

# HIGH ACCURACY IMMERSION Stainless Steel Immersion, Thermistor

The ACI High accuracy Thermistor Immersion Series features a 1/4" diameter stainless steel probe with two, 14 inch 22 AWG Etched Teflon colored lead wires to differentiate the different sensor types. The sensors in this series are manufactured using ACI's proven double encapsulation process to eliminate the effects of moisture upon the sensors and to increase the thermal response times using our high quality, thermally conductive epoxy. The immersion sensors come standard with a welded thermowell "-I" version but can be ordered without the welded thermowell "-INW" version. The "INW" version includes a standard 1/2" NPS (National Pipe Straight) Male process thread to be used with an optional machined thermowell or in an existing thermowell application. This series can be ordered with optional NEMA/IP rated enclosures or NIST Certificates as shown in the ordering information on the back of the product data sheet.

**Applications:** Data Centers, Flow Metering, Chilled Water Systems, Hot Water Systems, Boilers, Pumps, Compressors, Chillers, Refrigeration, Process Control

**The ACI High Accuracy Thermistor Immersion 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](http://www.workaci.com).**

## PRODUCT SPECIFICATIONS

<b>Sensor Type   Sensor Curve:</b>	Thermistor   Non-Linear, NTC (Negative Temperature Coefficient)
<b>Number Sensing Points:</b>	One
<b>Number Wires:</b>	Two (Non-Polarity Sensitive)
<b>Sensor Output @ 25°C (77°F)</b>	<b>A/O.1AN Series</b> (Type III): 10KΩ nominal (White/Black)
<b>(Lead Wire Colors):</b>	<b>A/O.1CP Series</b> (Type II): 10KΩ nominal (Green/Gray)
<b>Accuracy from 0-70°C (32-158°F) 1:</b>	+/- 0.1°C (+/- 0.18°F)
<b>Power Dissipation Constant:</b>	<b>A/O.1AN Series:</b> 2 mW/°C nominal <b>A/O.1CP Series:</b> 1 mW/°C nominal
<b>Stability 2:</b>	<b>A/O.1AN Series</b> (5 Years): +/- 0.127°C (0.228°F) @ 100°C (212°F) <b>A/O.1CP Series</b> (5 Years): +/- 0.12°C (0.216°F) @ 25°C (77°F) (10 Years): +/- 0.60°C (1.08°F) @ 25°C (77°F)
<b>Response Time (63% Step Change):</b>	10 Seconds nominal
<b>Sensor Operating Temperature Range 2:</b>	0 to 70°C (32 to 158°F)
<b>Enclosure Specifications (Temperature, Flammability, NEMA/IP Ratings):</b>	<b>"-GD" Enclosure:</b> Galvanized Steel, -40 to 115°C (-40 to 239°F), NEMA 1 (IP10) <b>"-PB" Enclosure:</b> ABS Plastic, -30 to 90°C (-22 to 194°F), UL94-HB, Plenum Rated <b>"-BB" Enclosure:</b> Aluminum, -40 to 121°C (-40 to 250°F), NEMA 3R (IP 14) <b>"-4X" Enclosure:</b> Polystyrene Plastic, -40 to 70°C (-40 to 158°F), UL94-V2, NEMA 4X (IP 66)
<b>Storage Temperature Range 1:</b>	0 to 70°C (32 to 158°F)
<b>Operating Humidity Range:</b>	10 to 95% RH, non-condensing
<b>NIST Certification:</b>	3 Point NIST Certificate available
<b>Probe Diameter   Thermowell Bore Diameter:</b>	0.250" (6.35mm)   0.260"
<b>Probe Material   Thermowell Material:</b>	304 Stainless Steel   304 Series Stainless Steel
<b>Thermowell Instrument Thread   Process Thread:</b>	1/2" NPS (National Pipe Straight) Female Thread   1/2" NPT (National Pipe Tapered) Male Thread
<b>Fitting Material   Flammability Rating:</b>	Polyamide 66 (High Performance Nylon 66)   UL94-HB
<b>Fitting Thread Size:</b>	1/2" NPS (National Pipe Straight) Male Thread
<b>Foam Pad Material   Flammability Rating:</b>	Neoprene/EPDM/SBR Polymer   UL94-HBF; FMVSS-302; MIL-R-6130C
<b>Lead Length   Conductor Size:</b>	14" (35.6 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>	CE, RoHS2, WEEE

**Note 1:** For best accuracy and long term stability the sensor should be used in applications where the operating temperatures remain within the specified operating temperature range of 0 to 70°C (32 to 158°F) | **Note 2:** The sensor will operate over an extended operating temperature range of -40 to 150°C (-40 to 302°F) without damaging the sensor but the accuracy and long term stability will not meet the specifications above





**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 <sup>1</sup>	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)

**MAXIMUM PRESSURE VS TEMPERATURE RATINGS** Two-Part Fabricated / Welded Thermowell

Material:	70°F (21.1°C)	200°F (93.3°C)	400°F (204.4°C)	600°F (315.6°C)	800°F (426.7°C)	1000°F (537.8°C)	1200°F (648.9°C)
304/316 SS	982 PSI (67.7 Bar)	820 PSI (56.5 Bar)	675 PSI (46.5 Bar)	604 PSI (41.6 Bar)	550 PSI (37.9 Bar)	510 PSI (35.1 Bar)	290 PSI (20.0 Bar)

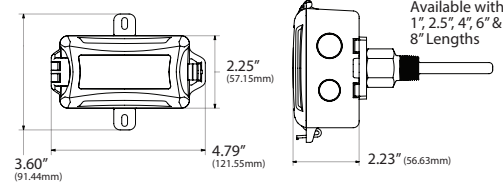
**MAXIMUM FLUID VELOCITY RATINGS** Two-Part Fabricated / Welded Thermowell

Straight Shank Insertion Length "U"		2.5" (63.5 mm)	4.0" (101.6 mm)	6.0" (152.4 mm)
Material:	Media Type:			
304/316 SS	Air/Gas/Steam <sup>2</sup>	169 ft/s (51.5 m/s)	61 ft/s (18.6 m/s)	20 ft/s (6.1 m/s)
304/316 SS	Water	88 ft/s (26.8 m/s)	20 ft/s (6.1 m/s)	10 ft/s (3.05 m/s)

**Note 2:** Values are for Air/Gas/Steam and similar density media

**DIMENSIONAL DRAWING. WEIGHTS**

**Plastic Box Enclosure [PB]**



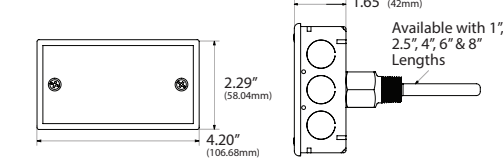
xx = Sensor Type | yy = Insertion Length

**Plastic Box Enclosure [PB] Weights**

ACI Model #	1.0"	2.5"	4.0"	6.0"	8.0"
A/xx-INW-yy-PB	0.20 lbs. (0.091 kg)	0.24 lbs. (0.109 kg)	0.28 lbs. (0.127 kg)	0.32 lbs. (0.145 kg)	0.36 lbs. (0.163 kg)
A/xx-I-yy-PB	N/A	0.56 lbs. (0.254 kg)	0.60 lbs. (0.272 kg)	0.64 lbs. (0.290 kg)	N/A
A/xx-IM-yy-PB	0.40 lbs. (0.182 kg)	0.58 lbs. (0.263 kg)	0.74 lbs. (0.336 kg)	0.92 lbs. (0.417 kg)	1.15 lbs. (0.522 kg)

N/A = Not Available

**Galvanized Enclosure [GD]**



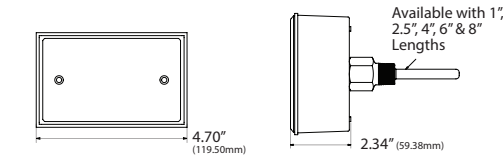
xx = Sensor Type | yy = Insertion Length

**Galvanized Enclosure [GD] Weights**

ACI Model #	1.0"	2.5"	4.0"	6.0"	8.0"
A/xx-INW-yy-GD	0.62 lbs. (0.281 kg)	0.66 lbs. (0.299 kg)	0.70 lbs. (0.318 kg)	0.74 lbs. (0.336 kg)	0.78 lbs. (0.354 kg)
A/xx-I-yy-GD	N/A	0.88 lbs. (0.399 kg)	1.00 lbs. (0.454 kg)	1.04 lbs. (0.472 kg)	N/A
A/xx-IM-yy-GD	0.81 lbs. (0.367 kg)	1.00 lbs. (0.454 kg)	1.16 lbs. (0.526 kg)	1.32 lbs. (0.599 kg)	1.55 lbs. (0.703 kg)

N/A = Not Available

**Bell Box Enclosure [BB]**



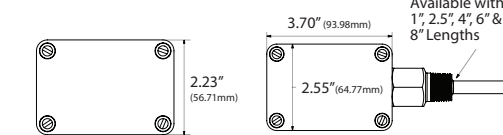
xx = Sensor Type | yy = Insertion Length

**Bell Box Enclosure [GD] Weights**

ACI Model #	1.0"	2.5"	4.0"	6.0"	8.0"
A/xx-INW-yy-BB	0.64 lbs. (0.290 kg)	0.68 lbs. (0.308 kg)	0.70 lbs. (0.318 kg)	0.74 lbs. (0.336 kg)	0.80 lbs. (0.363 kg)
A/xx-I-yy-BB	N/A	1.02 lbs. (0.463 kg)	1.00 lbs. (0.454 kg)	1.04 lbs. (0.472 kg)	N/A
A/xx-IM-yy-BB	0.83 lbs. (0.376 kg)	1.02 lbs. (0.463 kg)	1.16 lbs. (0.526 kg)	1.32 lbs. (0.599 kg)	1.59 lbs. (0.721 kg)

N/A = Not Available

**NEMA 4X Enclosure [4X]**



xx = Sensor Type | yy = Insertion Length

**NEMA 4X Enclosure [4X] Weights**

ACI Model #	1.0"	2.5"	4.0"	6.0"	8.0"
A/xx-INW-yy-4X	0.28 lbs. (0.127 kg)	0.32 lbs. (0.145 kg)	0.36 lbs. (0.163 kg)	0.40 lbs. (0.181 kg)	0.44 lbs. (0.200 kg)
A/xx-I-yy-4X	N/A	0.64 lbs. (0.290 kg)	0.68 lbs. (0.308 kg)	0.72 lbs. (0.327 kg)	N/A
A/xx-IM-yy-4X	0.48 lbs. (0.218 kg)	0.66 lbs. (0.299 kg)	0.82 lbs. (0.372 kg)	1.00 lbs. (0.454 kg)	1.27 lbs. (0.576 kg)

N/A = Not Available

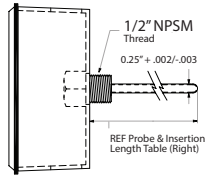
Standard Views

Product Weights



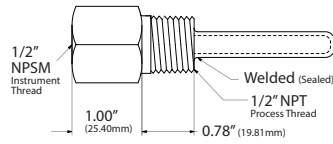


**PROBE AND INSERTION LENGTH IMMERSION NO WELL**



**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 #
3"	2.81 +/- 0.13"	A/xx-INW-1"-yy-zz	A/M1"
4.5"	4.31 +/- 0.13"	A/xx-INW-2.5"-yy-zz	A/2.5" or A/M2.5"
6"	5.81 +/- 0.13"	A/xx-INW-4"-yy-zz	A/4" or A/M4"
8"	7.81 +/- 0.13"	A/xx-INW-6"-yy-zz	A/6" or A/M6"
10"	9.81 +/- 0.13"	A/xx-INW-8"-yy-zz	A/M8"

**ORDERING** Welded Thermowell or No Thermowell

Model # Example: **A/** **0.1AN** **I** **4"** **GD** **NIST**

<b>A. Sensor Series</b> No Selection Required	<b>A/</b> <input type="text"/>	<b>MODEL #</b> <b>A/</b>
<b>B. Model Series</b> Select One (1)	<b>0.1AN</b> = 10K (Type III)   <b>0.1CP</b> = 10K (Type II)	
<b>C. Configuration</b> Select One (1)	<b>I</b> = Immersion with Welded Thermowell   <b>INW</b> = Immersion without Welded Thermowell	
<b>D. Insertion Length</b> Select One (1)	<b>2.5"</b> = 2.5" Insertion   <b>4"</b> = 4" Insertion   <b>6"</b> = 6" Insertion	
<b>E. Enclosure</b> Select One (1)	<b>GD</b> = Galvanized   <b>PB</b> = Plastic   <b>BB</b> = Aluminum, NEMA 3R   <b>4X</b> = NEMA 4X	
<b>F. NIST</b> Select One (1)	<b>----</b> = No NIST Certificate   <b>NIST</b> = NIST Certificate (3 Points)	

**ORDERING** Machined Thermowell or No Thermowell

Model # Example: **A/** **0.1CP** **IM** **4"** **GD** **NIST**

<b>A. Sensor Series</b> No Selection Required	<b>A/</b> <input type="text"/>	<b>MODEL #</b> <b>A/</b>
<b>B. Model Series</b> Select One (1)	<b>0.1AN</b> = 10K (Type III)   <b>0.1CP</b> = 10K (Type II)	
<b>C. Configuration</b> Select One (1)	<b>IM</b> = Immersion with Machined Well   <b>INW</b> = Immersion without Thermowell	
<b>D. Insertion Length</b> Select One (1)	<b>1"</b> = 1" Insertion   <b>2.5"</b> = 2.5" Insertion   <b>4"</b> = 4" Insertion   <b>6"</b> = 6" Insertion <b>8"</b> = 8" Insertion	
<b>E. Enclosure</b> Select One (1)	<b>GD</b> = Galvanized   <b>PB</b> = Plastic   <b>BB</b> = Aluminum, NEMA 3R   <b>4X</b> = NEMA 4X	
<b>F. NIST</b> Select One (1)	<b>----</b> = No NIST Certificate   <b>NIST</b> = NIST Certificate (3 Points)	

**Note:** Thermowells with lengths of 12", 18", and 24" are available and must be ordered separately | See the Machined Thermowells Data Sheet (Accessories)

**ACCESSORIES ORDERING**

Model # Example: **NSG HEAT TRANSFER PASTE 2OZ** **-OR-** **102595**

Model #	Item #	Description
<b>NSG HEAT TRANSFER PASTE 2OZ</b>	102595	Thermal Grease, 2 oz. Tube, Silicone Free, -40 to 320°F (-40 to 160°C)
<b>NSG HEAT TRANSFER PASTE 16OZ</b>	140574	Thermal Grease, 16 oz. Jar, Silicone Free, -40 to 390°F (-40 to 198°C)
<b>A/2.5"</b>	128349	2.5" (63.5mm) Insertion, 304 Stainless, Welded, 1/2" NPT Thermowell
<b>A/4"</b>	128350	4" (101.6mm) Insertion, 304 Stainless, Welded, 1/2" NPT Thermowell
<b>A/6"</b>	128351	6" (152.4mm) Insertion, 304 Stainless, Welded, 1/2" NPT Thermowell
<b>A/M1"</b>	128337	1" (25.4mm) Insertion, 304 Stainless, Machined, 1/2" NPT Thermowell
<b>A/M2.5"</b>	128338	2.5" (63.5mm) Insertion, 304 Stainless, Machined, 1/2" NPT Thermowell
<b>A/M4"</b>	128343	4" (101.6mm) Insertion, 304 Stainless, Machined, 1/2" NPT Thermowell
<b>A/M6"</b>	128344	6" (152.4mm) Insertion, 304 Stainless, Machined, 1/2" NPT Thermowell
<b>A/M8"</b>	138725	8" (203.2mm) Insertion, 304 Stainless, Machined, 1/2" NPT Thermowell
<b>A/M2.5"-316SS</b>	128352	2.5" (63.5mm) Insertion, 316 Stainless, Machined, 1/2" NPT Thermowell
<b>A/M4"-316SS</b>	128353	4" (101.6mm) Insertion, 316 Stainless, Machined, 1/2" NPT Thermowell
<b>A/M6"-316SS</b>	128354	6" (152.4mm) Insertion, 316 Stainless, Machined, 1/2" NPT Thermowell

