



IMMERSION

High Temperature Immersion Sensors & Transmitters

The ACI High Temperature Immersion Series sensors and transmitters are a single point immersion sensor featuring a three wire RTD sensor assembly using Nickel Fiberglass Lead wires, a 316 Series stainless steel probe, and a Machined 304 SS Steel thermowell. The "INW" version of the product can be ordered without the thermowell for applications in which there is an existing thermowell, increased design parameters or other materials are required for higher corrosion resistance. 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 wire (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. 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 with a 3 or 5 Point NIST Calibration Certificate since they include a second calibration step in which the RTD and transmitter are calibrated together as a system, which removes most of the sensor error over the calibrated temperature span of the transmitter.

Applications: Burners, Boilers, Stacks, Exhaust, Incinerators, Ovens, Plastics Processing, Process Heating, Process Control, Steam Lines

The ACI High 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
Maximum Load Resistance:	250 Ohm Load: +13.5 to 32 VDC 500 Ohm Load: +18.5 to 32 VDC (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: 800°F (426°C)
Matched Calibrated Temperature Spans (A/TTM Models) Ranges:	-49°F to 311°F (-45°C to 155°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-HT-D-XX" and A/1K-3W-HT-D-xx": Three (White / Two Red) Polarity Sensitive
Sensor Output @ 0°C (32°F):	A/100-3W-HT-D-xx": 100 Ohms nominal A/1K-3W-HT-D-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:	-40 to 395°C (-40 to 743°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: -40 to 85°C (-40 to 185°F); Aluminum; NEMA 3R
Storage Temperature Range:	-40 to 85°C (-40 to 185°F)
Operating Humidity Range:	10 to 90% RH, non-condensing
Probe Material Probe Diameter:	316 Stainless Steel 0.250" (6.35mm)
Compression Fitting Material Thread Size:	316 Stainless Steel ½" NPT
Thermowell Material:	304 Series Stainless Steel
Thermowell Instrument Thread Process Thread:	½" NPS (National Pipe Straight - Female) ½" NPT (National Pipe Tapered - Male)
Lead Length Conductor Size:	8' (2.44 m) 24 AWG (0.20 mm ²)
Lead Wire Insulation Conductor Material:	Fiberglass Braided Insulation with Mica Tape 27% Nickel 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

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MAXIMUM VELOCITY VS THERMOWELL INSERTION LENGTH			MACHINED THERMOWELL	
Straight Shank Insertion Length "U"			Stepped Shank Insertion Length "U"	
Material:	Media Type:	2.5" (63.5 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)	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)	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] Weights													
<p>Galvanized Enclosure [GD]</p> <p>Available with 2.5", 4", and 6" Lengths</p>		<table border="1"> <thead> <tr> <th>ACI Model #</th> <th>2.5" (Insertion Length)</th> <th>4" (Insertion Length)</th> <th>6" (Insertion Length)</th> </tr> </thead> <tbody> <tr> <td>A/xx-INW-yy-GD</td> <td>0.66 lbs. (0.299 kg)</td> <td>0.70 lbs. (0.318 kg)</td> <td>0.74 lbs. (0.336 kg)</td> </tr> <tr> <td>A/xx-IM-yy-GD</td> <td>1.00 lbs. (0.454 kg)</td> <td>1.16 lbs. (0.526 kg)</td> <td>1.32 lbs. (0.599 kg)</td> </tr> </tbody> </table>	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)	
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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		Probe & Insertion Length																	
<p>Pictured Above: immersion no well (INW) sensor in Bell Box Enclosure (BB).</p> <p>Pictured Below: welded two piece thermowell to show connection and depth reference. Thermowell not included with immersion no well (INW).</p>		<table border="1"> <thead> <tr> <th>Probe Length</th> <th>Insertion Length</th> <th>ACI Part #</th> <th>Thermowell Part #</th> </tr> </thead> <tbody> <tr> <td>4.5"</td> <td>4.31" +/- 0.13"</td> <td>A/xx-INW-2.5"-yy-zz</td> <td>A/M2.5"</td> </tr> <tr> <td>6"</td> <td>5.81" +/- 0.13"</td> <td>A/xx-INW-4"-yy-zz</td> <td>A/M4"</td> </tr> <tr> <td>8"</td> <td>7.81" +/- 0.13"</td> <td>A/xx-INW-6"-yy-zz</td> <td>A/M6"</td> </tr> </tbody> </table>	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"	
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CUSTOM ORDERING HIGH TEMPERATURE IMMERSION SENSORS		Model # Example: A/ 1K 3W HT I 4" GD NIST	MODEL#
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 = Three Wires (Specify for 100 and 1K RTD Sensors only)		3W
D. High Temperature <i>No Selection Required</i>	HT = High Temperature Series		HT
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 HIGH TEMPERATURE IMMERSION TRANSMITTERS		Model # Example: A/ TT100 HT I 6" 2 GD	MODEL#
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>	HT = High Temperature Series		HT
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: A/316SS_1-8IN_NPT_COMPRESS_FIT -OR- 143457
Model #	Item #	Description	
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	