

# Sanitary Sensors



## THORNTON

Leading Pure Water Analytics

### Sanitary Sensors

Temperature Sensors

3A Sanitary Turbine Flow Sensors

Pressure Sensors

Tank Level Sensors



## High Quality, Precision Sanitary Sensors

METTLER TOLEDO

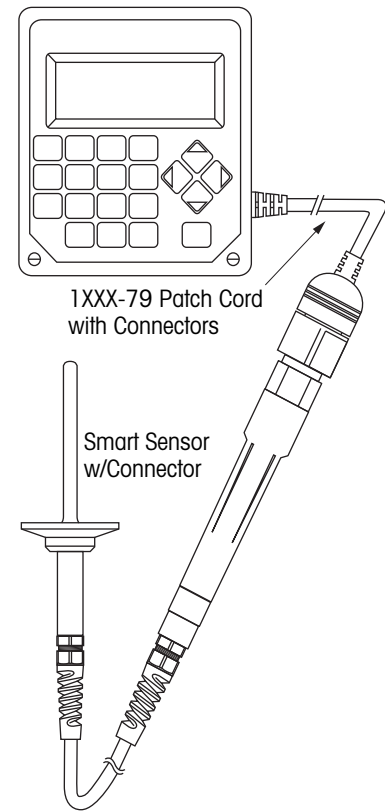
Thornton smart sensors are a key part of the 770MAX Multiparameter Analyzer/Transmitter measuring system. Sanitary sensors are available for conductivity (see separate data sheet), flow, pressure, tank level and temperature. Each sensor includes data stored in its non-volatile memory which is communicated to the instrument as soon as it is connected. Data includes measurement identification, calibration constants, date of last calibration, serial number, etc., providing especially fast, simple and reliable startup and documentation. In addition, all wiring is conveniently handled through connectors.

### Sensor Selection

Thornton offers a variety of sanitary sensors to accommodate most applications. Use the following criteria to select the most appropriate sensor for your installation.

- Measurement range
- Pipe connection type and size
- Temperature, pressure and chemical compatibility, including exposure to steam and/or chemical cleaning

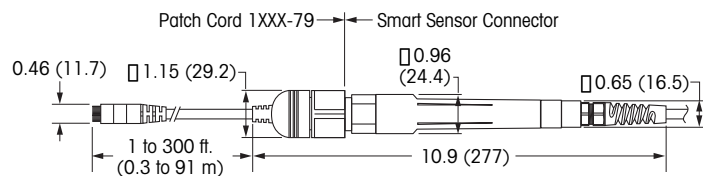
**For sanitary conductivity or general purpose sensors with non-sanitary connections, see separate data sheets or consult Thornton.**



Smart Sensor Patch Cords

Patch Cord	US & Canada Part No.	International Part No.
1 ft. (0.3 m)	1001-79	58 080 000
5 ft. (1.5 m)	1005-79	58 080 001
10 ft. (3 m)	1010-79	58 080 002
15 ft. (4.5 m)	1015-79	58 080 003
25 ft. (7.6 m)	1025-79	58 080 004
50 ft. (15.2 m)	1050-79	58 080 005
100 ft. (30.5 m)	1100-79	58 080 006
150 ft. (45.6 m)	1115-79	58 080 007
200 ft. (61 m)	1120-79	58 080 008
300 ft. (91 m)	1130-79	58 080 009

Observe length limitations of pressure and level sensors.



Dimensions: inches (mm), except where noted otherwise

### 328-Series Precision Sanitary Turbine Flow Sensor

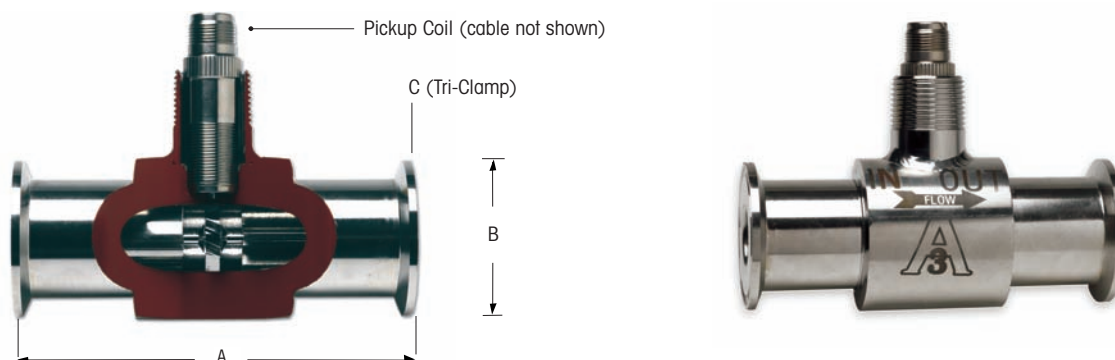
The 328-Series 3A precision sanitary flow sensors are constructed of 300 Series Stainless Steel material and electro-polished to eliminate any cracks, crevices or surface imperfections. Sizes range from 1/2 inch to 4 inch and can be installed in either horizontal or vertical pipe runs. Flow ranges from 1 to 1,250 GPM (3.8 to 4,732 LPM) can be measured using this precision flow measurement sensor. Featuring a turbine style rotor, and a magnetic pulse amplifier coil, these flow sensors are designed to provide continuous, precise and reliable fluid flow measurement where Tri-Clamp connections and 3A sanitary certification are required.

- Wetted Parts:** Body electro polished 316 SS, 32 microinch (0.8 micrometer) Ra finish, 17-4 PH SS Rotor, carbide sleeve bearing.
- Certification:** 3A Sanitary rated, manufacturer's NIST traceable calibration certificate and material certificate included.
- Temperature:** -100 °F to 450 °F (-73 °C to 232 °C)
- Pressure:** See table below for details.
- Electrical Connection:** Smart sensors have 1.5 ft (0.5 m) cable with Smart connector and require standard 770MAX patch cables. Pulse input models have 20 ft (6.1 m) twisted cable with flying leads. Wiring may be run up to 2000 ft (610 m) with 3-conductor shielded cable such as Belden 9364.
- Process Connections:** To achieve optimum performance, maintain 3A certification and protect the bearings from excess turbulence and damage, a typical installation should provide a minimum of 10 pipe diameters upstream and 5 pipe diameters downstream of turbine size pipe. For example, the 1/2" turbine sensor with 1 1/2" Tri-Clamp fittings must have 1/2" inlet and discharge piping. In addition, proper inside diameter flange gasket must be used.
- Linearity:** ± 0.5% \*\*
- Repeatability:** ± 0.1% over nominal rated range \*\*

Flow Range in GPM (LPM)	Turbine Size	Pressure Psig (bar)	Installation Dimensions inch (mm)			US & Canada		International	
			A	B	C	Pulse Input* Part No.	Smart Input Part No.	Pulse Input* Part No.	Smart Input Part No.
1-10 (3.8-37.8)	1/2"	1,000 (69)	4.0 (102)	0.99 (25)	3/4"	33441	328-006	58 034 516	58 034 116
2.5-29 (9.5-109.8)	3/4"	1,000 (69)	5.0 (127)	0.99 (25)	3/4"	33444	328-009	58 034 519	58 034 119
4-60 (15.1-227.1)	1"	1,000 (69)	5.0 (127)	1.98 (50)	1 1/2"	33445	328-010	58 034 520	58 034 120
8-130 (30.3-492.1)	1 1/2"	600 (41)	5.0 (127)	1.98 (50)	1 1/2"	33447	328-012	58 034 522	58 034 122
15-225 (56.8-851.7)	2"	550 (38)	6.0 (152)	2.52 (64)	2"	33448	328-013	58 034 523	58 034 123
40-650 (151-2,461)	3"	350 (24)	7.5 (191)	3.05 (77)	3"	33449	328-014	58 034 524	58 034 124
75-1,250 (284-4,732)	4"	300 (21)	9.5 (241)	3.58 (91)	4"	33450	328-015	58 034 525	58 034 125

\* Pulse input flow sensors for use with M300 FLOW and 770MAX (channels 5 and 6 only) do not include Smart Sensor communication and do not use patch cables. A separate isolated 12 VDC power supply 58 079 000 (1000-65 for US & Canada) is required when sensor is used with 770MAX. Refer to 770MAX and M300 FLOW operating manuals for respective wiring instructions.

\*\* Based on manufacturer's calibration



### 325-Series Compact Sanitary Turbine Flow Sensors

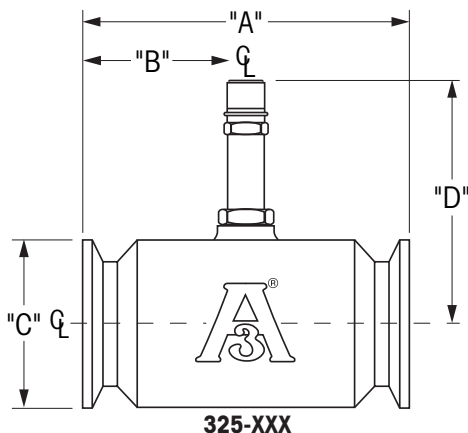
Another choice for applications demanding 3A sanitary certification and efficient flow measurement. 325-series flow sensors feature a compact flow sensor body with Tri-Clamp type connections and a magnetic variable reluctance type coil.

- Wetted Parts:** Body 316 SS, Ra 32 microinch (0.8 micrometer) finish; 17.4 pH SS rotor; 15.7 MO pH SS retaining rings; hard carbon composite bearings.
- Certification:** 3A Rated, manufacturers calibration and materials certificates included.
- Pressure:** 500 psi (35 bar) maximum
- Temperature:** 450 °F (232 °C) maximum
- Electrical Connection:** Smart models have 1.5 ft (0.5 m) cables and require patch cords, maximum length 300 ft (91 m). Pulse input models have 20 ft (6.1 m) twisted cable with 1/2" NPTM conduit connector. Wiring may be run up to 2,000 ft (610 m) with 3 conductor, 20 gauge, shielded cable, such as Belden 9364.
- Process Connections:** To achieve optimum performance, maintain 3A certification and to protect the bearings from excess turbulence and damage, a minimum of 10 pipe diameters upstream and 5 pipe diameters downstream of turbine size pipe must be used. For example, the 1/4" turbine with 1-1/2" Tri-Clamp fittings must have 1/4" inlet and discharge piping. In addition, proper inside diameter flange gasket must be used. Consult Thornton for installation kit if needed.
- Linearity:** ±0.5% of reading\*\*
- Repeatability:** ±0.1% of reading\*\*

Flow Range GPM (LPM)	Tri-Clamp <sup>□</sup> Fitting	Turbine Size	Dimensions (in.)				US & Canada		International	
			A	B	C	D	Pulse Input* Part No.	Smart Input Part No.	Pulse Input* Part No.	Smart Input Part No.
0.35-3.5 (1.3-13)	3/4"	1/4"	3.56	1.78	0.99	3.0	<b>33336</b>	<b>325-001</b>	<b>58 034 270</b>	<b>58 034 070</b>
0.35-3.5 (1.3-13)	1-1/2"	1/4"	3.56	1.78	1.98	3.0	<b>33337</b>	<b>325-002</b>	<b>58 034 271</b>	<b>58 034 071</b>
0.75-7.5 (2.8-28)	3/4"	3/8"	3.56	1.78	0.99	3.0	<b>33338</b>	<b>325-003</b>	<b>58 034 272</b>	<b>58 034 072</b>
0.75-7.5 (2.8-28)	1-1/2"	3/8"	3.56	1.78	1.98	3.0	<b>33339</b>	<b>325-004</b>	<b>58 034 273</b>	<b>58 034 073</b>
1.25-9.5 (4.7-36)	3/4"	1/2"	3.56	1.78	0.99	3.0	<b>33340</b>	<b>325-005</b>	<b>58 034 274</b>	<b>58 034 074</b>
1.25-9.5 (4.7-36)	1-1/2"	1/2"	3.56	1.78	1.98	3.0	<b>33341</b>	<b>325-006</b>	<b>58 034 275</b>	<b>58 034 075</b>
1.75-16 (6.6-60)	3/4"	5/8"	3.56	1.78	0.99	3.0	<b>33342</b>	<b>325-007</b>	<b>58 034 276</b>	<b>58 034 076</b>
1.75-16 (6.6-60)	1-1/2"	5/8"	3.56	1.78	1.98	3.0	<b>33343</b>	<b>325-008</b>	<b>58 034 277</b>	<b>58 034 077</b>
2.5-29 (9.5-110)	1-1/2"	3/4"	3.25	1.63	1.98	3.0	<b>33344</b>	<b>325-009</b>	<b>58 034 278</b>	<b>58 034 078</b>
4-60 (15-227)	1-1/2"	1"	3.56	1.78	1.98	3.0	<b>33345</b>	<b>325-010</b>	<b>58 034 279</b>	<b>58 034 079</b>
6-93 (23-352)	1-1/2"	1-1/4"	4.59	2.30	1.98	3.0	<b>33346</b>	<b>325-011</b>	<b>58 034 280</b>	<b>58 034 080</b>
8-130 (30-492)	1-1/2"	1-1/2"	4.59	2.30	1.98	3.0	<b>33347</b>	<b>325-012</b>	<b>58 034 281</b>	<b>58 034 081</b>
15-225 (57-852)	2"	2"	6.06	3.03	2.52	3.0	<b>33348</b>	<b>325-013</b>	<b>58 034 282</b>	<b>58 034 082</b>
25-400 (95-1,514)	3"	2-1/2"	10.00	5.00	3.58	3.0	<b>33376</b>	<b>325-014</b>	<b>58 034 303</b>	<b>58 034 103</b>
40-650 (151-2,460)	4"	3"	10.00	5.00	4.68	3.0	<b>33377</b>	<b>325-015</b>	<b>58 034 304</b>	<b>58 034 104</b>

\* Pulse input flow sensors for use with M300 FLOW and 770MAX (channels 5 and 6 only) do not include Smart Sensor communication and do not use patch cables. A separate isolated 12 VDC power supply 58 079 000 (1000-65 for US & Canada) is required when sensor is used with 770MAX. Refer to 770MAX and M300 FLOW operating manuals for respective wiring instructions.

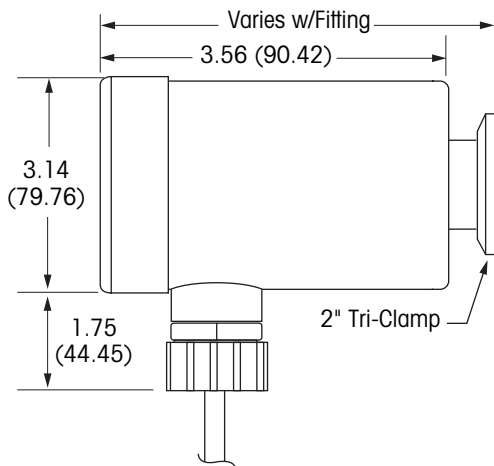
\*\* Based on manufacturer's calibration in water at 70°C



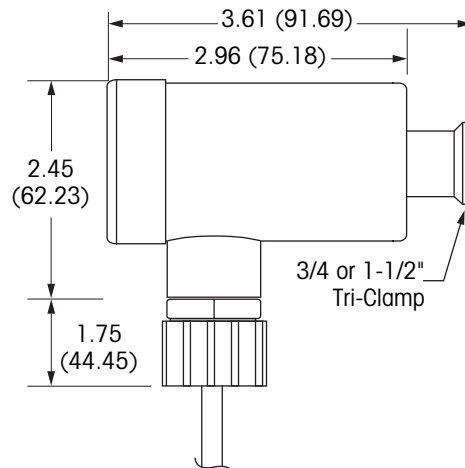
## 321-Series Smart Sanitary Pressure Sensors – Strain Gauge

<b>Accuracy:</b>	±0.5% F.S.
<b>Repeatability:</b>	±0.3% F.S.
<b>Cable:</b>	1.5 ft. (0.5 m) with Smart connector, PVC
<b>Patch cord:</b>	150 ft. (45.6 m) max.
<b>Wetted material:</b>	316L stainless steel, electropolished, Ra 8 microinches (0.2 micrometers)
<b>Certification:</b>	3A Rated
<b>Process temperature:</b>	30 to 275 °F (-1 to 135 °C)
<b>Temperature influence:</b>	±0.1% F.S./10 °F, typical

Tri-Clamp® Fitting	Range psi (bar)	US & Canada Part No.	International Part No.
3/4"	0-50 (0-3.5)	<b>321-110</b>	<b>58 038 020</b>
3/4"	0-100 (0-7)	<b>321-111</b>	<b>58 038 021</b>
3/4"	0-300 (0-20)	<b>321-112</b>	<b>58 038 022</b>
1-1/2"	0-50 (0-3.5)	<b>321-210</b>	<b>58 038 023</b>
1-1/2"	0-100 (0-7)	<b>321-211</b>	<b>58 038 024</b>
1-1/2"	0-300 (0-20)	<b>321-212</b>	<b>58 038 025</b>
2"	0-50 (0-3.5)	<b>321-310</b>	<b>58 038 026</b>
2"	0-100 (0-7)	<b>321-311</b>	<b>58 038 027</b>
2"	0-300 (0-20)	<b>321-312</b>	<b>58 038 028</b>



**321-310 to 321-312**



**321-110 to 321-212**

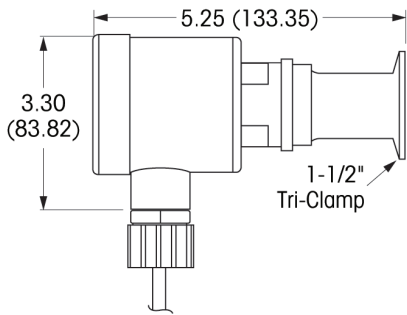
### 326-Series Smart Sanitary Tank Level – Strain Gauge

**Accuracy (constant temp):** ±0.2% F.S.  
**Cable:** 1.5 ft. (0.5 m) w/Smart connector, PVC jacket, 80 °C rating  
**Patch cord:** 150 ft. (45.6 m) max.  
**Wetted material:** 316L Stainless Steel  
**Certification:** 3A Rated

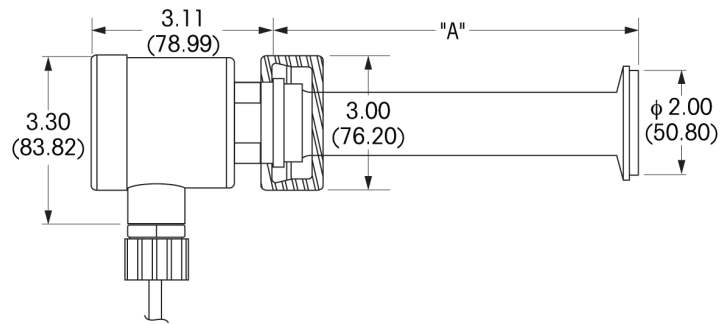


Fitting	Finish	Range in. Water (cm water)	Process Temp	Compensated Range	US & Canada	International
					Part No.	Part No.
1-1/2" Tri-Clamp, vertical	Ra 8	0-30 to 0-140 (0-76 to 0-356)			<b>326-205</b>	<b>58 039 009</b>
1-1/2" Tri-Clamp, horizontal	Ra 8	0-30 to 0-140 (0-76 to 0-356)	0 to 265°F	0 to 250°F	<b>326-206</b>	<b>58 039 010</b>
1-1/2" Tri-Clamp, vertical	Ra 8	0-140.1 to 0-415 (0-356 to 0-1,054)	(-18 to 130°C)	(-18 to 121°C)	<b>326-207</b>	<b>58 039 011</b>
1-1/2" Tri-Clamp, horizontal	Ra 8	0-140.1 to 0-415 (0-356 to 0-1,054)			<b>326-208</b>	<b>58 039 012</b>
Anderson Short, vertical	Ra 8	0-30 to 0-140 (0-76 to 0-356)			<b>326-209</b>	<b>58 039 013</b>
Anderson Short, horizontal	Ra 8	0-30 to 0-140 (0-76 to 0-356)	0 to 265°F	0 to 250°F	<b>326-210</b>	<b>58 039 014</b>
Anderson Short, vertical	Ra 8	0-140.1 to 0-415 (0-356 to 0-1,054)	(-18 to 130°C)	(-18 to 121°C)	<b>326-211</b>	<b>58 039 015</b>
Anderson Short, horizontal	Ra 8	0-140.1 to 0-415 (0-356 to 0-1,054)			<b>326-212</b>	<b>58 039 016</b>
Anderson Long, vertical	Ra 8	0-30 to 0-140 (0-76 to 0-356)			<b>326-213</b>	<b>58 039 017</b>
Anderson Long, horizontal	Ra 8	0-30 to 0-140 (0-76 to 0-356)	0 to 265°F	0 to 250°F	<b>326-214</b>	<b>58 039 018</b>
Anderson Long, vertical	Ra 8	0-140.1 to 0-415 (0-356 to 0-1,054)	(-18 to 130°C)	(-18 to 121°C)	<b>326-215</b>	<b>58 039 019</b>
Anderson Long, horizontal	Ra 8	0-140.1 to 0-415 (0-356 to 0-1,054)			<b>326-216</b>	<b>58 039 020</b>

Long mount is for Anderson fittings in insulated tanks; short is for un-insulated tanks. Vertical mount is for bottom of tank; horizontal is for side of tank. Specify exact calibrated range to nearest 0.1 inch.



**1-1/2" Tri Clamp**



**Anderson**

Anderson Shell Type	Length "A"
Insulated (long)	6.50" (165.1)
Non-insulated (short)	2.19" (55.6)

Dimensions: inches (mm). See sensor table at right for "A" dimensions.

## 322-Series Smart Sanitary Pressure and 327-Series Tank Level Sensors – Variable Capacitance

**Accuracy (constant temp):** ±0.2% F.S.  
**Repeatability:** ±0.1% F.S.  
**Cable:** 1.5 ft. (0.5 m) w/Smart connector, PVC jacket, 80 °C rating  
**Patch cord:** 150 ft. (45.6 m) max.  
**Wetted material:** 316L stainless steel, Ra 15.  
**Certification:** 3A Rated  
**Temperature limit:** 260°F (127 °C)  
**Compensated temp range:** 20 to 180°F (-7 to 82 °C)  
**Temperature influence:** zero shift ±2% F.S./100°F; span shift ±2% F.S./100°F



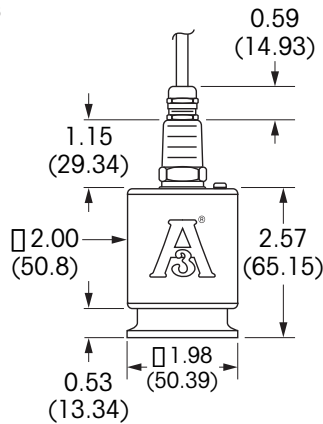
### 322-Series Pressure Sensors

Fitting	Range psi (bars)	US & Canada Part No.	International Part No.
1-1/2" Tri-Clamp	0-60 (0-4)	<b>322-701</b>	<b>58 038 029</b>
1-1/2" Tri-Clamp	0-100 (0-7)	<b>322-801</b>	<b>58 038 030</b>
1-1/2" Tri-Clamp	0-300 (0-20)	<b>322-901</b>	<b>58 038 031</b>

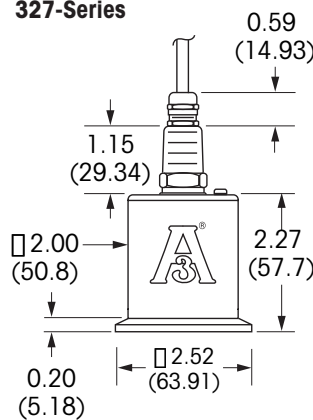
### 327-Series Tank Level Sensors

Fitting	Range in water (cm water)	US & Canada Part No.	International Part No.
2" Tri-Clamp	0-28 (0-70)	<b>327-101</b>	<b>58 039 000</b>
2" Tri-Clamp	0-56 (0-140)	<b>327-103</b>	<b>58 039 001</b>
2" Tri-Clamp	0-140 (0-350)	<b>327-105</b>	<b>58 039 002</b>
2" Tri-Clamp	0-280 (0-700)	<b>327-107</b>	<b>58 039 003</b>
2" Tri-Clamp	0-415 (0-1,050)	<b>327-109</b>	<b>58 039 004</b>

### 322-Series

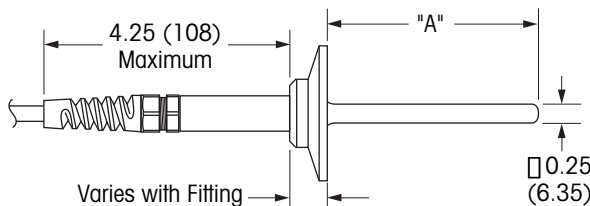


### 327-Series



## 231-Series Smart Sanitary Temperature Sensors

**Wetted Material:** 316L stainless steel, electropolished Ra 8 microinches (0.2 micrometers)  
**Certification:** 3A Rated, certificate of accuracy included  
**Cable:** 5 ft. (1.5 m), PVC jacket, with Smart Connector  
**Sensor:** Pt1000 RTD, DIN  
**Range:** -45 to 176 °C (-50 to 350 °F)  
**Accuracy:** ±1 °C at 25 °C



Tri-Clamp	Fitting	Length "A"	US & Canada Part No.	International Part No.
1/2 or 3/4"		1.25" (32 mm)	<b>231-001</b>	<b>58 040 010</b>
1 or 1-1/2"		2.75" (70 mm)	<b>231-003</b>	<b>58 040 011</b>
2"		3.50" (90 mm)	<b>231-005</b>	<b>58 040 012</b>

Dimensions: inches (mm). See sensor table at right for "A" dimension.

[www.mt.com/thornton](http://www.mt.com/thornton)

Visit for more information

**Mettler-Toledo Thornton, Inc.**

36 Middlesex Turnpike,  
Bedford, MA 01730 USA  
Tel. +1-781-301-8600  
Fax +1-781-301-8701  
Toll-Free: 1-800-510-PURE (US and Canada only)  
[thornton.info@mt.com](mailto:thornton.info@mt.com)

Subject to technical changes.  
© Mettler-Toledo Thornton, Inc.  
ML0073 Rev.1 6/08



**Quality certificate.**

Development, production and testing to ISO 9001.



A certified ServiceXXL provider.