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 Duct 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 or RTD options.

For optimal temperature readings, follow these tips:

- 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.
- 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.

MOUNTING INSTRUCTIONS

Drill a 3/8" hole in the duct and insert the probe through the hole until the foam pad is tight to the duct. Drill pilot holes for the (2) mounting screws. Use the enclosure flange as a guide, or use the dimensions listed below to measure out.

WITHOUT BOX (-DO)

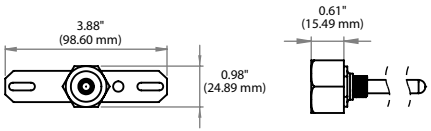
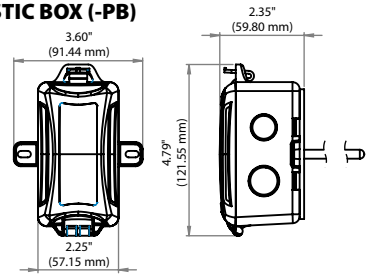
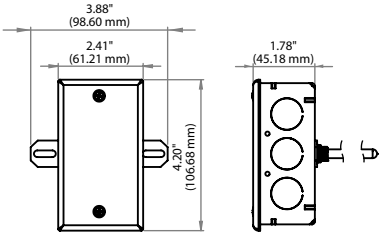


FIGURE 1: ENCLOSURE DIMENSIONS

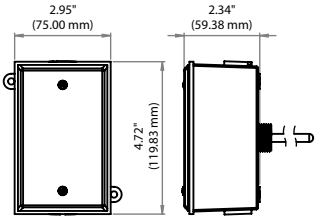
PLASTIC BOX (-PB)



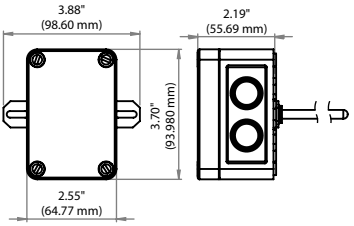
GALVANIZED ENCLOSURE (-GD)



BELL BOX (-BB)



NEMA -4X (-4X)



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MOUNTING *(Continued)*

Now fasten and insert (2) screws #8 x 3/4" TEK (provided and recommended) through the mounting holes in the flange and tighten until the unit is held firmly to the duct. Make sure the foam pad is tight to the duct to eliminate any possible air leaks. Refer to the **Wiring Instructions** (p. 2-3) to make necessary connections.

Note: All enclosures have the foam pad attached. For the "DO" (no enclosure), the foam pad is included, but not installed. The foam pad must be installed prior to mounting.

FIGURE 2: DUCT MOUNTING

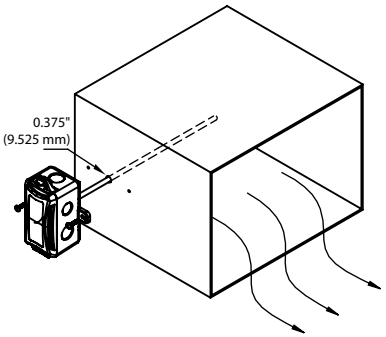
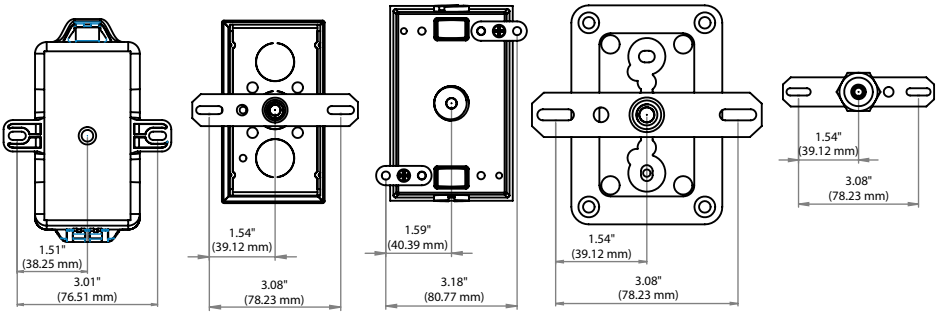


FIGURE 3: MOUNTING FOR DIFFERENT CONFIGURATIONS



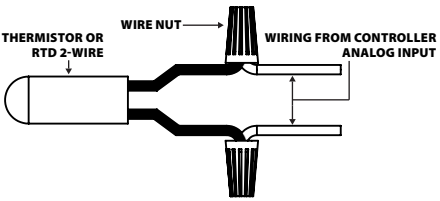
WIRING INSTRUCTIONS

Open the cover of the enclosure. **Note:** GD enclosures will have the cover shipped loose.

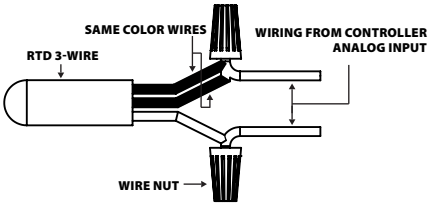
ACI recommends 16 to 26 AWG twisted pair wires or shielded cable for all sensors. Signal wiring must be run separate from low and high voltage wires (24/120/230VAC). All ACI thermistors and RTD temperature sensors are both non-polarity and non-position sensitive. All thermistor type units are supplied with (2) flying lead wires, and all RTD's are supplied with (2) or (3) flying lead wires – see **FIGURE 4** (below). The number of wires needed depends on the application.

FIGURE 4: TEMPERATURE WIRING

2-WIRE THERMISTOR or RTD WIRING



3-WIRE RTD WIRING



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WIRING INSTRUCTIONS *(Continued)*

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, 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.

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 Duct 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.

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PRODUCT SPECIFICATIONS

SENSOR NON-SPECIFIC INFORMATION		
Number Sensing Points:	One	
Storage Temperature Range:	-40 to 80 °C (-40 to 185 °F)	
Operating Humidity Range:	10 to 95% RH, non-condensing	
Probe Material | Diameter:	304 Stainless Steel | 0.250" (6.35 mm)	
Wire Size	22 AWG (0.65 mm)	
Enclosure Specifications: (Temperature, Material, Flammability, NEMA/IP Ratings)	**"-GD" Enclosure:** Galvanized Steel, -40 to 115 °C (-40 to 239 °F), NEMA 1 (IP10) **"-PB" Enclosure:** ABS Plastic, UL94-HB, -30 to 90 °C (-22 to 194 °F), Plenum Rated **"-BB" Enclosure:** Aluminum, -40 to 115 °C (-40 to 239 °F), NEMA 3R (IP 14) **"-4X" Enclosure:** Polystyrene Plastic, UL94-V2, -40 to 70°C (-40 to 158°F), NEMA 4X (IP 66) **"-DO" No Enclosure:** Polyamide 66 (High Performance Nylon), -40 to 115 °C (-40 to 239 °F), UL94-HB	
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:	+/- 0.06% 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): +/- 0.23ºC (+/- 0.414ºF)	**@ 115 °C (239 °F):** +/- 0.38 °C (+/- 0.69 °F)
	@ 0 °C (32 °F): +/- 0.15 °C (+/- 0.27 °F)	
BALCO		
Sensor Output @ 21.1 °C (70 °F): (Lead Wire Colors)	1 KΩ nominal (Orange/Yellow)	
Accuracy:	**@ 21.1 °C (70 °F):** +/- 1%	
NICKEL		
Sensor Output @ 21.1 °C (70 °F): (Lead Wire Colors)	1 KΩ nominal (Red/Red)	
Accuracy:	**@ -40 °C (-40 °F):** +/- 1.52 °C (+/- 2.73 °F)	**@ 54.4 °C (130 °F):** +/- 0.56 °C (+/- 1.00°F)
	@ 0 °C (32 °F): +/- 0.4 °C (+/- 0.72 °F)	**@ 121 °C (250 °F):** +/- 1.25 °C (2.25 °F)
	@ 21.1 °C (70 °F): +/- 0.17 °C (+/- 0.34 °F)	

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