



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 website, www.workaci.com.

PRODUCT SPECIFICATIONS

Transmitter Supply Voltage Supply Current:	+8.5 to 32 VDC (Reverse Polarity Protected) 25 mA minimum
Maximum Load Resistance:	250 Ohm Load: +13.5 to 32 VDC 500 Ohm Load: +18.5 to 32 VDC
Output Signals:	(Terminal Voltage -8.5 V) 0.020 A
Calibrated Accuracy Linearity¹:	Current: 4-20 mA (2-Wire Loop Powered) Voltage: 1-5 VDC or 2-10 VDC (3-Wires)
Thermal Drift²:	Temp. Spans < 500°F (260°C): +/- 0.2%
Min/Max Temperature Spans:	Temp. Spans < 100°F (38°C): +/- 0.04%/°F Temp. Spans > 100°F (38°C): +/- 0.02%
TTM100/TTM1K NIST Certification Points:	Minimum Span: 50°F (28°C) Maximum Span: 400°F (204°C)
Warm Up Time Warm Up Drift:	3 Point NIST: 20%, 50% & 80% of span 5 Point NIST: 20%, 35%, 50%, 65%, 80% of span
Transmitter Operating Temperature Range:	10 Minutes +/- 0.1%
Transmitter Operating Humidity Range:	-40°F to 185°F (-40 to 85°C)
Connections Wire Size:	0 to 90%, non-condensing
Terminal Block Torque Rating:	Screw Terminal Blocks (Polarity Sensitive) 16 AWG (1.31 mm ²) to 26 AWG (0.129 mm ²)
Sensor Type Sensor Curve Sensing Points:	0.37 ft-lb (0.5 Nm) nominal
Number Wires Wire Colors:	Platinum RTD PTC (Positive Temperature Coefficient) Continuous
Sensor Output @ 0°C (32°F):	Three Black/Black/White (Polarity Sensitive)
Sensor Accuracy:	1000 Ohms nominal
Temperature Coefficient:	+/- 0.1% @ 0°C (32°F) +/- 0.25% @ 21°C (70°F) +/- 1.0% @ 130°C (266°F)
Response Time (63% Step Change):	3850 ppm / °C
Sensor Operating Temperature Range:	15 Seconds nominal
Enclosure Specifications (Operating Temperature, Material, Flammability, NEMA/IP Ratings):	-40 to 135°C (-40 to 275°F)
	"-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)
Storage Temperature Range:	-40 to 80°C (-40 to 176°F)
Operating Humidity Range:	5 to 90% RH, non-condensing
Sensing Element Material Sensor Diameter:	Copper 0.210" (5.34mm) nominal
Probe Diameter Probe Material:	0.250" (6.35mm) 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:	12" (30.5 cm) 22 AWG (0.65mm)
Lead Wire Insulation Wire Rating:	Etched Teflon (PTFE) Colored Leads Mil Spec 16878/4 Type E
Conductor Material:	Silver Plated Copper
Product Dimensions Product Weight:	See table on back of Product Data sheet
Agency Approvals:	RoHS2, WEEE

Note¹: Transmitter's calibrated at 71°F (22°C) nominal | **Note²:** Thermal Drift is referenced to 71°F (22°C) nominal calibration temperature





DIMENSIONAL DRAWING. WEIGHTS

xx = Sensor Type | yy = Insertion Length

Plastic Box Enclosure [PB]

Averaging Available in 8', 12', 24', 50', 80' & 100' Lengths

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]

Averaging Available in 8', 12', 24', 50', 80' & 100' Lengths

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]

Averaging Available in 8', 12', 24', 50', 80' & 100' Lengths

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]

Averaging Available in 8', 12', 24', 50', 80' & 100' Lengths

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	MODEL #
A. Sensor Series <i>No Selection Required</i>	A/	A. B. C. D. E. F. G.	A/
B. Model Series <i>Select One (1)</i>	TT1K = 1K Ω RTD, Temperature Transmitter TTM1K = 1K Ω Matched RTD/Transmitter*		
C. Configuration <i>No Selection Required</i>	A = Bendable Copper Averaging		A
D. Probe Length <i>Select One (1)</i>	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)		
E. Analog Output <i>Select One (1)</i>	1 = 1 to 5 VDC 2 = 2 to 10 VDC 4 = 4 to 20 mA		
F. Enclosure <i>Select One (1)</i>	GD = Galvanized PB = Plastic BB = Aluminum, NEMA 3R 4X = NEMA 4X		
G. Calibrated Span	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 requested by adding the part number listed below (NIST TTM CERT - 5PT.) There is a surcharge of \$25 to upgrade to 5 point calibration

ACCESSORIES ORDERING			Model # Example: A/CAPILLARY CLIP QTY:1 -OR- 130525
Model #	Item #	Description	
NIST TTM CERT-5PT.	129743	5 Point Calibration & Certificate	
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	

Note =** Must specify a 3 or 5 Point NIST Certificate with the TTM1K Transmitter above

