

Copper Averaging Series I Transmitter

Bendable Copper Transmitter



Automation Components
a DwyerOmega brand

The ACI Transmitter Copper Averaging Series features a two-wire, 4 mA 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 1.02 mm (18 AWG) to 0.65 mm (22 AWG) shielded cable for all temperature transmitter installations to reduce the possibility of noise being introduced onto the signal lines. The 1 kΩ Rigid Averaging sensor assemblies include a continuous sensing element the covers the entire length of the 2.44 m (8 ft) to 30.48 m (100 ft) 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

Warranty

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 website, workaci.com.

Specifications

Transmitter Supply Voltage | Supply Current: 8.5 V dc to 32 V dc (Reverse Polarity Protected) | 25 mA minimum

250 Ω Load: 13.5 V dc to 32 V dc

500 Ω Load: 18.5 V dc to 32 V dc

Maximum Load Resistance: (Terminal Voltage - 8.5 V) | 0.020 A

Output Signals

Current: 4 mA to 20 mA (2-Wire Loop Powered)

Voltage: 1 V dc to 5 V dc or 2 V dc to 10 V dc (3-Wires)

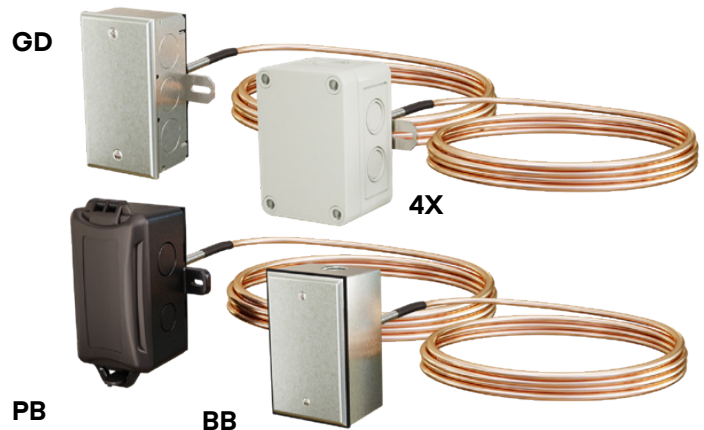
Calibrated Accuracy | Linearity¹

Temp. Spans < 260 °C (500 °F): ± 0.2%

Thermal Drift²

Temp. Spans < 100 °F (38 °C): ± 0.04 % / °F

Temp. Spans > 100 °F (38 °C): ± 0.02 %



Min/Max Temperature Spans

Minimum Span: 28 °C (50 °F)

Maximum Span: 204 °C (400 °F)

TTM1K NIST Certification Points

3 Point NIST: 20 %, 50 % & 80 % of span

5 Point NIST: 20 %, 35 %, 50 %, 65 %, 80 % of span

Warm Up Time | Warm Up Drift: 10 minutes | ± 0.1 %

Transmitter Operating Temperature Range: -40 °C to 85 °C (-40 °F to 185 °F)

Transmitter Operating Humidity Range: 0 % to 90 %, non-condensing

Connections | Wire Size: Screw Terminal Blocks (Polarity Sensitive) | 1.31 mm² (16 AWG) to 0.129 mm² (26 AWG)

Terminal Block Torque Rating: 0.5 Nm (0.37 lb-ft) nominal

Sensor Type | Sensor Curve | Sensing Points: Platinum RTD | PTC (Positive Temperature Coefficient) | Continuous

Number Wires | Wire Colors: Three | Black/Black/White (Polarity Sensitive)

Sensor Output at 0 °C (32 °F): 1000 Ω nominal

Sensor Accuracy: ± 0.1 % at 0 °C (32 °F) | ± 0.25 % at 21 °C (70 °F) | ± 1.0 % at 130 °C (266 °F)

Temperature Coefficient: 3850 ppm / °C

Response Time (63 % Step Change): 15 seconds nominal

Sensor Operating Temperature Range: -40 °C to 135 °C (-40 °F to 275 °F)

Enclosure Specifications (Operating Temperature, Material, Flammability, NEMA/IP Ratings)

"-GD" Enclosure: -40 °C to 115 °C (-40 °F to 239 °F); Galvanized Steel; NEMA 1 (IP10)

"-PB" Enclosure: -30 °C to 100 °C (-22 °F to 212 °F); ABS Plastic; UL94-5VB; Plenum Rated

"-BB" Enclosure: -40 °C to 115 °C (-40 °F to 239 °F); Aluminum; NEMA 3R (IP 14)

"-4X" Enclosure: -40 °C to 70 °C (-40 °F to 158 °F); Polystyrene Plastic; UL94-V2; NEMA 4X (IP 66)

Storage Temperature Range: -40 °C to 80 °C (-40 °F to 176 °F)

Operating Humidity Range: 5 % to 90 % RH, non-condensing

Sensing Element Material | Sensor Diameter: Copper | 5.34 mm (0.210 in) nominal

Probe Diameter | Probe Material: 6.35 mm (0.250 in) | 304 Stainless Steel

Fitting Material | Flammability Rating: Polyamide 66 (High Performance Nylon 66) | UL94-HB

Fitting Thread Size: 1/8"-27 NPSM

Foam Pad Material | Flammability Rating: Neoprene/EPDM/SBR Polymer | UL94-HBF; FMVSS-302; MIL-R-6130C

Lead Length | Conductor Size: 30.5 cm (12 in) | 0.65 mm (22 AWG)

Lead Wire Insulation | Wire Rating: Etched Teflon (PTFE) Colored Leads | Mil Spec 16878/4 Type E



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Conductor Material: Silver Plated Copper

Product Dimensions | Product Weight: See table on this product data sheet

Agency Approvals: CE, UKCA, RoHS2, WEEE, RoHS 20

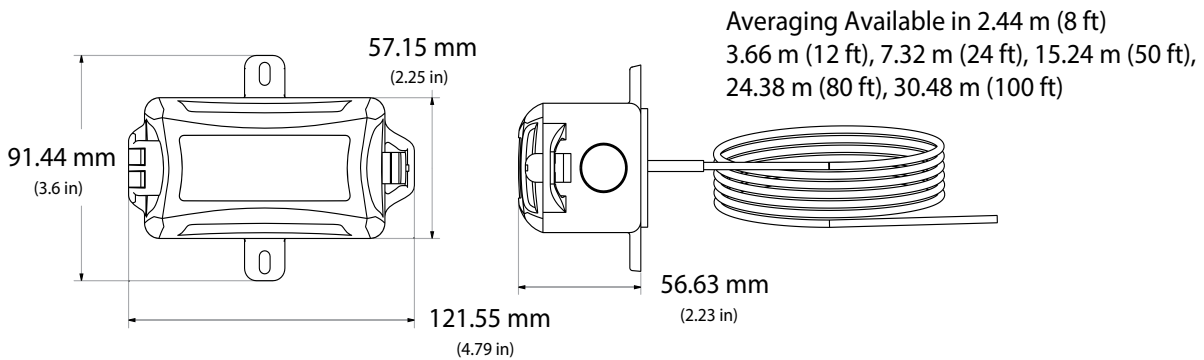
Note¹: Transmitter's calibrated at 22 °C (71 °F) nominal

Note²: Temperature Drift is referenced to 22 °C (71 °F) nominal calibration temperature

Dimensions and Weight

xx = sensor type | yy = insertion length

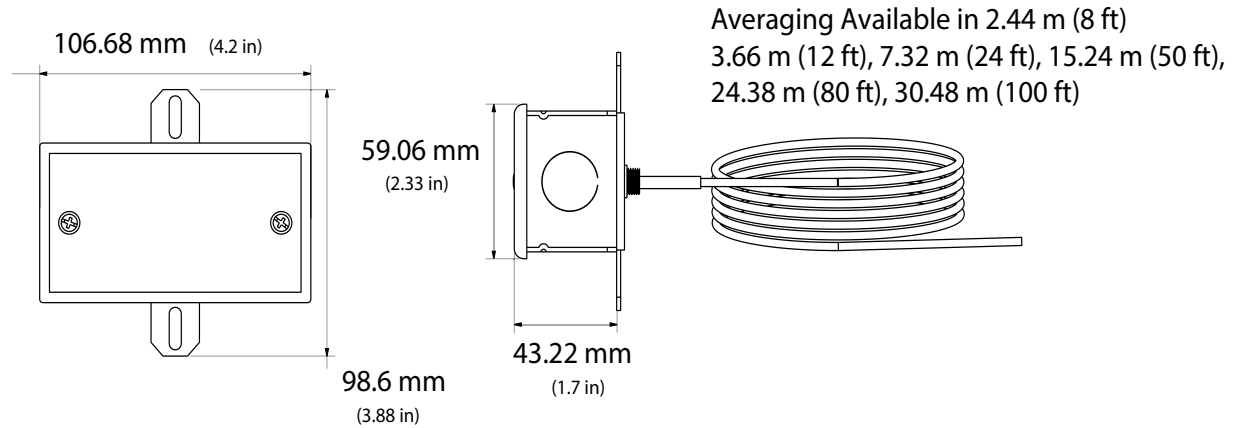
Plastic Box Enclosure (PB)



ACI Model #	Weight and Probe Length				
	2.44 m (8 ft)	3.66 m (12 ft)	7.32 m (24 ft)	15.24 m (50 ft)	24.38 m (80 ft)
A/xx-A-yy-PB	0.327 kg (0.72 lb)	0.435 kg (0.96 lb)	0.771 kg (1.70 lb)	1.488 kg (3.28 lb)	2.059 kg (4.54 lb)
	30.48 m (100 ft)				
	2.549 kg (5.62 lb)				

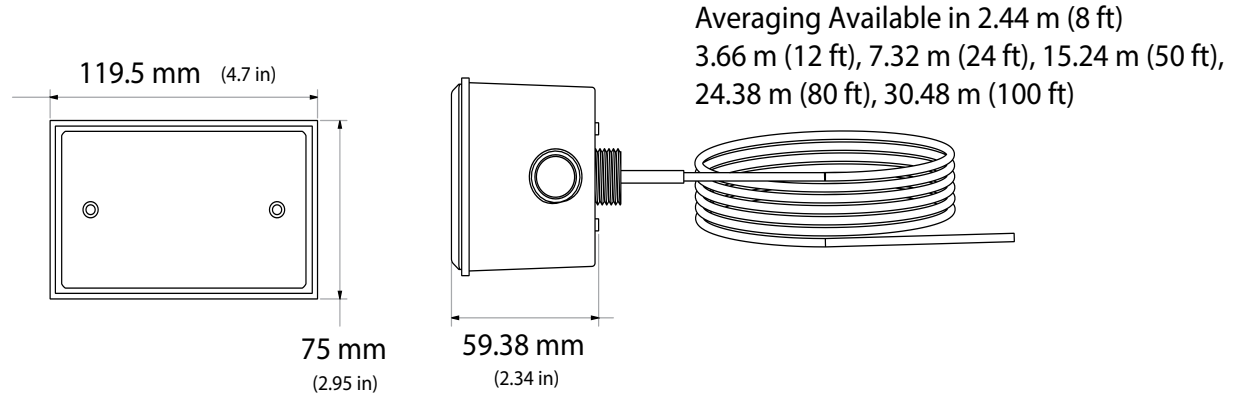


Galvanized Enclosure (GD)



ACI Model #	Weight and Probe Length				
	2.44 m (8 ft)	3.66 m (12 ft)	7.32 m (24 ft)	15.24 m (50 ft)	24.38 m (80 ft)
A/xx-A-yy-GD	0.526 kg (1.16 lb)	0.635 kg (1.4 lb)	0.998 kg (2.2 lb)	1.715 kg (3.78 lb)	2.304 kg (5.08 lb)
	30.48 m (100 ft)				
	2.794 kg (6.16 lb)				

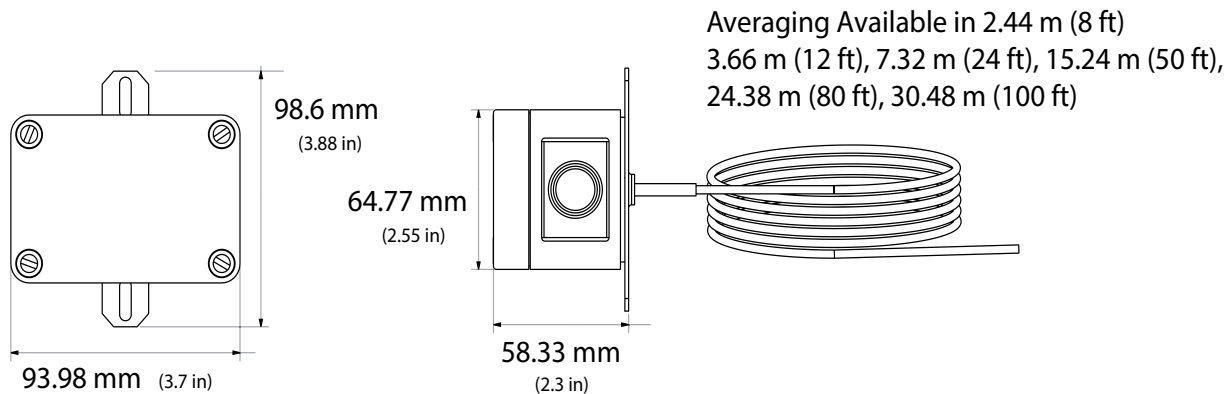
Bell Box Enclosure (BB)



ACI Model #	Weight and Probe Length				
	2.44 m (8 ft)	3.66 m (12 ft)	7.32 m (24 ft)	15.24 m (50 ft)	24.38 m (80 ft)
A/xx-A-yy-BB	0.553 kg (1.22 lb)	0.653 kg (1.44 lb)	0.989 kg (2.18 lb)	1.696 kg (3.74 lb)	2.286 kg (5.04 lb)
	30.48 m (100 ft)				
	2.776 kg (6.12 lb)				



NEMA 4X Enclosure (4X)



ACI Model #	Weight and Probe Length				
	2.44 m (8 ft)	3.66 m (12 ft)	7.32 m (24 ft)	15.24 m (50 ft)	24.38 m (80 ft)
A/xx-A-yy-4X	0.381 kg (0.84 lb)	0.481 kg (1.06 lb)	0.816 kg (1.8 lb)	1.524 kg (3.36 lb)	2.114 kg (4.66 lb)
	30.48 m (100 ft)				
	2.604 kg (5.74 lb)				

Custom Ordering

		Options and Descriptions			Model #			
A. Sensor Series <i>No Selection Required</i>	A/	—————→			A/			
B. Model Series <i>Select One (1)</i>	TT1K = 1 kΩ RTD, Temperature Transmitter TTM1K = 1 kΩ Matched RTD/Transmitter*							
C. Configuration <i>No Selection Required</i>	A = Bendable Copper Averaging	—————→			A			
D. Probe Length <i>Select One (1)</i>	8' = 2.44 m (8 ft) 50' = 15.24 m (50 ft)	12' = 3.66 m (12 ft) 80' = 24.38 m (80 ft)	24' = 7.32 m (24 ft) 100' = 30.48 m (100 ft)					
E. Output Signal <i>Select One (1)</i>	1 = 1 V dc to 5 V dc	2 = 2 V dc to 10 V dc	4 = 4 mA to 20 mA					
F. Enclosure <i>Select One (1)</i>	GD = Galvanized	BB = Aluminum, NEMA 3R	4X = NEMA 4X					
G. Calibration Span <i>Select One (1)</i>	Specify Span in °F or °C (Best Accuracy in 100 °F Increments)							
Model # Example:		A/	TT1K	A	24'	1	PB	0 °C to 40 °C
		A.	B.	C.	D.	E.	F.	G.

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.



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

