enclosure.

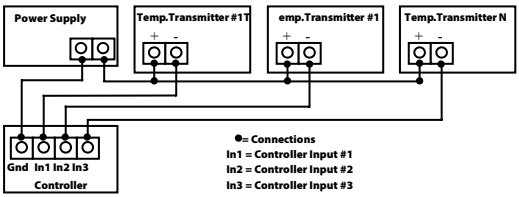
Note: The minimum voltage at the transmitter power terminal is 8.5V after load resistor voltage drop.

- 249 Ω load resistor (1-5VDC output) = 13.5V min supply voltage
- 499 Ω load resistor (2-10VDC output) = 18.5V min supply voltage

Formula for Number of Transmitters

Several transmitters may be powered from the same supply as shown in **FIGURE 3**. Each transmitter draws 25mA; refer to the following equation to obtain the number of permissible transmitters: ***[# Transmitters] =[Current]/(25mA).***

FIGURE 3: MULTIPLE TRANSMITTER CONNECTIONS



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PRODUCT SPECIFICATIONS

SENSOR NON-SPECIFIC	
Number Sensing Points:	One
Storage Temperature Range:	-40 to 85 °C (-40 to 185 °F)
Operating Humidity Range:	10 to 95% RH, non-condensing
Enclosure Specifications: (Temperature, NEMA Ratings)	**"-R" Enclosure:** Copper-Free Aluminum, -50 to 60 °C (-58 to 140 °C), NEMA 3, 4, 7ABCD, 9EFG
Enclosure Explosion Proof Rating:	CL. I, Div. 1 & 2, Groups A, B, C, D
Enclosure Dust-Ignition Proof Rating:	CL. II, Div. 1, Groups E, F, G
Enclosure Raintight Rating:	CL. II, Div. 2, Groups F, G
Enclosure Wet Locations Rating:	CL. III
Enclosure UL Standards:	**"-R" Enclosure:** UL 1203
Enclosure CSA Standards:	C22.2 No. 30
Enclosure Hubs | Hub Size:	Two | 1/2" NPT (National Pipe Tapered) Female Hubs
Probe Diameter | Sensor Threads:	0.250" (6.35mm) | ½" NPT Thread
Probe Material:	304 Stainless Steel
SENSOR	
Sensor Type | Sensor Curve:	Platinum RTD | PTC (Positive Temperature Coefficient)
Number Sensor Wires | Wire Colors:	Two | **A/TT100/TTM100-EXPL:** Brown/Brown | **A/TT1K/TTM1K-EXPL:** (Black/Black)
Nominal Sensor Output @ 0°C (32°F):	**A/TT100/TTM100-EXPL:** 100 Ohms | **A/TT1K/TTM1K-EXPL:** 1000 Ohms
Sensor Tolerance Class | Accuracy:	+/- 0.06% Class A | (**Tolerance Formula:** +/- ºC = (0.15ºC + (0.002 * |t|)) where |t| is the absolute value of Temperature above or below 0ºC in ºC)
Din Standard | Temperature Coefficient:	DIN EN 60751 (IEC 751) | 3850 ppm / ºC
Sensor Stability:	+/- 0.03% after 1000 Hours @ 300ºC (572ºF)
Sensor Operating | Storage Temperature Ranges:	-40 to 200ºC (-40 to 392ºF) | -40 to 85ºC (-40 to 185ºF)
TRANSMITTER	
Transmitter Supply Voltage | Supply Current:	+8.5 to 32 VDC (Reverse Polarity Protected) | 25 mA minimum **250 Ohm Load (1-5 VDC):** +13.5 to 32 VDC | **500 Ohm Load (2-10 VDC):** +18.5 to 32 VDC
Operating | Storage Temperature Range:	-40°F to 185°F (-40°C to 85°C)
Maximum Load Resistance:	(Terminal Voltage - 8.5 V) | 0.020 A
Output Signals:	**Current:** 4-20 mA (2-Wire; Loop Powered) | **Voltage:** 1-5 VDC or 2-10 VDC (3-Wires)
Calibrated Transmitter Accuracy | Linearity:	**Temp. Spans < 500ºF (260ºC):** +/- 0.2% | **Temp. Spans > 500ºF (260ºC):** +/- 0.5%
Temperature Drift:	**Temp. Spans < 100ºF (38ºC):** +/- 0.04%/ºF | **Temp. Spans > 100ºF (38ºC):** +/- 0.02%
Warm Up Time | Warm Up Drift:	10 Minutes | +/- 0.1%
Calibrated Temperature Spans1:	**Minimum Temp. Span:** 50ºF (28ºC) | **Maximum Temp. Span:** 500ºF (260ºC)

Note[1]: Transmitter's calibrated at 71 °F (22 °C) nominal \| **Note[2]:** Thermal Drift is referenced to 71 °F (22 °C) nominal calibration temperature

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TROUBLESHOOTING

PROBLEM	SOLUTION(S)
No Reading	• No power to board - check voltage at power terminal - should be between +8.5 and 32 VDC.
Reading too Low	• RTD shorted. Measure the resistance of RTD with an ohmmeter. Reading should be close to 100 Ω or 1 KΩ. • RTD Improper range of transmitter (too low). Check current or voltage - should be between 4-20 mA, 1-5 V, or 2-10 V.
Reading too High	• RTD opened. Measure the resistance of RTD with an ohmmeter. Reading should be close to 100 Ω or 1 KΩ. • Improper range of transmitter (too high). Check current or voltage - should be between 4-20 mA, 1-5 V, or 2-10 V.
Reading is Inaccurate	• **Sensor check:** Measure the resistance of RTD with an ohmmeter. Compare the resistance reading to the Temperature vs Resistance curves located on ACI's website. • **Transmitter check:** Determine that the proper output is being transmitted based on predetermined span: 1. Go to ACI Website, Span to Output Page: http://www.workaci.com/content/span-output 2. Enter the low end of the span 3. Enter the high end of the span 4. Click on the output of the transmitter. This will generate a span to output chart. 5. Measure output of transmitter. 6. Compare measured output to calculated output

WARRANTY

The ACI Hazardous Room Series temperature sensors is covered by ACI's Five (5) Year Limited Warranty, which is located in the front of ACI'S SENSORS & TRANSMITTERS CATALOG or can be found on ACI's website: www.workaci.com.

W.E.E.E. DIRECTIVE

At the end of their useful life the packaging and product should be disposed of via a suitable recycling centre. Do not dispose of with household waste. Do not burn.

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