



# FREEZER SERIES SENSOR

Installation & Operation Instructions

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## GENERAL INFORMATION

The ACI Freezer Series features a 3/16" diameter stainless steel probe with a 10 Foot or 30 Foot, 3 Conductor, 24 AWG Plenum rated jacketed Teflon cable. It is designed for use with electronic controllers in commercial heating and cooling building management systems. The Freezer sensors can be used with any of the Single or Triple Point Glycol Kits for use in applications where a Thermal Buffer (slower) response time is desired.

## MOUNTING INSTRUCTIONS

### ENCLOSURE MOUNTING

The enclosure must be mounted outside of the freezer/cooler. On Vertical units, mount on the top of the freezer see **Figure 3** (p. 2). On Horizontal units, mount on the backside or side of the freezer. Attach the base directly to the wall by using double sided tape.

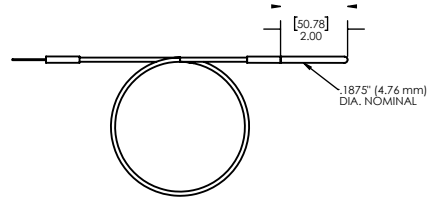
### WIRE INSTALLATION

ACI recommends installing the wire through the door seal, probe access port, or cooler wall. On horizontal units, the preferred method is using the rear door seal as shown in **Figure 4** (p. 2). On vertical units, remove the rear panel. There is typically a probe access hole. Probe and wires can be ran into that access hole. Probe and wires can be drilled a hole just larger than the diameter of the wire (0.125" (3.175 mm)) through the wall. From inside the cooler/freezer, push the wire through the hole. Use mounting clips to secure the wire to the interior wall or shelving. Use silicone caulking to seal the hole around the wire.

### SENSOR MOUNTING

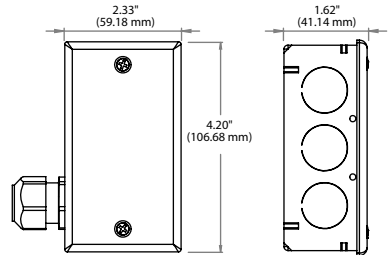
Bullet Probe sensors can be wrapped around a shelf as shown in **Figure 5** (p.2). Alternatively, the sensor may be mounted on walls using a mounting clip. The sensor should be mounted in an area where air circulation is well-mixed and not blocked by obstructions. Slide the sensor probe through the mounting

**FIGURE 1: FREEZER PROBE DIMENSIONS**

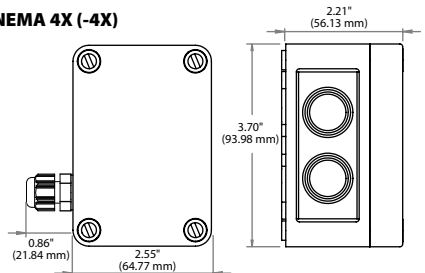


**FIGURE 2: ENCLOSURE DIMENSIONS**

### GALVANIZED (-GD)



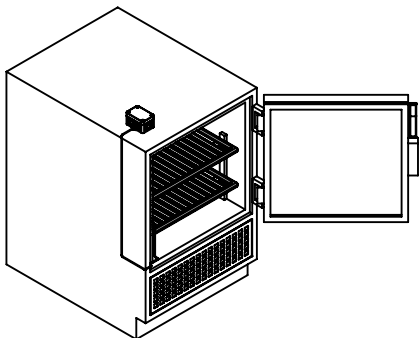
### NEMA 4X (-4X)



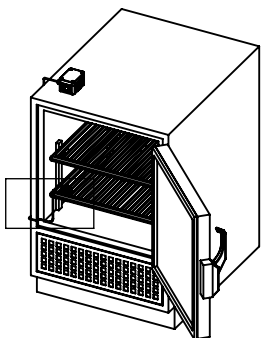
clip - see **FIGURE 6**. Drill a 1/4" screw through the socket and tighten to the wall. If a thermal buffer is required, use a glycol kit (ACI Item #130127). Drill pilot holes for the provided mounting screws. Use the mounting clip holes as a guide - see **FIGURE 7**. Drill the #10-16 x 1/2" screws through the bracket holes and fasten it to the wall. Insert the bottle into the bracket, and make sure it is seated securely.

**Note:** When using in tank or glycol application, the sensor cannot be fully submerged. The back end of the probe (where the wire enters), must be kept above the liquid.

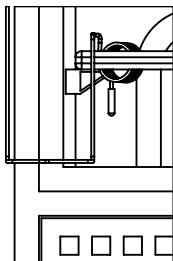
**FIGURE 3: ENCLOSURE MOUNTING**



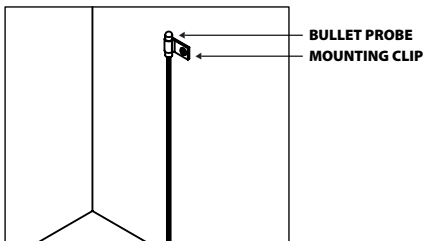
**FIGURE 4: WIRE ROUTING**



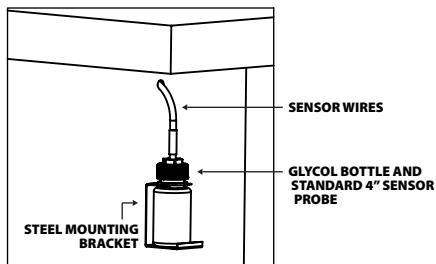
**FIGURE 5: SENSOR MOUNTING**



**FIGURE 6: SENSOR MOUNTING ON WALL**



**FIGURE 7: GLYCOL SENSOR w/ BRACKET**



## WIRING INSTRUCTIONS

ACI recommends 16 to 26 AWG twisted pair wires or shielded cables for all sensors. Signal wiring must be run separate from low and high voltage wires (24/120/230 VAC). All ACI temperature sensors are non-position sensitive. All freezer sensors are supplied with (3) flying lead wires – see **FIGURE 8** (p. 3).

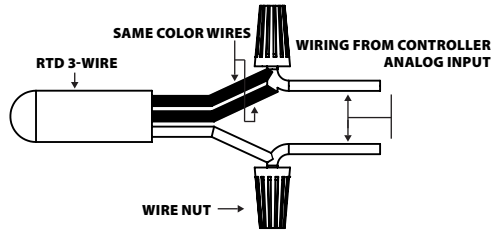
Connect sensor wire leads to controller analog input wires using wire nuts, terminal blocks, or crimp style connectors. All wiring must comply with all local and National Electric Codes.

## WIRING INSTRUCTIONS

(Continued)

**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.

**FIGURE 8: TEMPERATURE WIRING  
3-WIRE RTD WIRING**



**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)
<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 wires from sensor terminal block, tighten terminal block screws down, and take a resistance (ohm) 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>• Condensation on PCB board</li> <li>• Bad wire connections.</li> </ul>

## WARRANTY

The ACI Freezer Temperature 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](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.

# PRODUCT SPECIFICATIONS

SENSOR NON-SPECIFIC	
<b>Storage Temperature Range:</b>	-40 to 80 °C (-40 to 176 °F)
<b>Operating Humidity Range:</b>	10 to 100% RH
<b>Lead Length   Cable Diameter:</b>	10' (3.05 m) or 30' (9.15 m)   0.106" nominal (2.69 mm)
<b>Lead Wire Insulation   Jacket Color:</b>	FEP/FEP (Teflon) Jacketed Cable   White
<b>Conductor Size   Conductor Material:</b>	24 AWG (0.51 mm)   Silver Plated Copper
<b>Probe Material   Length   Diameter:</b>	316 Stainless Steel   2" (50.8 mm)   0.1875" (4.76 mm) nominal
<b>Enclosure Specifications:</b>	"-GD": -40 to 100 °C (-40 to 212 °F); Galvanized Steel; NEMA 1 (IP10) "-4X": -40 to 70 °C (-40 to 158 °F); Polystyrene Plastic, UL94-V2, IP66 (NEMA 4X)
<b>Cleaning Solutions:</b>	Alcohol, Ammonia, Bleach, Hydrogen Peroxide
1K / 100 ohm RTD SENSOR	
<b>Sensor Type   Sensor Curve:</b>	Platinum RTD   Linear, PTC (Positive Temperature Coefficient)
<b>DIN Standard   Temp Coefficient</b>	DIN EN 60751 (IEC 751)   3850 ppm / °C
<b>Response Time (63% Step Change):</b>	15 Seconds nominal
<b>Sensor Output @ 0°C (32°F):</b>	<b>A/100-LTS Series:</b> 100Ωnominal   <b>A/1K-LTS Series:</b> 1KΩ nominal
<b>Sensor Tolerance Class:</b>	<b>Class B Accuracy Formula:</b> $\pm/\text{ }^\circ\text{C} = (\pm/0.30^\circ\text{C} + (0.005 \times  t ))$ where t is the Absolute Value of temperature in °C above or below 0°C <b>-200°C (-328°F):</b> $\pm/ 1.30^\circ\text{C} (\pm/ 2.34^\circ\text{F})$   <b>0°C (-32°F):</b> $\pm/ 0.30^\circ\text{C} (\pm/ 0.54^\circ\text{F})$
<b>Sensor Operating Temperature Range:</b>	-198 to 150°C (-324 to 302°F)
Thermistor Sensor (1.8K, 3K, AN, CP, CSI, 20K)	
<b>Sensor Type   Sensor Curve</b>	Thermistor   Non-Linear, NTC (Negative Temperature Coefficient)
<b>Sensor Output @ 25°C (77°F)</b>	<b>A/1.8K:</b> 1.8KΩ nominal   <b>A/CP (Type II):</b> 10KΩ nominal   <b>A/20K:</b> 20KΩ nominal   <b>A/3K:</b> 3KΩ nominal   <b>A/AN (Type III):</b> 10KΩ nominal   <b>A/CSI:</b> 10KΩ nominal
<b>Accuracy 0-70°C (32-158°F):</b>	$\pm/0.2^\circ\text{C} (\pm/0.36^\circ\text{F})$ except A/CP Series & <b>A/AN Series:</b> $\pm/ 0.85^\circ\text{C} (\pm/1.53^\circ\text{F})$ ; <b>A/1.8K Series:</b> $\pm/ 0.5^\circ\text{C} @ 25^\circ\text{C} (77^\circ\text{F})$ and $\pm/1.0^\circ\text{C} (\pm/1.8^\circ\text{F})$
<b>Response Time (63% Step Change):</b>	15 Seconds nominal
<b>Sensor Operating Temperature Range:</b>	-40 to 150°C (-40 to 302°F)

