



# HAZARDOUS DUCT SERIES

Installation & Operation Instructions

Phone: 1-888-967-5224

Website: workaci.com

## PRECAUTIONS

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

## GENERAL INFORMATION

The ACI Hazardous Duct Sensor is a single point temperature sensor that is designed for use with electronic controllers in commercial and industrial heating and cooling building management systems. It is available with multiple thermistor or RTD options. Hazardous Duct sensors come standard with a heavy-duty Feraloy® Iron Alloy 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:**

- The sensor should be mounted in the middle of the duct where air circulation is well mixed (no stratification), and not blocked by obstructions. Stratification and obstructions can cause sensing errors. An example is downstream from a heating or cooling coil.
- The Duct probe should be placed (3) to (4) duct segments down from any bend or obstructions and away from 90° bends.
- Mount the sensor on the top or sides of duct work; mounting on the bottom risks damage due to moisture.

## ASSEMBLY INSTRUCTIONS

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

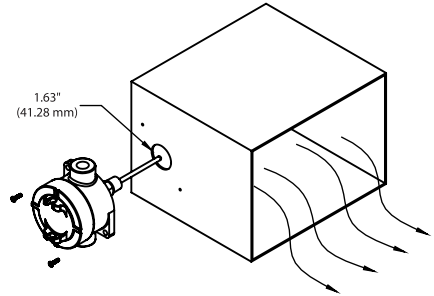
Thread the probe fitting into the hole and fasten tightly with channel lock pliers/wrench.

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

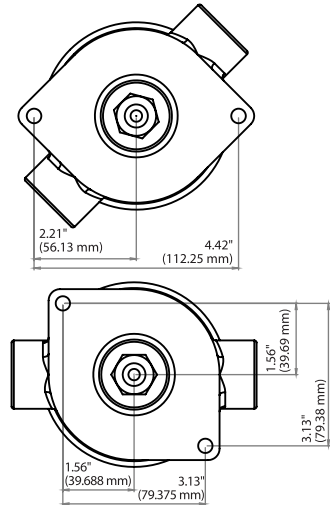
## MOUNTING INSTRUCTIONS

This product must be installed by a trained professional with knowledge of local codes and regulations. Before carrying out any work,

**FIGURE 1: MOUNTED ASSEMBLY**



**FIGURE 2: ENCLOSURE DIMENSIONS**



ensure local regulations and site procedures are followed to maintain overall certification of the sensor.

Drill a hole approximately 1.63" (41.28 mm) in the duct and insert the probe through the hole until the housing is tightly seated to the duct work - see **FIGURE 1** (top). Drill pilot holes for (2) mounting screw (not provided). Use the enclosure flange as a guide, or use the dimensions listed in **FIGURE 2** (bottom). There are 1/2" NPT tappings located



at the top and bottom of the enclosure. Seal fittings, intrinsically safe barriers, and explosion proof flex fittings **are not provided by ACI**.

Refer to the Wiring Instructions (p. 2) to make necessary connections. Remove the cover from housing by twisting off the cover. The housing is provided with Green ground screw if the housing requires an earth ground. After wiring, attach the cover to the base.

## WIRING INSTRUCTIONS

All thermistor type units are supplied with (2) flying lead wires, and all RTD's are supplied with (2) or (3) flying lead wires – see **FIGURES 3** (right). The number of wires needed depends on the application.

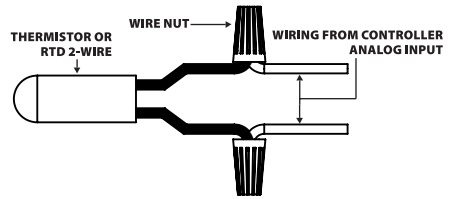
Connect thermistor/RTD wire leads to controller analog input wires using wire nuts, terminal blocks, crimp connectors, or soldering. If the controller requires a (2) wire input for a RTD, connect the (2) common wires (same color) together. All wiring must comply with local codes and National Electric Code.

**Note:** When using a shielded cable, be sure to connect only (1) end of the shield to ground at the controller. 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.

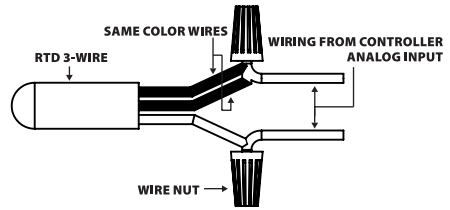
**Note:** If the controller requires a (2) wire input for a RTD, connect the (2) common wires (same color) together. If the controller requires (3) wires, use (3) individual wires.

## FIGURE 3: TEMPERATURE WIRING

### 2-WIRE THERMISTOR or RTD WIRING



### 3-WIRE RTD WIRING



# TROUBLESHOOTING

PROBLEM	SOLUTION(S)
<b>Sensor reading is incorrect</b>	<ul style="list-style-type: none"> <li>Verify sensor wiring to controller is not damaged and has continuity.</li> <li>Verify sensor or wires are not shorted together.</li> <li>Verify controller is setup for correct sensor curve.</li> <li>Disconnect sensor wires, and take a resistance reading with a multimeter.</li> <li>Compare the resistance reading to the Temperature Vs Resistance Curves online: <a href="http://www.workaci.com/content/thermistor-curves-0">http://www.workaci.com/content/thermistor-curves-0</a></li> <li>Verify proper mounting location to confirm no external factors are affecting reading.</li> </ul>
<b>Sensor reads infinity/very high resistance</b>	<ul style="list-style-type: none"> <li>Sensor or wires are open</li> </ul>
<b>Sensor reads low resistance</b>	<ul style="list-style-type: none"> <li>Sensor or wires are shorted together</li> </ul>
<b>Erratic readings</b>	<ul style="list-style-type: none"> <li>Bad wire connections</li> </ul>

# PRODUCT SPECIFICATIONS

## SENSOR NON-SPECIFIC

<b>Number Sensing Points:</b>	One
<b>Storage Temperature Range:</b>	-40 to 85 °C (-40 to 185 °F)
<b>Operating Humidity Range:</b>	10 to 95% RH, non-condensing
<b>Enclosure Specifications:</b> (Temperature, NEMA Ratings)	"-D" Enclosure: Feraloy® Iron Alloy, -50 to 60 °C (-58 to 140 °F), NEMA 3, 4, 7ABCD, 9EFG
<b>Sensor Operating Temperature Range:</b>	<b>Thermistor:</b> -40 to 150°C (-40 to 302°F)   <b>A/CP-HT and RTD:</b> -40 to 200°C (-40 to 392°F)
<b>Enclosure Explosion Proof Rating:</b>	CL I, Div. 1 & 2, Groups A, B, C, D
<b>Enclosure Dust-Ignition Proof Rating:</b>	CL II, Div. 1, Groups E, F, G
<b>Enclosure Raintight Rating:</b>	CL II, Div. 2, Groups F, G
<b>Enclosure Wet Locations Rating:</b>	CL III
<b>Enclosure UL Standards:</b>	<b>Enclosure:</b> UL 886
<b>Enclosure CSA Standards:</b>	C22.2 No. 30
<b>Enclosure Hubs   Hub Size:</b>	Two   1/2" NPT (National Pipe Tapered) Female Hubs
<b>Probe Diameter   Sensor Threads:</b>	0.250" (6.35mm)   1/2" NPT Thread
<b>Probe Material:</b>	304 Stainless Steel

## THERMISTOR

<b>Sensor Output @ 25°C (77°F):</b> (Lead Wire Colors)	<b>A/AN (Type III):</b> 10 KΩ nominal (White/White)	<b>A/1.8K:</b> 1.8 KΩ nominal (Red/Yellow)
	<b>A/CP (Type II):</b> 10 KΩ nominal (White/Green)	<b>A/3K:</b> 3 KΩ nominal (White/Brown)
	<b>A/CP-HT (Type II):</b> 10 KΩ nominal (White/Green)	<b>A/20K:</b> 20 KΩ nominal (Brown/Blue)
	<b>A/10K-E1:</b> 10 KΩ nominal (Orange/Gray)	<b>A/100KS:</b> 100 KΩ nominal (Black/Yellow)
<b>Accuracy 0-70°C (32-158°F):</b>	<b>A/1.8K Series:</b> +/- 0.5 °C @ 25 °C (77 °F) and (+/-1.0 °C) (+/-1.8 °F)	<b>A/10K-E1 Series:</b> +/- 0.3 °C (+/- 0.54 °F) <b>All Else:</b> +/- 0.2 °C (+/- 0.36 °F)

## PLATINUM

<b>Sensor Output @ 0°C (32°F):</b>	<b>A/100:</b> 100 Ω nominal	<b>A/1K:</b> 1 KΩ nominal
<b>Accuracy:</b>	+/- 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)	
	<b>@ -40 °C (-40 °F):</b> +/- 0.23°C (+/- 0.414 °F)	<b>@ 200 °C 392 °F):</b> +/- 0.55 °C (+/- 0.99 °F)
	<b>@ 0 °C (32 °F):</b> +/- 0.15°C (+/- 0.27 °F)	



## WARRANTY

The ACI Hazardous Duct 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](http://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.

