

IMMERSION

Low Temperature Immersion Sensors & Transmitters

The ACI Low Temperature Immersion Series sensors and transmitters are a single point immersion sensor featuring a three wire RTD sensor assembly using Teflon insulated lead wires and a 316 Series stainless steel probe. The three wire sensors can be used with a two wire transmitter by connecting the two (Red) colored wires to one of the RTD Terminal blocks with the 3rd (White) wire going to the second RTD Terminal block. The purpose of the 3rd wire is to compensate for external lead wire resistance that will affect the accuracy of your sensor output when using with a three wire temperature transmitter or sensor configuration on your Building Management System or PLC (Programmable Logic Controller). ACI recommends the use of 18 AWG lead wires to reduce the external lead wire resistance when using a Platinum RTD. The operating specifications are for both the sensor and transmitter as designated in the specification table. The overall accuracy of the temperature transmitter must be calculated using the transmitter calibrated accuracy plus that of the sensor error over temperature unless ordering as a TTM matched transmitter. Standard enclosure options include the “-GD” Galvanized or “-BB” Aluminum weather proof

enclosure. NIST Certificates are available for all of the configurations listed in the ordering grid on the back of the product data sheet. For best accuracy, ACI recommends the use of the TTM100 or TTM1K Series Matched transmitters since they include a second calibration step in which the RTD and transmitter are calibrated together as a system, in order to remove most of the sensor error over the calibrated temperature span of the transmitter.

Applications: Chillers, Pharmaceutical, Refrigeration, Process Cooling, Industrial Process Control

The ACI Low Temperature Immersion Sensors and Transmitters 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.

PRODUCT SPECIFICATIONS

Transmitter Supply Voltage Supply Current:	+8.5 to 32 VDC (Reverse Polarity Protected) 25 mA minimum 250 Ohm Load: +13.5 to 32 VDC 500 Ohm Load: +18.5 to 32 VDC
Maximum Load Resistance:	(Terminal Voltage - 8.5 V) 0.020 A
Output Signal:	Current: 4-20 mA (2-Wire Loop Powered) Voltage: 1-5 VDC or 2-10 VDC (3-Wires)
Calibration Transmitter Accuracy Linearity:	Temp. Spans < 500°F (260°C): +/- 0.2% Temp. Spans > 500°F (260°C): +/- 0.5%
Temperature Drift:	Temp. Spans < 100°F (38°C): +/- 0.04%/°F Temp. Spans > 100°F (38°C): +/- 0.02%
Warm Up Time Warm Up Drift:	10 Minutes +/- 0.1%
Operating Storage Temperature Range:	-40°F (-40°C) to 185°F (85°C)
Operating Humidity Range:	0 to 90%, non-condensing
Calibration Temperature Spans¹:	Minimum Temp. Span: 50°F (28°C) Maximum Temp. Span: 700°F (370°C)
Connections Wire Size:	Screw Terminal Blocks (Non-Polarity Sensitive) 16 AWG (1.31 mm ²) to 26 AWG (0.129 mm ²)
Terminal Block Torque Rating:	0.5 Nm nominal
Sensor Type Sensor Curve Sensor Points:	Platinum RTD PTC (Positive Temperature Coefficient) One
Number Wires:	A/100-3W-LT-I-XX” and A/1K-3W-LT-I-xx”: Three (White / Two Red) Polarity Sensitive
Sensor Output @ 0°C (32°F):	A/100-3W-LT-I-xx”: 100 Ohms nominal A/1K-3W-LT-I-xx”: 1000 Ohms nominal
Sensor Tolerance Accuracy²:	+/- 0.12% Class B Class B Tolerance Formula: +/- °C = (0.30°C + (0.005 * t))
Din Standard Temperature Coefficient:	DIN EN 60751 (IEC 751) 3850 ppm / °C
Sensor Stability:	< 0.04 % at 1000 hours at 400°C
Self-Heating Maximum Operating Current:	100 Ohm RTD: 7 mW/°C (Still Air) 5 mA 1K Ohm RTD: 4 mW/°C (Still Air) 3 mA
Sensor Operating Temperature Range:	-198 to 150°C (-324 to 302°F)
Enclosure Specifications (Operating Temperature Range, Material, Flammability, NEMA/IP Rating):	“-GD” Enclosure: -40 to 199°C (-40 to 390°F); Galvanized Steel; NEMA 1 (IP10) “-BB” Enclosure: -50 to 115°C (-58 to 239°F); Aluminum; NEMA 3R
Storage Temperature Range:	-40 to 85°C (-40 to 185°F)
Operating Humidity Range:	10 to 95% RH, non-condensing
Probe Material Probe Diameter:	316 Stainless Steel 0.250” (6.35mm)
Compression Fitting Material:	316 Stainless Steel
Lead Length Conductor Size:	8’ (2.44 m) 22 AWG (0.25 mm ²)
Lead Wire Insulation Conductor Material:	Etched Teflon (PTFE) 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:** Where |t| is the absolute value of temperature above or below 0°C in Centigrade





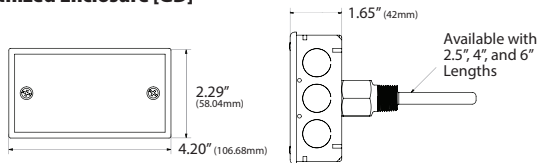
MAXIMUM VELOCITY VS THERMOWELL INSERTION LENGTH MACHINED THERMOWELL

Straight Shank Insertion Length "U"					Stepped Shank Insertion Length "U"	
Material:	Media Type:	1.0" (25.4 mm)	2.5" (63.5 mm)	8.0" (203.2 mm)	4.0" (101.6 mm)	6.0" (152.4 mm)
304/316 SS	Air/Gas/Steam ¹	349 ft/s (106.3 m/s)	349 ft/s (106.3 m/s)	71.9 ft/s (21.9 m/s)	109 ft/s (33.2 m/s)	39.5 ft/s (12.0 m/s)
304/316 SS	Water	360 ft/s (109.7 m/s)	360 ft/s (109.7 m/s)	71.9 ft/s (21.9 m/s)	82.2 ft/s (25.1 m/s)	39.5 ft/s (12.0 m/s)

Note 1: Values are for Air/Gas/ Steam and similar density media | All velocity ratings are based upon an operating temperature of 1000°F (537.8°C)

DIMENSIONAL DRAWING

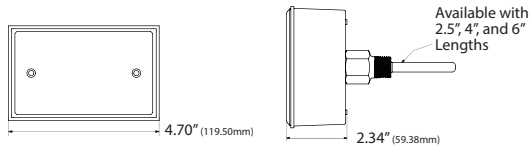
Galvanized Enclosure [GD]



Galvanized Enclosure [GD] Weights

ACI Model #	2.5" (Insertion Length)	4" (Insertion Length)	6" (Insertion Length)
A/xx-INW-yy-GD	0.66 lbs. (0.299 kg)	0.70 lbs. (0.318 kg)	0.74 lbs. (0.336 kg)
A/xx-IM-yy-GD	1.00 lbs. (0.454 kg)	1.16 lbs. (0.526 kg)	1.32 lbs. (0.599 kg)

Bell Box Enclosure [BB]



Bell Box Enclosure [BB] Weights

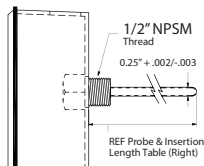
ACI Model #	2.5" (Insertion Length)	4" (Insertion Length)	6" (Insertion Length)
A/xx-INW-yy-BB	0.68 lbs. (0.308 kg)	0.72 lbs. (0.326 kg)	0.76 lbs. (0.345 kg)
A/xx-IM-yy-BB	1.02 lbs. (0.463 kg)	1.20 lbs. (0.544 kg)	1.36 lbs. (0.617 kg)

Standard Views

Product Weights

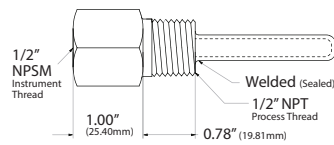
Note: There are two enclosures included with configurations involving Temperature Transmitters. A secondary GD (Galvanized) enclosure contains the transmitter board to protect it from the extreme temperatures exposed to the sensing element

PROBE AND INSERTION LENGTH IMMERSION NO WELL



Pictured Above: immersion no well (INW) sensor in Bell Box Enclosure (BB).

Pictured Below: welded two piece thermowell to show connection and depth reference. Thermowell not included with immersion no well (INW).



Probe & Insertion Length

Probe Length	Insertion Length	ACI Part #	Thermowell Part #
4.5"	4.31" +/- 0.13"	A/xx-INW-2.5"-yy-zz	A/M2.5"
6"	5.81" +/- 0.13"	A/xx-INW-4"-yy-zz	A/M4"
8"	7.81" +/- 0.13"	A/xx-INW-6"-yy-zz	A/M6"

Standard Views

Product Weights





CUSTOM ORDERING LOW TEMPERATURE IMMERSION SENSORS		Model # Example:	A/	1K	3W	LT	I	4"	GD	NIST	MODEL #
			A.	B.	C.	D.	E.	F.	G.	H.	
A. Sensor Series <i>No Selection Required</i>	A/	→									A/
B. Model Series <i>Select One (1)</i>	100 = 100 Ohm Platinum RTD only 1K = 1K Ohm Platinum RTD only										
C. Number of Wires <i>No Selection Required</i>	3W	→									3W
D. High Temperature <i>No Selection Required</i>	LT	→									LT
E. Configuration <i>Select One (1)</i>	IM = Immersion with Machined Thermowell INW = Immersion without Thermowell										
F. Thermowell Insertion Length <i>Select One (1)</i>	2.5" = 2.5" Probe 4" = 4" Probe 6" = 6" Probe										
G. Enclosure <i>Select One (1)</i>	GD = Galvanized Enclosure BB = Cast Aluminum Weather Proof Enclosure										
H. NIST <i>Select One (1)</i>	---- = No NIST Certificate NIST = NIST Certificate (3 Points)										

CUSTOM ORDERING LOW TEMPERATURE TRANSMITTERS		Model # Example:	A/	TT100	LT	I	6"	2	GD	MODEL #	
			A.	B.	C.	D.	E.	F.	G.	H.	
A. Sensor Series <i>No Selection Required</i>	A/	→									A/
B. Model Series <i>Select One (1)</i>	TT100 = Unmatched Temperature Transmitter & 100 Ohm RTD TT1K = Unmatched Temperature Transmitter & 1K RTD TTM100 = Matched 100 Ohm Temperature Transmitter/Sensor TTM1K = Matched 1K Ohm Temperature Transmitter/Sensor (Must specify 3 or 5 Point NIST Certificates for all TTM100 and TTM1K Transmitters)										
C. High Temperature <i>No Selection Required</i>	LT	→									LT
D. Configuration <i>Select One (1)</i>	IM = Immersion with Machined Thermowell INW = Immersion without Thermowell										
E. Thermowell Insertion Length <i>Select One (1)</i>	2.5" = 2.5" Probe 4" = 4" Probe 6" = 6" Probe										
F. Analog Output <i>Select One (1)</i>	1 = 1 to 5 VDC 2 = 2 to 10 VDC 4 = 4 to 20 mA										
G. Enclosure <i>Select One (1)</i>	GD = Galvanized Enclosure BB = Cast Aluminum Weather Proof Enclosure										
H. Calibration Span	Specify Span in °F or °C (Best Accuracy in 100°F Increments)										

ACCESSORIES ORDERING			Model # Example:
Model #	Item #	Description	A/316SS_1-8IN_NPT_COMPRESS_FIT -OR- 143457
A/316SS_1-8IN_NPT_COMPRESS_FIT	143457	1/8" MNPT x 1/4" Tube Fitting (Bore Through), Compression Fitting	
A/316SS_1-2IN_NPT_COMPRESS_FIT	143458	1/2" MNPT x 1/4" Tube Fitting (Bore Through), Compression Fitting	

