



WALL PLATE SERIES TEMPERATURE TRANSMITTER

Installation & Operation Instructions

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GENERAL INFORMATION

The ACI Wall Plate Series sensors and transmitters are single point sensors that output 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.

MOUNTING INSTRUCTIONS

For optimal temperature measurement, follow these tips:

- Do not install on external walls.
- Avoid air registers, diffusers, vents, and windows.
- Do not install near heat sources. eg: lamps, radiators, direct sunlight, copiers, chimney walls, walls concealing hot-water pipes.
- Eliminate and seal all wall and conduit penetrations. Air migration from wall cavities may alter temperature readings.
- Avoid confined areas such as shelves, closed cabinets, closets, and behind curtains.

The ACI Stainless Plate temperature sensors are mounted on the back of a 1 Gang stainless steel plate. The foam pad will insulate the sensor from any drafts in the wall. There are (2) 6-32 x 3/4" machine screws provided for junction box mounting. Remove plastic film off stainless steel cover.

Take care when mounting. Check local code for mounting height requirements. Typical mounting heights are 48-60" (1.2-1.5 m) off the ground and at least 1.5' (0.5 m) from the adjacent wall. The sensor should be mounted in an area where air circulation is well mixed and not blocked by obstructions.

Refer to the **Wiring Instructions** (p. 2-3) to make necessary connections.

FIGURE 1: PLATE DIMENSIONS

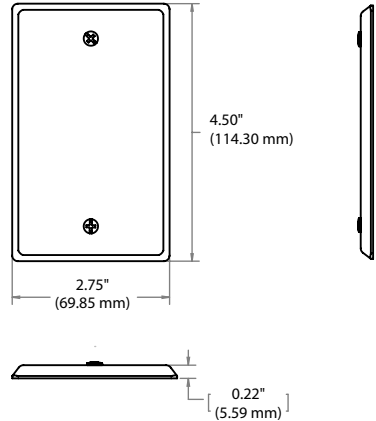
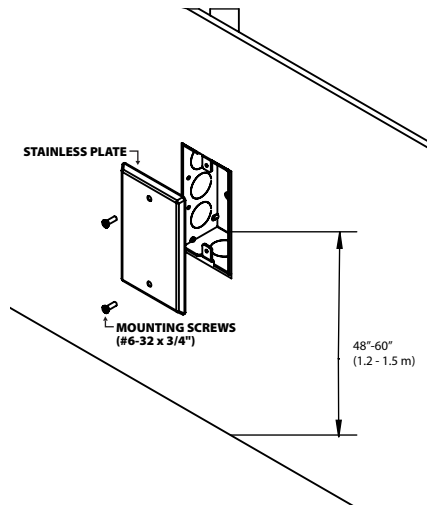


FIGURE 2: MOUNTING



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.

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 3** (right) for wiring diagrams. All wiring must comply with local and National Electric Codes. All ACITT 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.

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

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

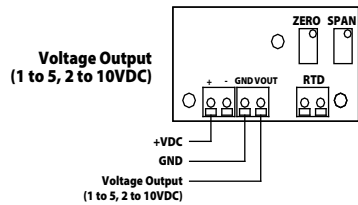
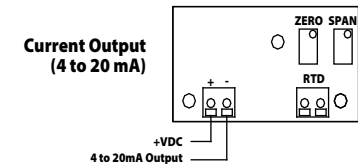
Note: Adding extra wire length between the sensor and transmitter board may affect accuracy.

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.

FORMULA FOR NUMBER OF TRANSMITTERS

Several transmitters may be powered from the same supply as shown in **FIGURE 4** (p. 3). Each transmitter draws 25mA; refer to the following equation to obtain the number of permissible transmitters: $[# \text{ Transmitters}] = [\text{Current}] / (25 \text{ mA})$.

FIGURE 3: WIRING DIAGRAMS
STANDARD UNITS



POTTED UNITS

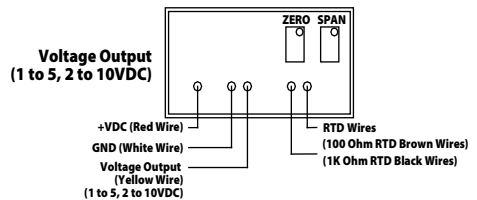
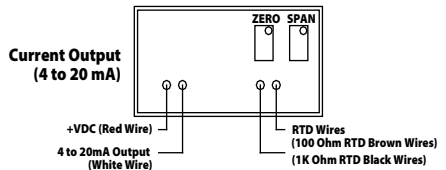
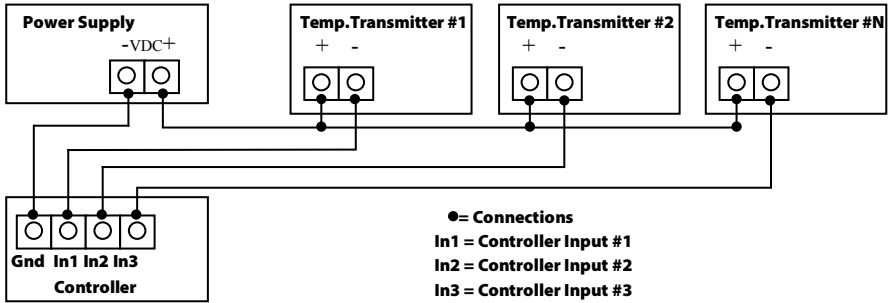


FIGURE 5: MULTIPLE TRANSMITTER CONNECTIONS



TROUBLESHOOTING

TEMPERATURE PROBLEM

No Reading

- No power to board - check voltage at power terminal - should be between +8.5 and 32 VDC.

Reading too Low

- RTD wires shorted. Disconnect wires from terminal block and check with 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. Disconnect sensor wires from terminal block and check with 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:** Disconnect sensor wires from terminal block and check with ohmmeter. Compare the resistance reading to the Temperature vs Resistance curves located on ACI's website.
- **Transmitter check:** Make sure sensor wires are connected to terminal block. 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 Wall Plate Series temperature sensors are 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.

PRODUCT SPECIFICATIONS

SENSOR NON-SPECIFIC	
Storage Temperature Range:	-40 to 71 °C (-40 to 160 °F)
Operating Humidity Range:	5 to 90% RH, non-condensing
Lead Length Conductor Size:	14" (35.6cm) 22 AWG (0.65mm)
Lead Wire Insulation Wire Rating:	Etched (PTFE) Teflon Colored Leads MIL-W-16878/4 (Type E)
Conductor Material:	Silver Plated Copper
Plate Material:	SP Series: 430 Stainless Steel (Brushed Stainless Steel Finish)
SENSOR	
Sensor Type Sensor Curve Sensing Points:	Platinum RTD PTC (Positive Temperature Coefficient) One
Number Wires Wire Colors:	Two A/TT100/TTM100-SP: Brwn/Brwn A/TT1K/TTM1K-SP: Blk/Blk
Sensor Output @ 0°C (32°F):	A/TT100/TTM100: 100 Ω A/TT1K/TTM1K: 1 KΩ
RTD Tolerance Class Sensor Accuracy:	+/- 0.06% Class A (Tolerance Formula: +/- °C = (0.15 °C + (0.002 * t)) where t is the absolute value of temperature above or below 0 °C in °C)
Din Standard Temperature Coefficient:	DIN EN 60751 (IEC 751) 3850 ppm / °C
Sensor Stability:	+/- 0.03% after 1000 Hours @ 300 °C (572vF)
Response Time (63% Step Change):	20 Seconds nominal
Operating Temperature Range:	35 to 160 °F (1.5 to 71 °C)
TRANSMITTER	
Transmitter Supply Voltage 	+8.5 to 32 VDC (Reverse Polarity Protected) 25 mA minimum
Supply Current:	250 Ω Load: +13.5 to 32 VDC 500 Ω Load: +18.5 to 32 VDC
Maximum Load Resistance:	(Terminal Voltage - 8.5 V) 0.020 A
Output Signals:	Current: 4-20 mA (2-Wire) Voltage: 1-5 VDC or 2-10 VDC (3-Wires)
Calibrated Accuracy Linearity¹:	T. Spans < 500 °F (260 °C): +/- 0.2%
Thermal Drift²:	T. Spans < 100 °F (38 °C): +/- 0.04%/°F T. Spans > 100 °F (38 °C): +/- 0.02%
Min./Max. Calibrated Temperature Spans:	Min. T. Span: 50 °F (28 °C) Max T. Span: 400 °F (204 °C)
TTM100/TTM1K Certification Points:	3 Pt. NIST: 20, 50, & 80% of span 5 Pt. NIST: 20, 35, 50, 65, & 80% of span
Warm Up Time Warm Up Drift:	10 Minutes +/- 0.1%
Connections Wire Size:	Screw Terminal Blocks 16 AWG (1.31 mm ²) to 26 AWG (0.129 mm ²)
Terminal Block Torque Rating:	0.37 ft-lb (0.5 Nm) nominal

Note¹: Transmitter's calibrated at 71 °F (22 °C) nominal | **Note²:** Thermal Drift is referenced to 71 °F (22 °C) nominal calibration temperature

