



ROOM SERIES TEMPERATURE TRANSMITTER

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Installation & Operation Instructions

GENERAL INFORMATION

The ACI Room 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.
- Avoid confined areas such as shelves, closed cabinets, closets, and behind curtains.
- Eliminate and seal all wall and conduit penetrations. Air migration from wall cavities may alter temperature readings.
- A thermally-insulated backing should be used when fitting to solid walls (concrete, steel, etc.). ACI part: A/ROOM-FOAM-PAD
- Do not install near heat sources, eg: lamps, radiators, direct sunlight, copiers, chimney walls, walls concealing hot-water pipes.

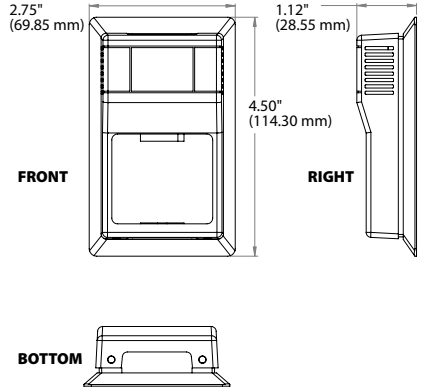
Separate the cover from the base. Attach the base directly to the wall or to a standard 2" x 4" junction box using the (2) #6-32 x 1" screws provided.

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 - see **FIGURE 2** (p.2).

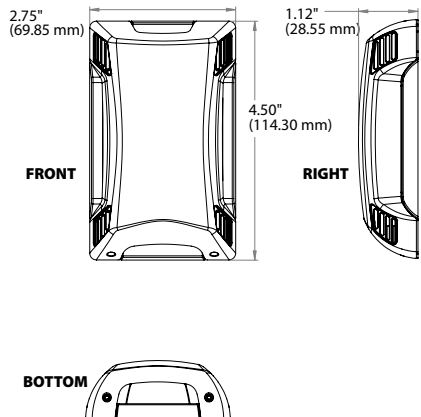
Refer to the **Wiring Instructions** (p. 2-3) to make necessary connections. After wiring, attach the cover to the base by snapping the top of the cover on first and then the bottom. Tighten the cover down, using the (2) 1/16" Allen screws located in the bottom of the housing. A 1/16" Hex driver is needed to secure the cover to the base.

FIGURE 1: ROOM DIMENSIONS

ROOM, VERSION 1 [R]



ROOM, VERSION 2 [R2]



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) and **TABLE 1** (p. 3) 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.

Note: If the A/TT-RSO is selected with both the temperature and the setpoint transmitter features, 50mA is required from a single power source.

Note: The A/TT-RSO temperature transmitter function and setpoint transmitter function can be operated with two power sources to allow for separate 4-20mA current loops.

Note: If the A/TT-RSO is selected with the resistance setpoint feature, the setpoint resistance supports a maximum of 0.25 Watt power dissipation capability.

FIGURE 2: MOUNTING

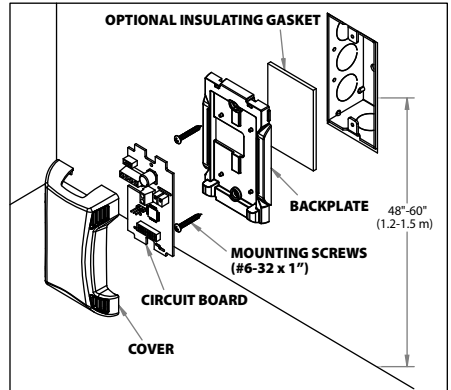


FIGURE 3: PCB

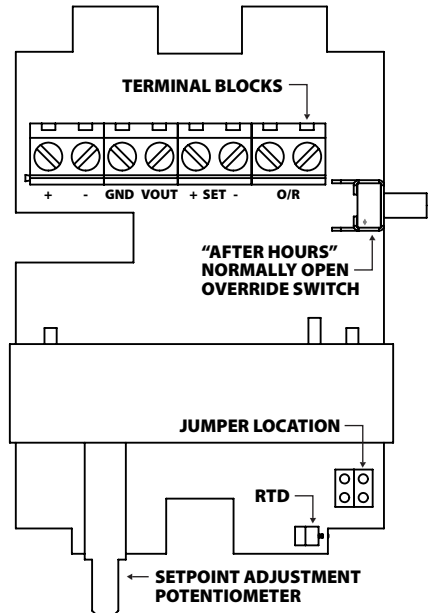


TABLE 1: TERMINAL BLOCK CONNECTIONS

CURRENT OUTPUT (4-20mA)

TERMINAL BLOCK	CONNECTION
(+)	250 ohm load: +13.5 to 32VDC 500 ohm load: +18.5 to 32VDC
(-)	4-20mA temperature sensor signal to controller analog input
GND	(NOT USED)
VOUT	(NOT USED)
SET (+)	250 ohm load: +13.5 to 32VDC 500 ohm load: +18.5 to 32VDC
SET (-)	4-20mA setpoint signal to controller analog input
O/R (Dry Contact)	Override signal to controller analog input
O/R (Dry Contact)	Override signal common to controller analog input

VOLTAGE OUTPUT (1-5VDC or 2-10VDC)

TERMINAL BLOCK	CONNECTION
(+)	+8.5 to 32VDC
(-)	(NOT USED)
GND	(-) Ground / common power supply
VOUT	1-5VDC or 2-10VDC temperature sensor signal to controller analog input
SET (+) (Resistive)	Set point signal to controller analog input
SET (-) (Resistive)	Set point signal common to controller analog input
O/R (Dry Contact)	Override signal to controller analog input
O/R (Dry Contact)	Override signal common to controller analog input

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.

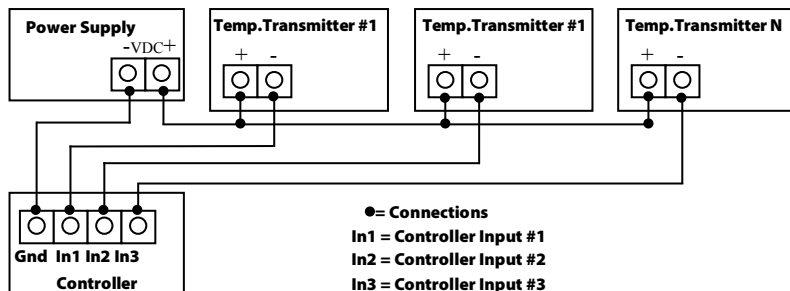
Note: The minimum voltage at the transmitter power terminal is 8.5V after load resistor voltage drop.

- 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 4** (below). Each transmitter draws 25mA; refer to the following equation to obtain the number of permissible transmitters: **[# Transmitters] = [Current]/(25 mA)**.

FIGURE 4: MULTIPLE TRANSMITTER CONNECTIONS



SETPOINT CONTROL

Adjust slider at bottom of housing for set point control. Slide to right to increase set point temperature. Slide to left to decrease temperature control. Units can be setup from factory for Direct Acting (resistance increases when adjusted to right), or Reverse Acting (resistance decreases when adjusted to right).

OVERRIDE OPTIONS

Override will be set to Separate Input (Dry Contact Closure).

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 shorted. Remove both J35 jumper shunts (bottom right of PCB). Measure the 2 bottom pins with an ohmmeter. Reading should be close to 100 Ω or 1 K Ω .
- 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. Remove both J35 jumper shunts (bottom right of PCB). Measure the 2 bottom pins with an ohmmeter. Reading should be close to 100 Ω or 1 K Ω .
- 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:** Remove both J35 jumper shunts (bottom right of PCB). Measure the 2 bottom pins with an ohmmeter. Compare the resistance reading to the Temperature vs Resistance curves located on ACI's website.
- **Transmitter check:** Make sure J35 jumper shunts are inserted vertically. 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 Room 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	
Number Temperature Sensing Points:	One
Housing Screw Size / Drive Size:	1/16" Allen screws (2 qty) / 1/16" Hex Driver
Override Option:	"Dry Contact" Closure (Separate Input);
Operating Storage Temperature Range:	1.5 to 50 °C (35 to 122 °F) -40 to 65 °C (-40 to 149 °F)
Operating Humidity Range:	5 to 90% RH, non-condensing
Enclosure Material Color:	"-R2" Enclosure: ABS Plastic White, UL94-HB "R" Enclosure: ABS Plastic Beige UL94-HB
SENSOR	
Sensor Type Sensor Curve Sensing Points:	Platinum RTD PTC (Positive Temperature Coefficient) One
Nominal Sensor Output @ 0°C (32°F):	A/TT100: 100 Ohms A/TT1K: 1000 Ohms
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 (572°F)
TRANSMITTER	
Transmitter Supply Voltage Supply Current:	+8.5 to 32 VDC (Reverse Polarity Protected) 25 mA minimum 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



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