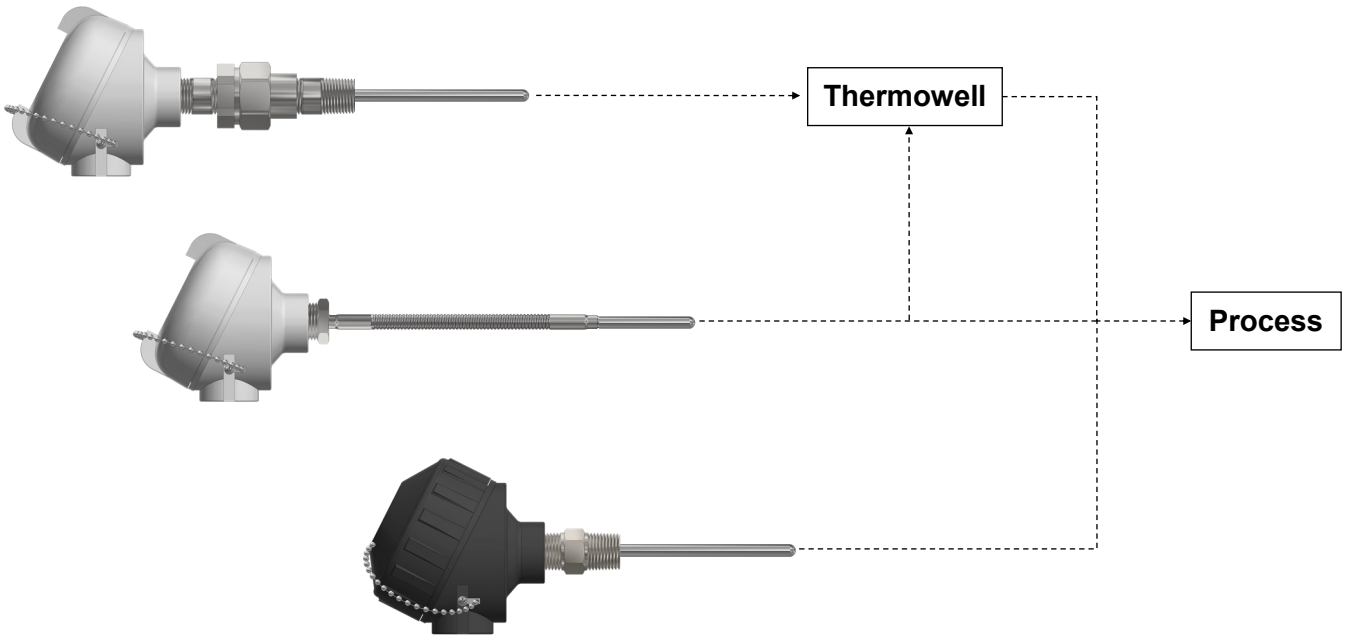
# TC1 Thermocouple Assembly

**General Purpose / Ordinary Location Thermocouple Assembly**




## Overview

**Description:**

The TC1 thermocouple assembly is a thermocouple sensor designed for use general purpose non-hazardous locations. The TC1 is a customizable product that is model number configured and made to order.

The TC1 consists of a thermocouple sensor, complete with a connection head (enclosure) that may or may not contain an internal temperature transmitter module. Connection extension fittings will spring load the sensor into a thermowell or a fixed fitting can be used without a thermowell.

**Features:**

- Simple design that is used and accepted across multiple process industries.
- TC1 configuration options allow for many different patterns to be configured for almost any temperature measurement application.

**Application:**

- Industrial temperature measurement
- Process control
- Outdoor or indoor use (as per connection head & thermowell ratings)

## Configuration Considerations

When configuring the TC1 model to suit your application it is important to consider the following:

- Site specific standards
- Connection head type
- Extension length
- Thermocouple type (tolerance)
- Junction style and quantity
- Minimum and maximum temperature of the process
- Maximum pressure
- Process conditions and their effects on the assembly
- Sensor probe length (to align with what it is going into)

If using a TC1 with a thermowell, consider:

- Thermowell length alignment with TC1 sensor probe
- Spring loaded TC1 “L” length = Thermowell stem
- Fixed fitting TC1 “L” length = Thermowell stem - 0.5”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# TC1 Thermocouple Assembly Model Code

TC1 - T1 T1A - T2 - T3 - T4 - T5 - T6 - T7 - T8 - T9 - T10 - T11

| TC1 | General Purpose / Ordinary Location RTD Assembly |
|---|---|

| T1 | Connection Head / Termination | T1 | Continued |
|---|---|---|---|
| **0AL** | **Aluminum, 1/2" instrument x 3/4" conduit** | **8** | **Without termination (standard 8" flying leads (W))** |
| **2CI** | **Cast iron, 1/2" instrument x 3/4" conduit** | 75G | Head transmitter with display (PR 7501A3A2A12GY) |
| 0PY | Polypropylene, 1/2" instrument x 3/4" conduit | CST | Customer supplied transmitter (Check with Aircom) |
| **2ALT** | **Aluminum, 1/2" instrument x 3/4" conduit** | Other | Refer to page 7-8 for details, styles and options |

| T1A | Terminal Block / Transmitter | T1A | Continued |
|---|---|---|---|
| **'Blank'** | **Bakelite terminal block** | **31D** | **5331D PR puck transmitter** |
| **C** | **Ceramic terminal block** | 35D | 5335D PR puck transmitter (with HART) |
| D | DIN mount technology | Other | Consult Factory |
| S | Splicing connectors | | |

| T2 | Flex-Armor/Connection Extension | T2 | Continued |
|---|---|---|---|
| N | Nipple 1/2" NPT (galvanized)[1] | SN | Nipple 1/2" NPT (stainless steel)[1] |
| **NUN** | **Nipple-union-nipple 1/2" NPT (galvanized)**[1] | SNUN | Nipple-union-nipple 1/2" NPT (stainless steel)[1] |
| **TXUN** | **Spring loaded fitting-union-nipple (galvanized)** | STXUN | Spring loaded fitting-union-nipple (stainless) |
| FS | Fixed bushing 1/2"x1/2" NPT | FX | Fixed hex instrument fitting 1/2" NPT |
| TX | Spring loaded fitting (transmitter bushing) 1/2"x1/2" NPT | OS | Spring loaded bushing with oil seal 1/2"x1/2" NPT |
| **AT** | **Fixed hex instrument fitting - flex armor over Teflon** | AF | Fixed hex instrument fitting - flex armor over fiberglass |
| PT | Fixed hex fitting - Poly jacketed flex armor over Teflon | Other | Consult factory |

| T3 | Connection Extension Length (CEL) |
|---|---|
| X | **Fixed** extension. FS/TX/OS:1" installed length (A); FX: 0.5" installed length (A) |
| **3.5** | **3.5" Connection Extension Length (CEL), 3" Installed Length (A)** |
| 8.5 | 8.5" Connection Extension Length (CEL), 8" Installed length (A) |
| "inches" | Specify other **Flex** Connection Extension Length (CEL) if AF, AT, PT, TT, Note[2]: CEL = A |
| "inches" | Specify other **Union** Connection Extension Length (CEL). Note[2]: CEL = A + $t_p$; A = CEL - $t_p$ |

| T4 | Thermocouple Type | T4 | Continued |
|---|---|---|---|
| **K** | **Type K** | N | Type N |
| J | Type J | R | Type R |
| T | Type T | S | Type S |
| E | Type E | B | Type B |

| T5 | Sensor Sheath Diameter |
|---|---|
| 18 | 1/8" OD |
| 36 | 3/16" OD |
| **14** | **1/4" OD** |
| 38 | 3/8" OD |

**Continued on page 3**

**NOTES:**
1. N, SN, NUN, SNUN require connection heads and terminal block to enable spring-loaded functionality.
2. CEL = Connection Extension Length; A = Installed Length; $t_h$ = Head thread engagement; $t_p$ = Process thread engagement.
3. Bold text indicates most common part selections.


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| TC1 | - | T1 | T1A | - | T2 | - | T3 | - | T4 | - | T5 | - | T6 | - | T7 | - | T8 | - | T9 | - | T10 | - | T11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**Continued from page 2**

| T6 | Thermocouple Junction |
|---|---|
| G | Grounded |
| **U** | **Ungrounded** |
| E | Exposed |

| T7 | Thermocouple Junction Quantity |
|---|---|
| **S** | **Single** |
| D | Dual |
| T | Triple |
| Q | Quad |

| T8 | Sensor Sheath Material |
|---|---|
| 304 | 304/304L Stainless Steel |
| **316** | **316/316L Stainless Steel** |
| 310 | 310 Stainless Steel |
| 600 | Inconel 600 |
| HAC | Hastelloy C276 |
| CI | Ceramic Insulators |
| Other | Consult Aircom Specialist |

| T9 | Sensor “L” Length (inches) |
|---|---|
| **“inches”** | **Specify length in inches** |
| “LA”N“LB” | Length(s) with bend; LA = above bend (leave blank for standard supply); N = 90° Bend; LB = below bend; *e.g. N12 or 4N8* |

| T10 | Fitting Options |
|---|---|
| **X** | **No fitting required** |
| **CF** | **Compression Fitting** |
| SL0 | Spring loaded fitting (1/2”NPT Only) |
| Other | Consult factory |

| T11 | Fitting Size |
|---|---|
| **X** | **No fitting required (size not applicable)** |
| 18 | 1/8” NPT |
| 14 | 1/4” NPT |
| **12** | **1/2” NPT** |
| 34 | 3/4” NPT |
| Other | Consult factory |

**NOTES:**
1. Part number example: TC1-0AL32D-TXUN-3.5-K-14-U-S-316-12-CF-12.
2. Reference page 4-6 for part outline and dimensions.


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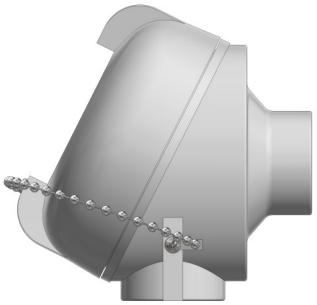
# TC1 Thermocouple Assembly Outline

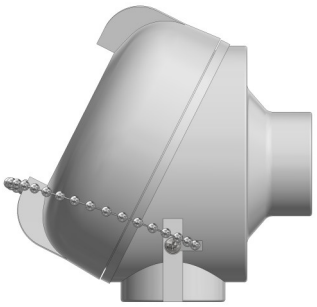
## Connection Head

0AL



2CI

0PY

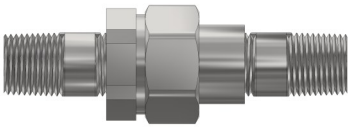


Refer to page 7-8 for additional connection head styles, options, and details

## Flex-Armor/Connection Extension

N & SN

NUN & SNUN

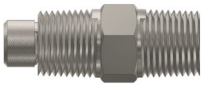


FS

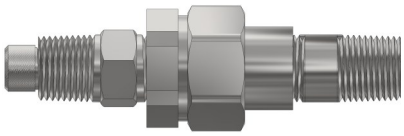
FX

OS

TX

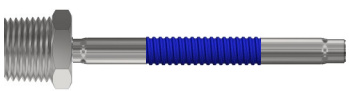


TXUN & STXUN



AF - AT

PT



## Sensor Probe (OD)

18
(0.125”)



36
(0.188”)

14
(0.250”)

38
(0.375”)

CI
(0.250 or 0.375”)



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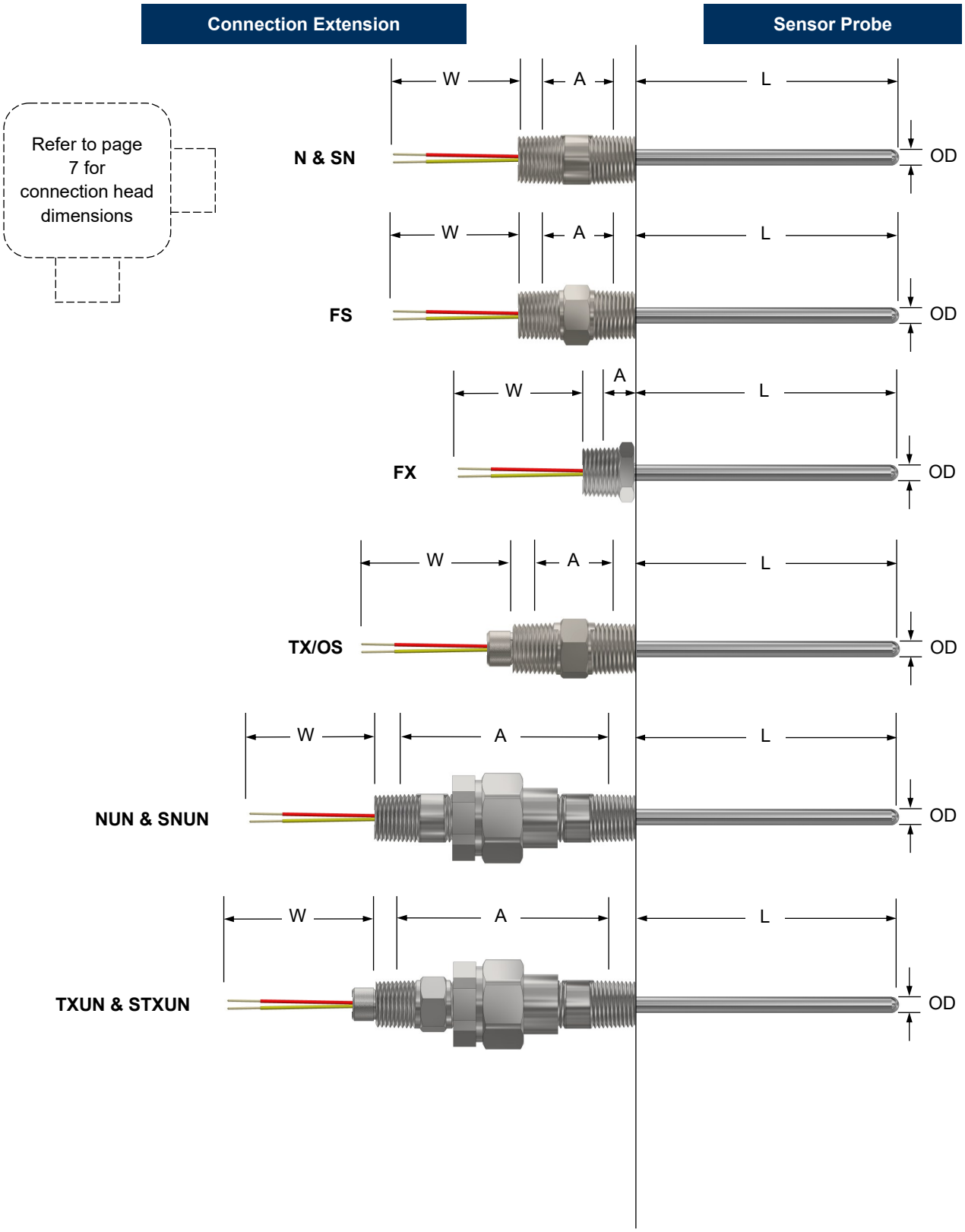
# TC1 Thermocouple Assembly Dimensions




**NOTES:**

1. Thread engagements are approximately 0.5”.

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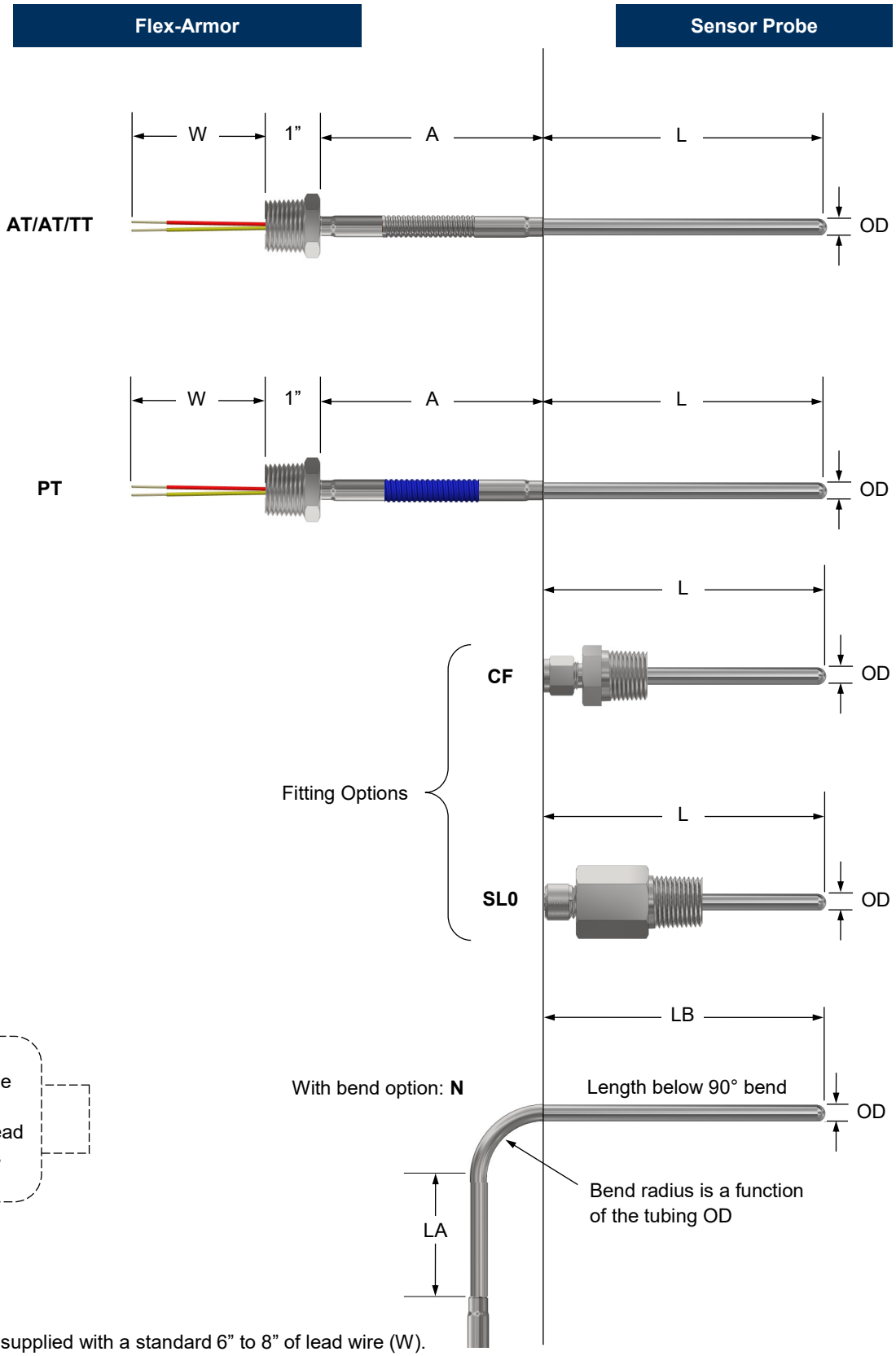
# TC1 Thermocouple Assembly Dimensions




**NOTES:**

1. Assemblies are supplied with a standard 6” to 8” of lead wire (W).
2. Thread engagements are approximately 0.5”.

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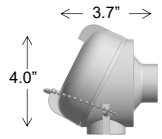
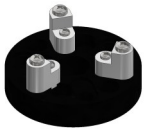
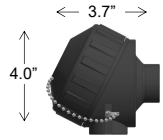
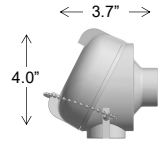
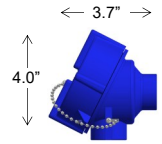
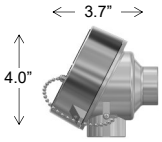
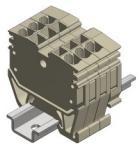
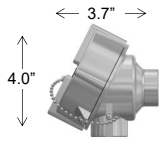
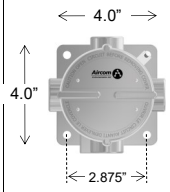
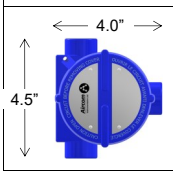
## Model, Outline, and Dimensions for T1/T1A

| Outline & Dimensions | Model | Connection (NPT) | | Material & Type | Max. Temperature Rating | Terminal Block Options (T1A) |
|---|---|---|---|---|---|---|
| | | Instrument | Conduit | | | |
|   | 4AL | 1/2" | 1x 1/2"[2] | Cast aluminum Buna O-ring General Purpose | +440°C (+825°F) |  Bakelite - standard Screw terminals to suit sensor configuration |
| | 0AL | 1/2" | 1x 3/4" | | | |
|   | 1CI | 1/2" | 1x 1/2"[2] | Iron alloy General Purpose | +440°C (+825°F) | |
| | 2CI | 1/2" | 1x 3/4" | | | |
| | 3CI | 3/4" | 1x 3/4" | | | |
|   | 0PY | 1/2" | 1x 3/4" | Polypropylene General Purpose | +121°C (+250°F) |  Ceramic - optional Screw terminals to suit sensor configuration Add suffix "C" to connection head model number |
|   | 1ALT | 1/2" | 1x 1/2"[2] | Cast aluminum epoxy coated Buna O-ring Hazardous[1] Type 4X | -50°C to +85°C (-58°F to +185°F) (+125°C (+257°F) Canada only) | |
| | 2ALT | 1/2" | 1x 3/4" | | | |
| | 3ALT | 3/4" | 1x 3/4" | | | |
|   | 1SS | 1/2" | 1x 1/2"[2] | 316 stainless Hazardous[1] Type 4X | |  Clamp technology - optional DIN mounted clamp technology terminals to suit sensor configuration Add suffix "D" to connection head model number. |
| | 2SS | 1/2" | 1x 3/4" | | | |
| | 3SS | 3/4" | 1x 3/4" | | | |
|   | 1AL | 1/2" | 1x 1/2"[2] | Cast aluminum Buna O-ring Hazardous[1] Type 4X | | |
| | 2AL | 1/2" | 1x 3/4" | | | |
| | 3AL | 3/4" | 1x 3/4" | | | |
|   | 1ALW | 1/2"[2] | 1x 1/2"[2] | Cast aluminum epoxy coated Buna O-ring Hazardous[1] Type 4X | -40°C to +85°C (-40°F to +185°F) |  Splice technology - optional Wire splicing connectors contained loosely within connection head. Add suffix "S" to connection head model number. |
| | 2ALW | 1/2"[2] | 1x 3/4" | | | |
| | 3ALW | 3/4" | 1x 3/4" | | | |
| | 4ALW | 3/4" | 2x 3/4" | | | |
|   | 1ALM | 1/2" | 2x 1/2" | | | |
| | 2ALM | 1/2" | 2x 3/4" | | | |
| | 3ALM | 3/4" | 2x 3/4" | | | |

**NOTES:**
1. Hazardous location rating is for connection head ONLY and not the complete temperature sensor assembly.
2. May be supplied with an approved reducer bushing.
3. Ambient temperature rating -50°C to +85°C (-58°F to +185°F); maximum temperature rating +125°C (+257°F) Canada only.
4. Ambient temperature rating -40°C to +85°C (-40°F to +185°F).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## Transmitter Options for T1/T1A

| Image | Code | Model | Specifications |
|---|---|---|---|
|  | **31D** | 5331D PR Order PN<br>RTD, TC, Ohm, or mV input<br>Extremely high accuracy<br>1.5 kVAC galvanic isolation<br>Programmable sensor error value<br>For DIN form B sensor head mounting | Operating Temperature: -40°C to +85°C<br>Protection Degree: IP68 (enclosure) / IP00 (terminal)<br>Dimensions: Ø 44 x 20.2 mm<br>Weight: Approx. 50 g<br>Supply Voltage: 7.2…30 VDC<br>Isolation Voltage: 1.5 kVAC (test) / 50 VAC (working)<br>Accuracy: Better than 0.05% of selected range<br>Response Time (Programmable): 1…60 s<br>Signal Range (Output): 4…20 mA<br>Approvals: ATEX, IECEx, FM, CSA, INMETRO<br>Refer to PR Electronics for full details |
|  | **35D** | 5335D PR Order PN<br>RTD, TC, Ohm, or mV input<br>Extremely high accuracy<br>HART 5 protocol<br>Galvanic isolation<br>For DIN form B sensor head mounting | Zone 0,1,2,21,22, M1 / DIV.1, DIV.2<br>Operating Temperature: -40°C to +85°C<br>Protection Degree: IP68 (enclosure) / IP00 (terminal)<br>Dimensions: Ø 44 x 20.2 mm<br>Weight: Approx. 50 g<br>Supply Voltage: 8.0…30 VDC<br>Isolation Voltage: 1.5 kVAC (test) / 50 VAC (working)<br>Accuracy: Better than 0.05% of selected range<br>Response Time (Programmable): 1…60 s<br>Signal Range (Output): 4…20 mA<br>Approvals: ATEX, IECEx, FM, CSA, INMETRO, SIL<br>Refer to PR Electronics for full details |
|  | **75G** | 7501A3A2A12GY PR Order PN<br>RTD, TC, Ohm, and bipolar mV input and analog output<br>High definition local operator interface (LOI)<br>3 optical buttons<br>Selectable red or white backlight<br>Ex d explosion proof / flame proof<br>HART 7 functionality with HART 5 compatibility | Operating Temperature: -40°C to +85°C (with silicone O-ring)<br>Storage Temperature: -40°C to +85°C<br>Protection Degree: IP54 / IP66 / IP68 / Type 4X<br>Dimensions: Ø 110 mm<br>Dimensions (HxWxD): 109.3 x 145 x 126 mm<br>Weight: 1.3 kg<br>Display Resolution: 96 x 64 pixels<br>Backlight: Selectable ON/OFF, Color: White or Red<br>Supply Voltage: 10 (12 with backlight)…30 VDC (Ex ia) / 10…35 VDC (Other)<br>Isolation Voltage: 1.5 kVAC (test) / 50 VAC (working)<br>Accuracy: Better than 0.05% of selected range Response Time (Programmable): 1…60 s<br>Long-Term Stability: ±0.1% of span per year<br>Programming: HART<br>Approvals: ATEX, IECEx, FM, CSA, INMETRO, SIL<br>Refer to PR Electronics for full details |
| *Image Not Applicable* | 31A | 5331A PR Order PN | Refer to PR Electronics for full details |
| *Image Not Applicable* | 37D2 | 5337D2 PR Order PN | Refer to PR Electronics for full details |
| *Image Not Applicable* | 47D1 | 5437D1 PR Order PN | Refer to PR Electronics for full details |
| *Image Not Applicable* | Other | Consult Aircom for other available options | |

**NOTES:**

1. Models shown represent the most commonly selected configurations.


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