



# COPPER AVERAGING

## Bendable Copper, Transmitter

The ACI Transmitter Copper Averaging Series features a two-wire, 4 to 20 mA loop powered output signal with an optional 3-Wire voltage output signal available. The Copper Averaging sensors are designed to be installed in medium to large ducts or air handling units where moisture, UV Light Air Treatment equipment, critical temperature control, higher corrosion resistance and faster response times when compared to similar Aluminum sensing elements. Copper has also been proven to provide an anti-bacterial effect on molds, fungus and other bacteria typically found in ducts. All transmitters

include Zero and Span adjustments for field calibration and are calibrated using NIST Certified Calibration equipment. ACI recommends the use of an 18 to 22 AWG shielded cable for all temperature transmitter installations to reduce the possibility of noise being introduced onto the signal lines. The 1K Ohm Rigid Averaging sensor assemblies include a continuous sensing element the covers the entire length of the 8 to 100 foot sensing elements and are manufactured using Etched Teflon lead wires to differentiate between the different sensor types. All units are hermetically sealed using our epoxy material to eliminate the effects of moisture on the sensors. All Copper Averaging transmitters include a foam pad to properly seal the duct and limit vibration once installed. Optional NEMA/IP rated weather proof enclosures are available as specified on the back of the product data sheet. For best accuracy, ACI recommends the use of the A/TTM Series Matched transmitters with a 3 or 5 Point NIST Calibration Certificate, since they include a second calibration process in which the RTD and transmitter are calibrated together as a system.

**Applications:** Roof Top Units, Air Handlers, Monitoring Supply/Discharge/Return/Mixed Air Temperatures, Data Centers, Hospitals, Laboratories

The ACI Copper Averaging Transmitter Series is covered by ACI's Five (5) Year Limited Warranty. The warranty can be found in the front of ACI's Sensors & Transmitters catalog, as well as on ACI's web site, [workaci.com](http://workaci.com).

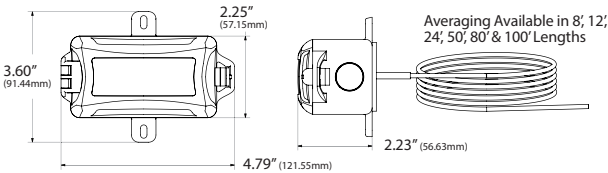
PRODUCT SPECIFICATIONS	
<b>Transmitter Supply Voltage   Supply Current:</b>	+8.5 to 32 VDC (Reverse Polarity Protected)   25 mA minimum
<b>Maximum Load Resistance:</b>	<b>250 Ohm Load:</b> +13.5 to 32 VDC   <b>500 Ohm Load:</b> +18.5 to 32 VDC (Terminal Voltage - 8.5 V)   0.020 A
<b>Output Signals:</b>	<b>Current:</b> 4-20 mA (2-Wire Loop Powered)   <b>Voltage:</b> 1-5 VDC or 2-10 VDC (3-Wires)
<b>Calibrated Accuracy   Linearity<sup>1</sup>:</b>	<b>Temp. Spans &lt; 500°F (260°C):</b> +/- 0.2%
<b>Thermal Drift<sup>2</sup>:</b>	<b>Temp. Spans &lt; 100°F (38°C):</b> +/- 0.04%/°F   <b>Temp. Spans &gt; 100°F (38°C):</b> +/- 0.02%
<b>Min/Max Temperature Spans:</b>	<b>Minimum Span:</b> 50°F (28°C)   <b>Maximum Span:</b> 400°F (204°C)
<b>TTM1K NIST Certification Points:</b>	<b>3 Point NIST:</b> 20%, 50% & 80% of span   <b>5 Point NIST:</b> 20%, 35%, 50%, 65%, 80% of span
<b>Warm Up Time   Warm Up Drift:</b>	10 Minutes   +/- 0.1%
<b>Transmitter Operating Temperature Range:</b>	-40°F to 185°F (-40 to 85°C)
<b>Transmitter Operating Humidity Range:</b>	0 to 90%, non-condensing
<b>Connections   Wire Size:</b>	Screw Terminal Blocks (Polarity Sensitive)   16 AWG (1.31 mm <sup>2</sup> ) to 26 AWG (0.129 mm <sup>2</sup> )
<b>Terminal Block Torque Rating:</b>	0.37 ft-lb (0.5 Nm) nominal
<b>Sensor Type   Sensor Curve   Sensing Points:</b>	Platinum RTD   PTC (Positive Temperature Coefficient)   Continuous
<b>Number Wires   Wire Colors:</b>	Three   Black/Black/White (Polarity Sensitive)
<b>Sensor Output @ 0°C (32°F):</b>	1000 Ohms nominal
<b>Sensor Accuracy:</b>	+/- 0.1% @ 0°C (32°F)   +/- 0.25% @ 21°C (70°F)   +/- 1.0% @ 130°C (266°F)
<b>Temperature Coefficient:</b>	3850 ppm / °C
<b>Response Time (63% Step Change):</b>	15 Seconds nominal
<b>Sensor Operating Temperature Range:</b>	-40 to 135°C (-40 to 275°F)
<b>Enclosure Specifications (Operating Temperature, Material, Flammability, NEMA/IP Ratings):</b>	"-GD" Enclosure: -40 to 115°C (-40 to 239°F); Galvanized Steel; NEMA 1 (IP10) "-PB" Enclosure: -30 to 90°C (-22 to 194°F); ABS Plastic; UL94-HB; Plenum Rated "-BB" Enclosure: -40 to 115°C (-40 to 239°F); Aluminum; NEMA 3R (IP 14) "-4X" Enclosure: -40 to 70°C (-40 to 158°F); Polystyrene Plastic; UL94-V2; NEMA 4X (IP 66)
<b>Storage Temperature Range:</b>	-40 to 80°C (-40 to 176°F)
<b>Operating Humidity Range:</b>	5 to 90% RH, non-condensing
<b>Sensing Element Material   Sensor Diameter:</b>	Copper   0.210" (5.34mm) nominal
<b>Probe Diameter   Probe Material:</b>	0.250" (6.35mm)   304 Stainless Steel
<b>Fitting Material   Flammability Rating:</b>	Polyamide 66 (High Performance Nylon 66)   UL94-HB
<b>Fitting Thread Size:</b>	1/8"-27 NPSM
<b>Foam Pad Material   Flammability Rating:</b>	Neoprene/EPDM/SBR Polymer   UL94-HBF; FMVSS-302; MIL-R-6130C
<b>Lead Length   Conductor Size:</b>	12" (30.5 cm)   22 AWG (0.65mm)
<b>Lead Wire Insulation   Wire Rating:</b>	Etched Teflon (PTFE) Colored Leads   Mil Spec 16878/4 Type E
<b>Conductor Material:</b>	Silver Plated Copper
<b>Product Dimensions   Product Weight:</b>	See table on back of Product Data sheet
<b>Agency Approvals:</b>	RoHS2, WEEE

**Note<sup>1</sup>:** Transmitter's calibrated at 71°F (22°C) nominal | **Note<sup>2</sup>:** Temperature Drift is referenced to 71°F nominal calibration temperature

# TEMPERATURE | TRANSMITTERS | COPPER AVERAGING

## DIMENSIONAL DRAWING, WEIGHTS

### Plastic Box Enclosure [PB]

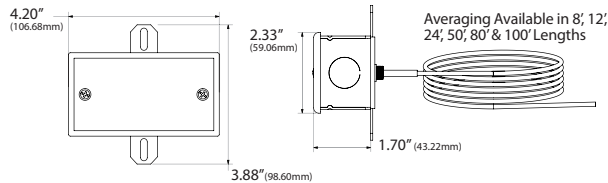


xx = Sensor Type | yy = Insertion Length

### Plastic Box Enclosure [PB] Weights

ACI Model #	8' (Probe Length)	12' (Probe Length)	24' (Probe Length)
A/xx-A-yy-PB	0.72 lbs. (0.327 kg)	0.96 lbs. (0.435 kg)	1.70 lbs. (0.771 kg)
ACI Model #	50' (Probe Length)	80' (Probe Length)	100' (Probe Length)
A/xx-A-yy-PB	3.28 lbs. (1.488 kg)	4.54 lbs. (2.059 kg)	5.62 lbs. (2.549 kg)

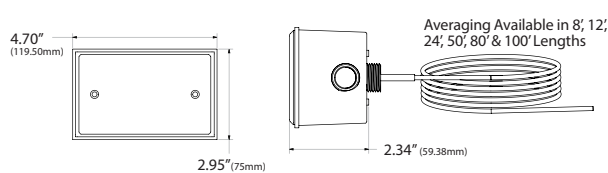
### Galvanized Enclosure [GD]



### Galvanized Enclosure [GD] Weights

ACI Model #	8' (Probe Length)	12' (Probe Length)	24' (Probe Length)
A/xx-A-yy-GD	1.16 lbs. (0.526 kg)	1.40 lbs. (0.635 kg)	2.20 lbs. (0.998 kg)
ACI Model #	50' (Probe Length)	80' (Probe Length)	100' (Probe Length)
A/xx-A-yy-GD	3.78 lbs. (1.715 kg)	5.08 lbs. (2.304 kg)	6.16 lbs. (2.794 kg)

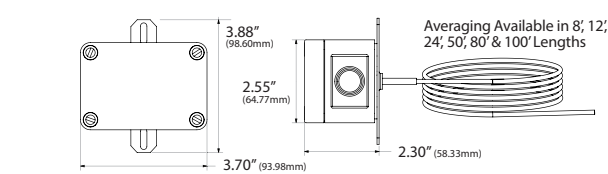
### Bell Box Enclosure [BB]



### Bell Box Enclosure [BB] Weights

ACI Model #	8' (Probe Length)	12' (Probe Length)	24' (Probe Length)
A/xx-A-yy-BB	1.22 lbs. (0.553 kg)	1.44 lbs. (0.653 kg)	2.18 lbs. (0.989 kg)
ACI Model #	50' (Probe Length)	80' (Probe Length)	100' (Probe Length)
A/xx-A-yy-BB	3.74 lbs. (1.696 kg)	5.04 lbs. (2.286 kg)	6.12 lbs. (2.776 kg)

### NEMA 4X Enclosure [4X]



### NEMA 4X Enclosure [4X] Weights

ACI Model #	8' (Probe Length)	12' (Probe Length)	24' (Probe Length)
A/xx-A-yy-4X	0.84 lbs. (0.381 kg)	1.06 lbs. (0.481 kg)	1.80 lbs. (0.816 kg)
ACI Model #	50' (Probe Length)	80' (Probe Length)	100' (Probe Length)
A/xx-A-yy-4X	3.36 lbs. (1.524 kg)	4.66 lbs. (2.114 kg)	5.74 lbs. (2.604 kg)

Standard Views

Product Weights

## CUSTOM ORDERING

Model # Example: **A/** **TT1K** **A** **24'** **1** **PB** **0 to 40°C**

<b>A. Sensor Series</b> No Selection Required	A/
<b>B. Model Series</b> Select One (1)	TT1K = 1K Ω RTD, Temperature Transmitter   TTM1K = 1K Ω Matched RTD/Transmitter*
<b>C. Configuration</b> No Selection Required	A = Bendable Copper Averaging
<b>D. Probe Length</b> Select One (1)	8' = 8' (2.44 m)   12' = 12' (3.66 m)   24' = 24' (7.32 m)   50' = 50' (15.24 m) 80' = 80' (24.38 m)   100' = 100' (30.48 m)
<b>E. Output Signal</b> Select One (1)	1=1 to 5 VDC   2=2 to 10 VDC   4=4 to 20 mA
<b>F. Enclosure</b> Select One (1)	GD=Galvanized   PB=Plastic   BB=Aluminum, NEMA 3R   4X=NEMA 4X
<b>G. Calibration Span</b>	Specify Span in °F or °C (Best Accuracy in 100°F Increments)

Note\*: For TTM100 or TTM1K part numbers, the default NIST is 3 points | 5 points may be specified by using "-5PTNIST" at the end of any TTM part number.

## MODEL#

A/
A

## ACCESSORIES ORDERING

Model #	Item #	Description
A/CAPILLARY CLIP QTY: 1	130525	Capillary Mounting Clip, Copper, Quantity: 1
A/CAPILLARY CLIP QTY: 50/BAG	142410	Capillary Mounting Clip, Copper, Quantity: 50/Bag
UNIVERSAL CLIP 50	145430	Universal Mounting Clip, Plastic, Quantity: 50/Bag
UNIVERSAL CLIP 6	145421	Universal Mounting Clip, Plastic, Quantity: 6/Bag

## ACCESSORIES ORDERING (NIST)

Model #	Description
-5PTNIST	5 Point Calibration & Certificate for TTM parts