STRAP ON SERIES
Installation & Operation Instructions

PRECAUTIONS
- **DO NOT RUN THE WIRING IN ANY CONDUIT WITH LINE VOLTAGE (24/120/230 VAC).**

GENERAL INFORMATION
The ACI Strap-On Series Sensor features a 1.5" square copper plate with the sensor encapsulated to the back side of the plate to improve the thermal conductivity between the pipe and the sensor when an immersion style sensor can't be inserted into the pipe. The Strap-On temperature sensor is a single point temperature sensor that is designed for use with electronic controllers in commercial heating and cooling building management systems. It is available with multiple thermistor and RTD options.

The Strap-On series sensor can be used to monitor pipe sizes from 1-1/4" to 10" (31.75mm to 254mm). The "-S" Model is designed to fit around an 1-1/4" to 4" (31.75mm to 101.5mm) pipe. The "-S10" Model is designed to fit around a 2" to 10" (50.8mm to 101.5mm) pipe. The "-S" Model can be mounted to larger diameter pipe by adding an additional hose clamp.

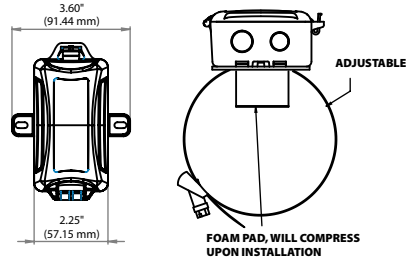### For optimal temperature measurement, follow these tips:
- Clean the pipe with an emery cloth or file before applying thermal grease and insulate the sensor from the effects of ambient air.
- The sensing element is the 1.5" square copper plate. Applying thermal grease in-between the sensor plate and pipe is recommended, but not required.
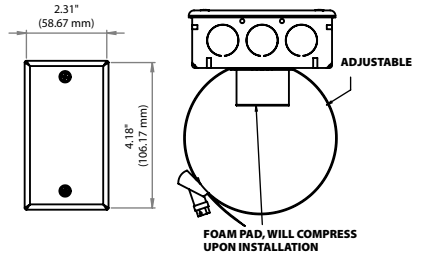
MOUNTING INSTRUCTIONS
If there is insulation around the pipe, remove a section of insulation to accommodate the width of the junction box and sensor. The sensor should be mounted on the top or side of the pipe. Press the sensor copper plate to the cleaned pipe surface, and tighten the clamp around the pipe. Take care not to overtighten clamp to prevent damage to the copper heat transfer plate or sensor.
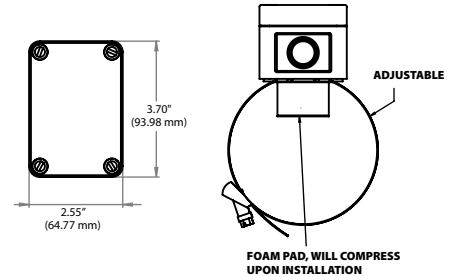
FIGURE 1: ENCLOSURE DIMENSIONS
PLASTIC BOX (-PB)

3.60" (91.44 mm)
2.25" (57.15 mm)
ADJUSTABLE
FOAM PAD, WILL COMPRESS UPON INSTALLATION

GALVANIZED ENCLOSURE (-GD)

2.31" (58.67 mm)
4.18" (106.17 mm)
ADJUSTABLE
FOAM PAD, WILL COMPRESS UPON INSTALLATION

NEMA -4X (-4X)

3.70" (93.98 mm)
2.55" (64.77 mm)
ADJUSTABLE
FOAM PAD, WILL COMPRESS UPON INSTALLATION

FIGURE 2: MOUNTING ASSEMBLY

INSULATION

PIPE

FIGURE 3: ROOM, FOAM PAD

INSULATION ADDED TO COVER SENSOR. INSULATION CAN WRAP AROUND ENTIRE ENCLOSURE.
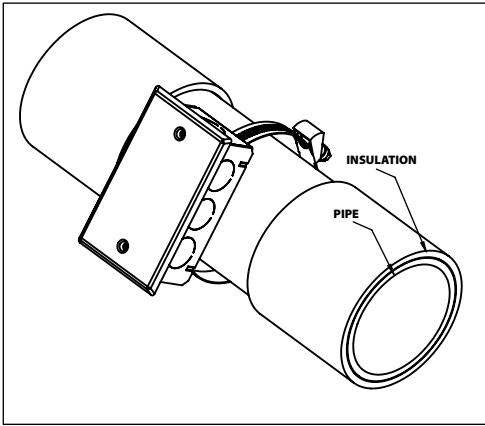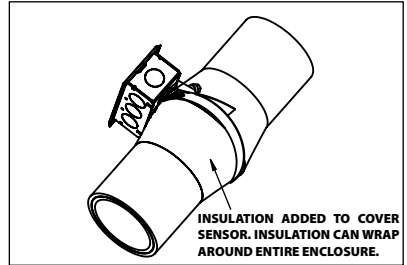
MOUNTING (CONTINUED)

As you are tightening the clamp, make sure the sensor does not rotate. Place insulation around the sensing point to prevent ambient air affecting the sensed temperature - see **FIGURE 3**.

WIRING INSTRUCTIONS

Open the cover of the enclosure. ACI recommends 14 to 22 AWG twisted pair wires or shielded cable for all sensors. Signal wiring must be run separate from low and high voltage wires (24/120/230VAC). All ACI thermistors and RTD temperature sensors are both non-polarity and non-position sensitive. Thermistor sensors are supplied with (2) flying lead wires, and RTD's are supplied with (2) or (3) flying lead wires – see **FIGURE 4**. The number of wires needed depends on the application.
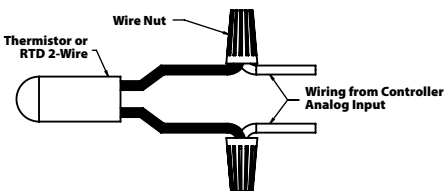
Connect thermistor/RTD wire leads to controller analog input wires using wire nuts, terminal blocks, or crimp style connectors. All wiring must comply with all local and National Electric Codes. After wiring, attach the cover to the enclosure.

Note: When using a shielded cable, connect only (1) end of the shield to ground at the controller only. Connecting both ends of the shield to ground may cause a ground loop. When removing the shield from the sensor end, make sure to properly trim the shield to prevent any chance of shorting.
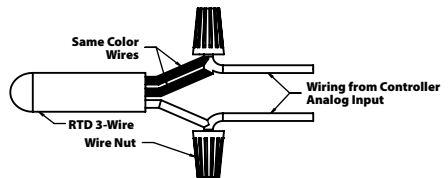
Note: If the controller requires a (2) wire input for a RTD, connect the (2) common wires(same color) together. If the controller requires (3) wires, use (3) individual wires.

FIGURE 4: WIRING

2-WIRE THERMISTOR or RTD WIRING

Wire Nut

Thermistor or RTD 2-Wire

Wiring from Controller Analog Input

3-WIRE RTD WIRING

Same Color Wires

Wiring from Controller Analog Input

RTD 3-Wire

Wire Nut

Version: 2.0
I0000819

TROUBLESHOOTING

PROBLEM	SOLUTION(S)
Sensor reading is incorrect	• Verify sensor wiring to controller is not damaged and has continuity. • Verify sensor or wires are not shorted together. • Verify controller is setup for correct sensor curve. • Disconnect wires from sensor terminal block, tighten terminal block screws down, and take a resistance (ohm) reading with a multimeter. • Compare the resistance reading to the Temperature Vs Resistance Curves online: *http://www.workaci.com/content/thermistor-curves-0* • Verify proper mounting location to confirm no external factors are affecting reading.
Sensor reads infinity/very high resistance	• Sensor or wires are open.
Sensor reads low resistance	• Sensor or wires are shorted together.
Erratic readings	• Condensation on PCB board • Bad wire connections.

WARRANTY

The ACI Strap On 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 INFORMATION	
Number Sensing Points:	One
Storage Temperature Range:	-40 to 85 °C (-40 to 185 °F)
Operating Temperature Range:	(see **Enclosure Specifications**)
Operating Humidity Range:	10 to 95% RH, non-condensing
Wire Size	22 AWG (0.65 mm)
Enclosure Specifications: (Temperature, NEMA Ratings)	**A/xx-S-GD:** Galvanized Steel, -40 to 93 °C (-40 to 200 °F), NEMA 1 (IP 10)
	A/xx-PB: ABS Plastic, -30 to 85 °C (-22 to 185 °F), UL94-HB, Plenum Rated
	A/xx-S-4X: Polystyrene, -40 to 70 °C (-40 to 158 °F), UL94-V2, NEMA 4X (IP 66)

THERMISTOR		
Sensor Output @ 25 °C (77 °F): (Lead Wire Colors) *Does not include CL2P	**A/1.8K:** 1.8 KΩ nominal (Red/Yellow) **A/3K:** 3 KΩ nominal (White/Brown) **A/AN (Type III):** 10 KΩ nominal (White/White) **A/AN-BC:** 5.238 KΩ nominal (White/Yellow) **A/CP (Type II):** 10 KΩ nominal (White/Green) **A/50K:** 50 KΩ nominal (Brown/Yellow)	**A/CSI:** 10 KΩ nominal (Green/Yellow) **A/10KS:** 10 KΩ nominal (White/Blue) **A/10K-E1:** 10 KΩ nominal (Gray/Orange) **A/20K:** 20 KΩ nominal (Brown/Blue) **A/100KS:** 100 KΩ nominal (Black/Yellow)
Accuracy 0-70 °C (32-158 °F):	**A/1.8K Series:** +/- 0.5 °C @ 25 °C (77 °F) and (+/-1.0 °C) (+/-1.8 °F)	**A/10K-E1 Series:** +/- 0.3 °C (+/- 0.54 °F) **All Else:** +/- 0.2 °C (+/- 0.36 °F)

PLATINUM		
Sensor Output @ 0°C (32 °F):	**A/100:** 100 Ω nominal	**A/1K:** 1 KΩ nominal
Accuracy @ 0°C (32°F):	+/- 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)	
	@ -40 °C (-40 °F): +/- 0.23°C (+/- 0.414 °F) **@ 0 °C (32 °F):** +/- 0.15°C (+/- 0.27 °F)	**@ 93 °C (200 °F):** +/- 0.34 °C (+/- 0.61 °F)

NICKEL		
Sensor Output @ 21.1°C (70 °F):	1 KΩ nominal (Red/Red)	
Accuracy:	**@ -40 °C (-40 °F):** +/- 1.52 °C (+/- 2.73 °F) **@ 0 °C (32 °F):** +/- 0.4 °C (+/- 0.72 °F)	**@ 54.4 °C (130 °F):** +/- 0.56 °C (+/- 1.00 °F) **@121 °C (250 °F):** +/- 1.25 °C (+/- 2.25 °F)
	@ 21.1 °C (70 °F): +/- 0.17 °C (+/- 0.34 °F)	

BALCO	
Sensor Output @ 21.1°C (70 °F):	1 KΩ nominal (Orange/Yellow)
Accuracy @ 21.1°C (70 °F):	+/- 1%

CE   RoHS2   20