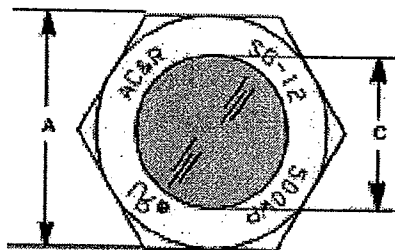
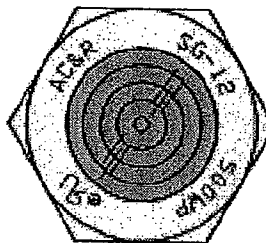


## Sight Glasses

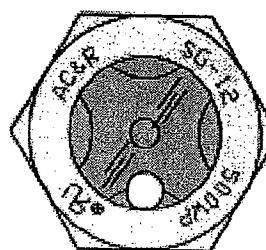
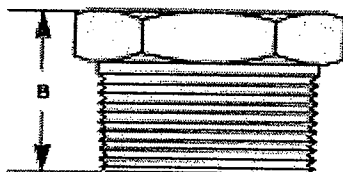
### The SG - 1000's & The SG-1100's



**Clear Lens**



**Reflex  
Lens**



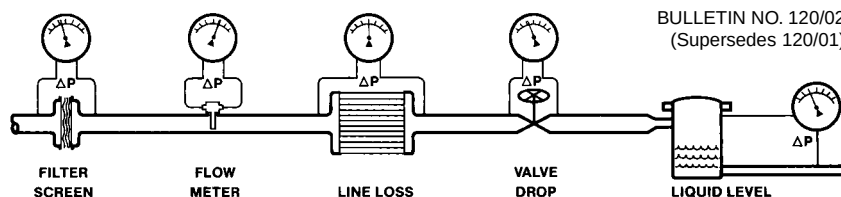
**Clear Lens with  
Floating ball**

These sight glasses are available in three basic styles; Clear Lens; Reflex Lens and Clear Lens with floating ball. All sight glasses feature a nickel plated steel body, hermetically sealed viewing lens, 34.5 bar maximum working pressure. These sight glasses are suitable for most standard refrigerants, and other industrial fluids non-corrosive to glass and steel

The SG -1000s & SG-1100s are rated for a maximum temperature of 260°C. The SG- 1200's are rated for a maximum temperature of 148°C. The SG-1100's reflex lens appears dark when liquid is present and light when liquid is absent.

| Part No    |            |               | Thread Size MPT | Dimensions (mm) |      |        | CE Cat*        |
|------------|------------|---------------|-----------------|-----------------|------|--------|----------------|
| Clear      | Reflex     | Clear W/Ball* |                 | Hex A           | B    | Dia. C |                |
| SG-1004    | SG-1104    | SG-1204       | 1/2"            | 23.9            | 22.9 | 14.2   | SEP            |
| SG-1006    | SG-1106    | SG-1206       | 3/4"            | 28.5            | 26.9 | 19.1   | SEP            |
| SG-1008    | SG-1108    | SG-1208       | 1"              | 35.1            | 33.5 | 23.9   | SEP            |
| SG-1010-CE | SG-1110-CE | SG-1210       | 1 1/4"          | 44.5            | 31.8 | 30.2   | SEP (CAT II)   |
| SG-1012-CE | SG-1112-CE | SG-1212-CE    | 1 1/2"          | 50.8            | 35.8 | 33.3   | CAT I (CAT II) |
| SG-1016-CE | SG-1116-CE | SG-1216-CE    | 2"              | 63.5            | 32.5 | 41.4   | CAT I (CAT II) |

\*SG-12 Series are not suitable for use with ammonia  
Brackets indicates classification for ammonia use



## Model 120 Series "Filter Minder"<sup>®</sup> Piston-Type Differential Pressure Gauge

**MEDIUM RANGE: 0-5 P.S.I.D. to 0-110 P.S.I.D. (0.35 to 7.0 bar)**

A low cost differential pressure gauge for use in measuring the pressure drop across filters, strainers, separators, valves, pumps, chillers, etc., and for local flow indication and control.

- Simple, rugged, compact design.
- Working pressure 6000 P.S.I.G. (400 bar) models 120-A and 120-S.
- Working pressure 5000 P.S.I.G. (340 bar) models 120-M and 120-N.
- Over-range protection to max. pressure.
- Aluminum or 316 stainless steel housing with 316 stainless steel internals.
- Monel or Aluminum Bronze housing with monel internals.
- Weather-resistant construction standard.
- Accuracy  $\pm 3-2-3\%$  full scale (ascending).
- Shatter resistant lens.
- More cost effective and more accurate than using two pressure gauges in monitoring differential pressure.
- 2-1/2" and 4-1/2" plastic dial assemblies.



2-1/2" Plastic Dial Assy.

- 3-1/2" and 4-1/2" anodized aluminum dial assemblies.
- Uni-directional or bi-directional.
- Five Year Limited Warranty



4-1/2" Plastic Dial Assy

Differential pressure is sensed by the movement of a floating piston magnet against a calibrated spring. The gauge pointer, outside the pressure housing, follows the movement of the piston magnet and indicates differential pressure.

Available with magnetically actuated hermetically sealed CSA listed reed switches to provide high and low limit alarm or control.

An optional maximum indication follower pointer provides automatic indication of maximum differential occurring during a time period or system cycle.

Reversed pressure ports are optionally available to facilitate installation and readability depending on which side of a filter, etc., the instrument must be installed.



2-1/2" Plastic Dial Assy. w/Max.  
Follower Pointer

Why use a dp gauge like this, instead of one or two pressure gauges to monitor a filter? Let's take a typical filter application – 1000 P.S.I.G. system pressure and 25 P.S.I.G. maximum dp. Two 1% accuracy pressure gauges (0-2000 P.S.I.G.) could have a combined error of  $\pm 40$  P.S.I.G. (more than the maximum allowable dp!) A 0-50 P.S.I.D. Model 120 would have an error of  $\pm 1$  P.S.I. at a reading of 25 P.S.I.D., **40 times the accuracy of more costly pressure gauges!**

**NOTE:** Due to precision sizing of piston and body bore, leakage across the piston will not exceed 15 SCFH air at 100 P.S.I.D. at ambient conditions.



Cutaway View w/1/4" FNPT Back Connections

## Model 120 "Filter Minder"<sup>®</sup> Differential Pressure Gauge with Control Switching

The Model 120 "Filter Minder"<sup>®</sup> gauge is available with one or two hermetically sealed reed switches. The switches are adjustable (see table for adjustment range) within a defined percentage of the full scale range of the gauge and are available in SPDT and SPST, normally open or normally closed configurations for various load power ratings. The switches can be set to activate or deactivate on rising or falling pressure.

All hazardous location switches are CSA & UL Listed. The CSA & UL listings are for the entire design and not just the enclosure. All standard and weatherproof units are CE marked for conformance with the Low Voltage Directive to harmonized standard EN 61010-1.

The standard reed switch is enclosed in a weather-resistant plastic housing. Adjustment of the switch setting is made with an external screw adjustment.

The switch functionality will be different for gauges with bi-directional operation for positive and negative delta pressure. For example a SPDT switch with positive  $\Delta P$  applied to the gauge, the red wire will be N.O. and the black will be N.C.. For negative  $\Delta P$  the functionality will be reversed.



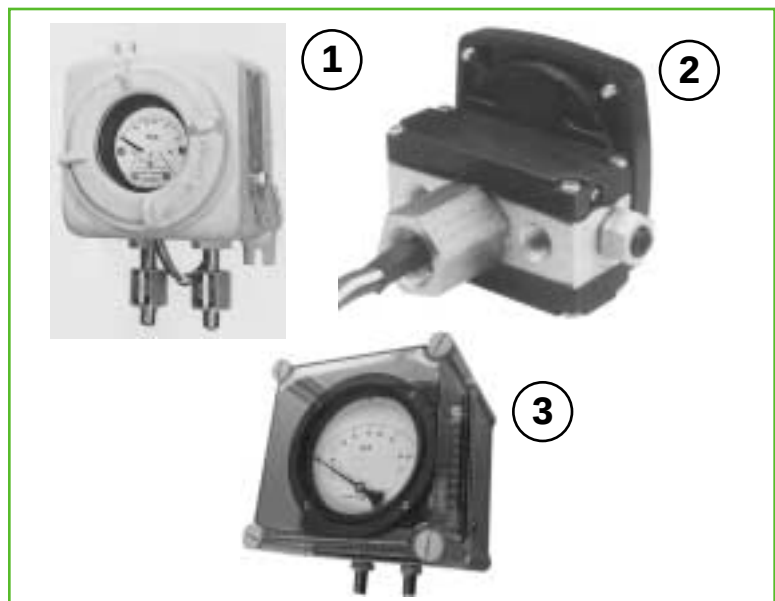
Standard Enclosures for two (2) Switches  
w/1/4" FNPT Conduit Connection.  
Nema 4X/IP65

Location for a single SPDT (grommet or conduit) switch will be on the bottom of the gauge body for a normal port and on the top for a reverse port. Locations for a single SPST (grommet or conduit) N.O. or SPST N.C. switch will be on the bottom and top respectively for a normal port gauge. The locations will be reversed for a reverse port gauge. For more details request IM 120/latest.

A non-indicating (no dial) differential pressure switch is also available.

## Special Switch Enclosures

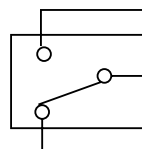
- 1 Hazardous Locations Division 1:**  
CSA & UL listed design with SPST or SPDT switches in NEMA 7/9 enclosure approved for use in Class 1 Division 1, Groups C & D; Class 2, Division 1, Groups E, F, & G atmospheres.
- 2 Hazardous Locations Division 2:**  
CSA & UL listed design with SPST or SPDT switches in a general purpose enclosure approved for use in Class 1, Division 2, Groups A, B, C, & D; Class 2, Division 2, Groups F & G atmospheres.
- 3 Weatherproof:**  
Switch(es) and gauge are enclosed in a non-corrosive, molded, plastic enclosure that are oil-tight, dust-tight, and water-tight per NEMA 4X. Design is CE marked for conformance to the Low Voltage Directive.



# Reed Switch Ratings (Resistive Load)

| Type                    | SPST               | SPST               | SPDT                | SPDT               |
|-------------------------|--------------------|--------------------|---------------------|--------------------|
| Option:                 | B,C,D***           | E,F,G              | H                   | A                  |
| *Power                  | 50 W               | 60 W               | 60 W                | 3 W                |
| Max. Current            | 0.5 Amps           | 3.0 Amps           | 1.0 Amps            | 0.25 Amps          |
| Max. Voltage<br>VAC/VDC | 240                | 240                | 240                 | 125                |
| **Setting (%F.S.)       | 10 to 100          | 25 to 95           | 25 to 100           | 10 to 90           |
| Hysteresis<br>(Max/Nom) | 10% / 2%<br>(F.S.) | 15% / 8%<br>(F.S.) | 20% / 13%<br>(F.S.) | 10% / 5%<br>(F.S.) |
| Repeatability           | 1% F.S.            | 1% F.S.            | 1% F.S.             | 1% F.S.            |
| Leads 22 Awg.           | (2), 24"           | (2), 24"           | (3), 24"            | (3), 24"           |

Switch  
Shown at  
Zero  
Pressure



Red (Normally Open)

White (Common)

Black (Normally Closed)

\*Product of the Switching Voltage & Current shall not exceed power rating of the device.

\*\*Except where otherwise noted.

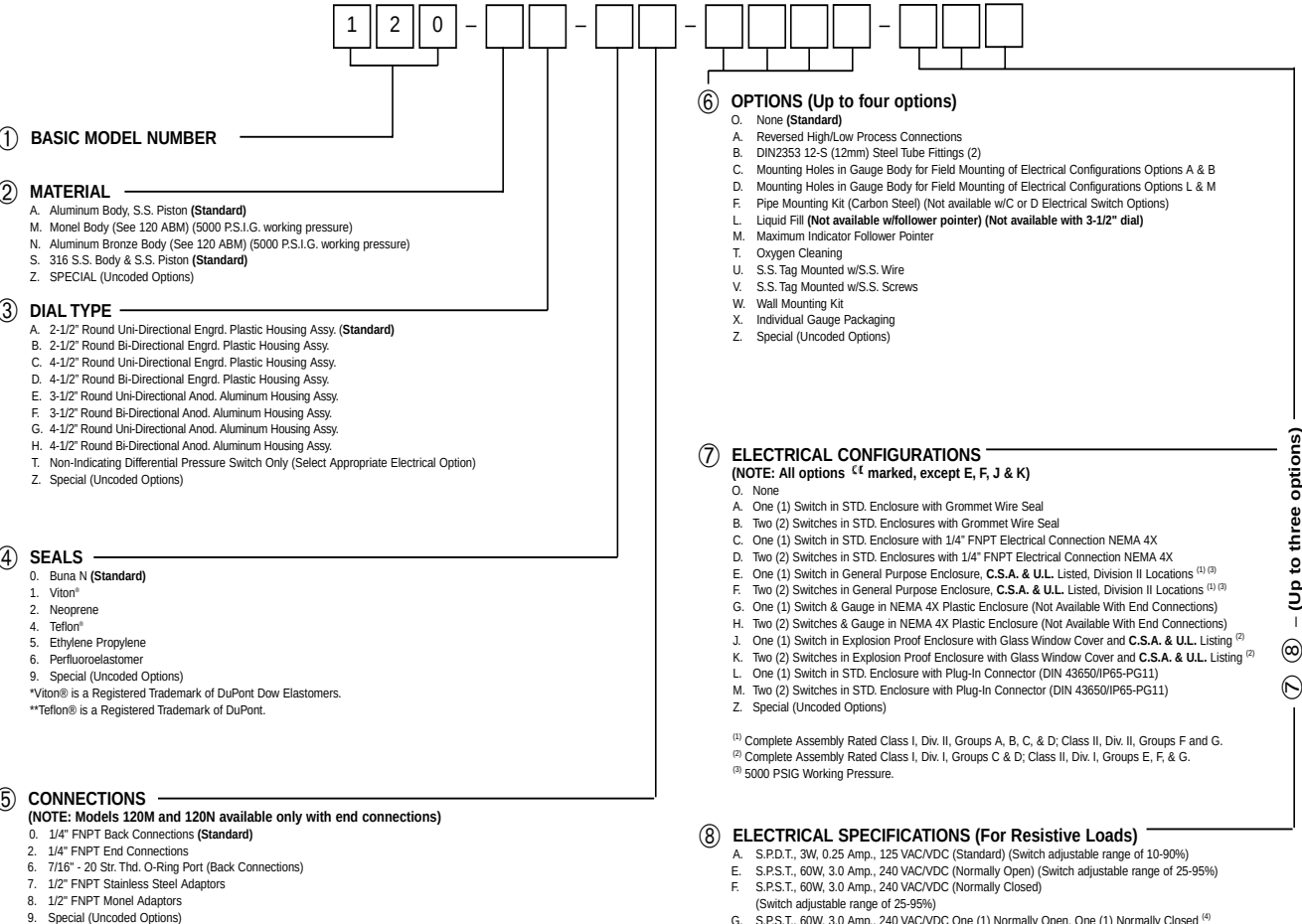
\*\*\*B, C, & D options are available, however they are not identified in Electrical Specifications. (Recommend using E, F, or G)

## STANDARD MODEL SPECIFICATIONS

### 120-AA-00-00

6000 P.S.I.G. Working Pressure Aluminum Body, Stainless Steel Piston, Ceramic Magnets, Buna N Seals, 2-1/2" Engineering Plastic Case with Shatter-Resistant Lens. 1/4" FNPT Back Connections. Accuracy  $\pm 3-2-3\%$  Full Scale (Ascending).

## PART NUMBERING SYSTEM



NOTE: NOT ALL OPTIONS AVAILABLE IN COMBINATION WITH OTHER OPTIONS.

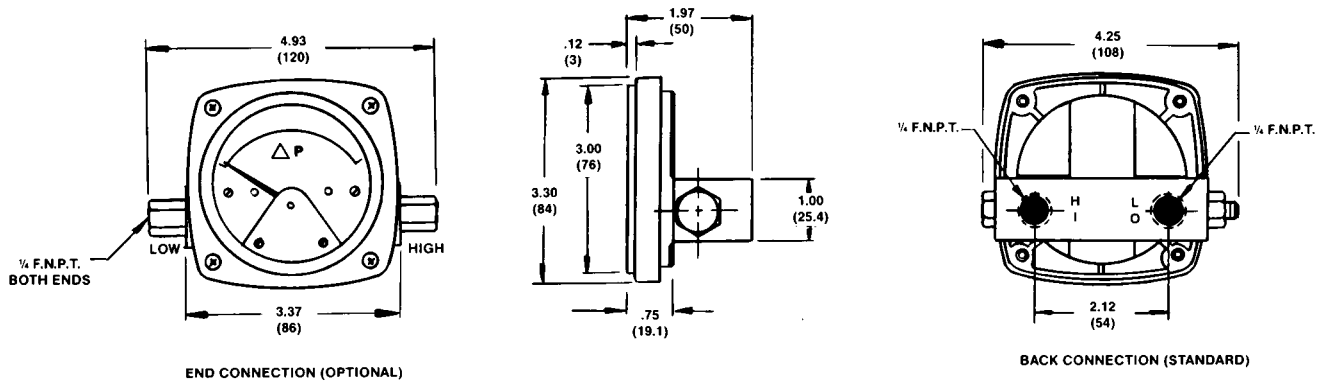
NOTE: FACTORY PRESET SWITCHES AT NO CHARGE (SPECIFY SETTING)

NOTE: THE USE OF DIAPHRAGM SEALS IS NOT RECOMMENDED FOR MODEL 120 SERIES GAUGE. ATTEMPTS TO INSTALL SUCH SEALS ON THIS GAUGE WILL VOID THE WARRANTY.

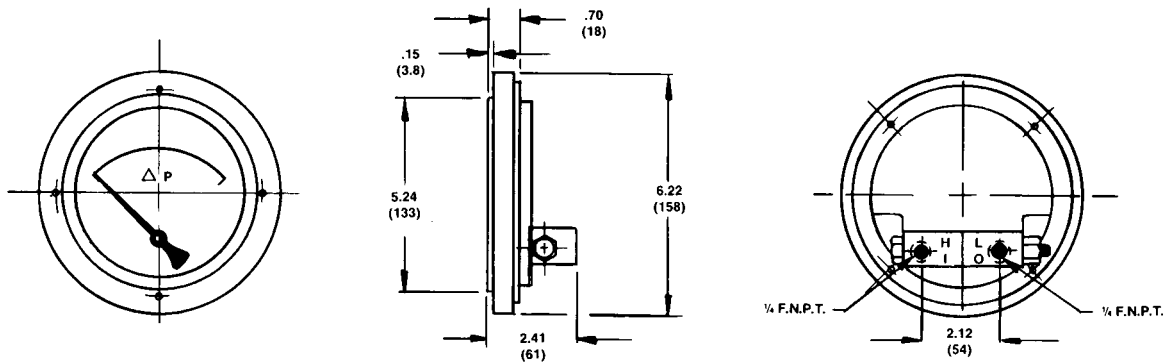


# MOUNTING INFORMATION & DIMENSIONAL DATA

## MODEL 120: 2-1/2" INCH PLASTIC DIAL ASSY.



## MODEL 120: 4-1/2" INCH PLASTIC DIAL ASSY.



- NOTES:
1. Drawings show standard gauge nominal dimensions. (not to scale)
  2. Dimensions shown in parentheses are in millimeters.
  3. Mounting dimensions for 3-1/2" & 4-1/2" alum. Dial assys. – Contact Factory

Manufacturer reserves the right to change specifications without prior notice.

**PROOF PRESSURE:** 12,000 PSI for models 120-A and 120-S.  
10,000 PSI for models 120-M and 120-N.

**TEMPERATURE LIMITS:** -40°F(-40°C) to +200°F(+93°C) - These limits are based on the entire instrument being saturated to these temperatures. System (process) temperatures may exceed these limitations with proper installation. Contact our customer service representative for details.

**STANDARDS:** All Model 120 Series differential pressure gauges either conform to and/or are designed to the requirements of the following standards:

ASME B1.20.1  
ASME B40.1  
CSA-C22.2 No. 14.25 and 30  
EN-61010-1

NACE MR0175  
NEMA Std. No. 250  
SAE J514  
UL Std. No. 50,508 and 1203

**Mid-West<sup>®</sup>**  
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Printed in U.S.A.



REPRESENTED BY:



**TREND instruments, inc.**  
A Division of WIKA Instrument Corporation

## General Specifications - Bimetal Dial Thermometers



**CASE:** Sturdy, corrosion resistant series 304 stainless steel case and bezel. Designed and constructed to provide a hermetic seal which prevents crystal fogging and damage caused by moisture to the working components.

**DIAL:** Anti parallax heavy gauge aluminum with white matte finish to reduce glare. Dished form with Celsius on lower inner plane and Fahrenheit on raised outer plane offers accurate indication of both scales.

**EXTERNAL RESET:** A slotted-hex adjustment head offers screwdriver or wrench use to field calibrate the thermometer. This feature allows maximum accuracy at a selected area of temperature range. O-ring gasket prevents leakage and maintains weather tight seal. Note - use well agitated bath and accurate test thermometer when making any adjustment.

**CRYSTAL:** Optically clear, strong glass, gasketed to maintain weather tight integrity. Acrylic and Lexan crystals are available as an option but not recommended for case temperature exceeding 200°F maximum (150°F maximum for plastic/acrylic lens).

**POINTER:** Balanced, lightweight aluminum with matte black finish.

**STEM:** 304 SS welded at tip and case connector to prevent leakage. 1/4" diameter is standard, 3/8" is available. Stem lengths to 72" are available as well as 316SS stem and connector assemblies.

**IMMERSION:** For accurate temperature readings, immerse the stem a minimum of 2 inches in agitated liquid or 4 inches in moving air or gas.

**OVER RANGE:** Temporary over or under range of 50% of scale up to 500°F or 260°C will not affect the instrument's accuracy.

**BIMETAL ELEMENT:** An extremely responsive temperature sensing helix which has been carefully sized and tested, heat treated and aged to relieve inherent stresses and insure continued accuracy.

**ACCURACY:** Guaranteed to be accurate to within 1% of full scale (Grade A per ASME B40.3). Calibration is to standards traceable to the National Institute of Standards and Technology.

**HERMETIC SEAL:** Hermetically sealed per ASME B40.3. Guaranteed not to fog up.

**DAMPENING:** Bimetal element is coated with viscous silicone to minimize pointer oscillation and to improve temperature transmission for ranges from -20° to 400°F.

**FILLED THERMOMETER POLICY:** It is not recommended that filled instruments be used for continual use at operating temperatures above of 400°F (204°C) or below -100° F (-70° C). Under no circumstances will an instrument warranty apply nor will the manufacturer assume any liability for use above these temperatures.



## 2" Bimetal Dial Thermometers – Model 20

**Model 20 Thermometers are high-quality, economical thermometers designed for limited space and OEM applications**

- ***Stainless Steel Case***
- ***Hermetically Sealed***
- ***Tamper-Proof***



**CASE:** 304 Stainless Steel

**DIAL:** Anti Parallax or flat dial, heavy gauge aluminum with white matte finish.

**CRYSTAL:** Fully gasketed glass standard. Lexan and acrylic available.

**HERMETIC SEAL:** Per ASME B40.3

**STEM:** 304 Stainless Steel, TIG welded at tip and case connection. 1/4" diameter standard.

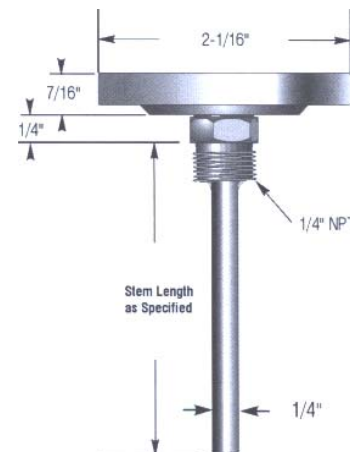
**DAMPENING:** Helix coated with viscous silicone to minimize pointer oscillation and improve sensitivity (ranges below 500°F).

**OVER RANGE:** Temporary over or under range *tolerance of 50%* of scale up to 500°F (260°C)

**ACCURACY:** Guaranteed to 1 % of full scale (Grade A per ASME B40.3 Standard)

**CONNECTION:** 1/4" NPT, 304 Stainless Steel standard, other connections available.

**STEM LENGTHS:** (In Inches) 2-1/2" to 24" available



**Stem lengths are available from 2-1/2" to 24".**

**Ranges from - 100 °F (-70 °C) to 1000 °F (550 °C) are available. Please see page 15 for complete stem length, range and option selection. Silicone fill not available on this model.**



## Back Connected Bimetal Thermometers Model 30 & 50



- **Stainless Steel Case**
- **Hermetically Sealed**
- **External Adjustment Screw Standard**

*TREND Bimetal Thermometers are ideal for most rugged industrial temperature measurement applications. The hermetically-sealed case offers protection from weather and dust, and is guaranteed against fogging up. The bimetal helix is coated with a viscous silicone to minimize pointer oscillation and improve temperature transmission.*

### SPECIFICATIONS

**CASE:** 304 Stainless Steel

**DIAL:** Anti Parallax, heavy gauge aluminum with white matte finish.

**EXTERNAL RESET** Slotted hex adjustment

**CRYSTAL:** Fully gasketed glass standard. Lexan, acrylic and shatterproof available.

**HERMETIC SEAL:** Hermetically sealed per ASME B40.3 Standard. **GUARANTEED NOT TO FOG UP**

**STEM:** 304 Stainless Steel, TIG welded at tip and case connection. 1/4" diameter standard; 3/8" diameter available.

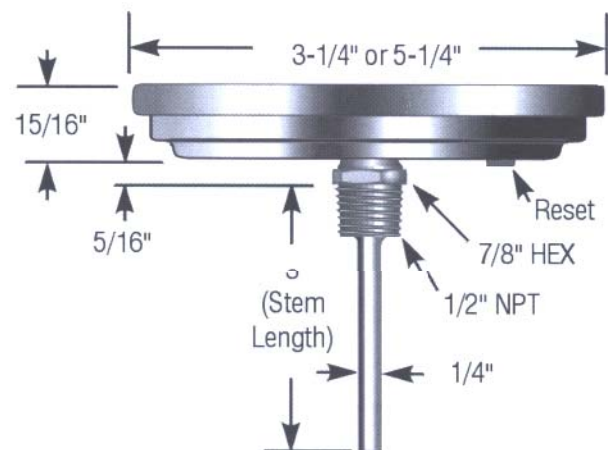
**DAMPENING:** Helix coated with viscous silicone to minimize pointer oscillation and improve sensitivity (ranges below 500°F).

**OVER RANGE:** Temporary over or under range tolerance of 50% of scale up to 500°F (250°C) **ACCURACY:** Guaranteed to 1% of full scale (Grade A per ASME B40.3 Standard)

**CONNECTION:** 1/2" NPT, 304 Stainless Steel standard, other connections and 316 Stainless Steel available.

**STEM LENGTHS:** (In Inches) 2-1/2, 4, 6, 9, 12, 15, 18, 24, up to 72" upon application.

**OPTIONS:** Silicone Fill, Custom Dials, Min-Max Pointer, Union Locknut, Union Connection and more available.



**Back Connected (Models 30 & 50)**



## Bottom Connected Bimetal Thermometers Model 31 & 51

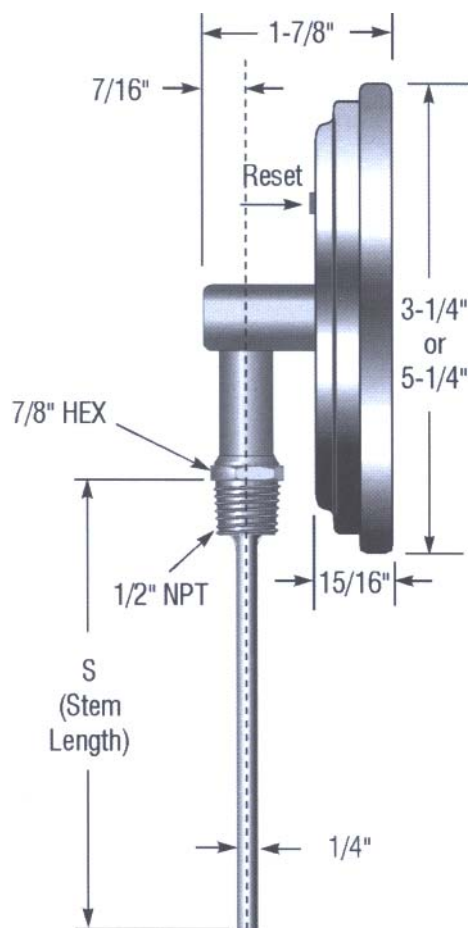


- **Stainless Steel Case**
- **Hermetically Sealed**
- **External Adjustment Screw Standard**



*TREND Model 31 and 51 Bimetal Thermometers offer the same features as the Model 30 and 50, with a fixed lower mount (bottom) connection. The hermetically-sealed case offers protection from weather and dust, and is guaranteed against fogging up. The bimetal helix is coated with a viscous silicone to minimize pointer oscillation and improve temperature transmission.*

### SPECIFICATIONS



**CASE:** 304 Stainless Steel

**DIAL:** Anti Parallax, heavy gauge aluminum with white matte finish.

**EXTERNAL RESET** Slotted hex adjustment

**CRYSTAL:** Fully gasketed glass standard. Lexan, acrylic and shatterproof available.

**HERMETIC SEAL:** Hermetically sealed per ASME B40.3 Standard. GUARANTEED NOT TO FOG UP

**STEM:** 304 Stainless Steel, TIG welded at tip and case connection. 1/4" diameter standard; 3/8" diameter available.

**DAMPENING:** Helix coated with viscous silicone to minimize pointer oscillation and improve sensitivity (ranges below 500°F).

**OVER RANGE:** Temporary over or under range tolerance of 50% of scale up to 500°F (260°C)

**ACCURACY:** Guaranteed to 1 % of full scale (Grade A per ASME B40.3 Standard)

**CONNECTION:** 1/2" NPT, 304 Stainless Steel standard, other connections and 316 Stainless Steel available.

**STEM LENGTHS:** (In Inches) 2-112, 4, 6, 9, 12, 15, 18, 24, up to 72" upon application.

**OPTIONS:** Silicone Fill, Custom Dials, Min-Max Pointer, Union Locknut, Union Connection and more available.

Bottom Connected (Models 31 & 51)

**TREND** instruments, inc.  
A Division of Wika Instrument Corporation

# Tamper-Proof Bimetal Thermometers Models 33, 34, 53 & 54



*TREND's Industrial Grade Bimetal Dial Thermometers offer performance equal to our Process-Grade thermometers, but without the reset feature and the 7Year Warranty. They are an ideal choice where a weather-resistant, tamperproof thermometer is needed. They are warranted for 1 year.*

- Stainless Steel Case
- Hermetically Sealed
- Tamper-Proof

## SPECIFICATIONS

**CASE:** 304 Stainless Steel

**DIAL:** Anti Parallax, heavy gauge aluminum with white matte finish.

**CRYSTAL:** Fully gasketed glass standard. Lexan, acrylic and shatterproof available.

**HERMETIC SEAL:** Per ASME B40.3

**STEM:** 304 Stainless Steel, TIG welded at tip and case connection. 1/4" diameter standard.

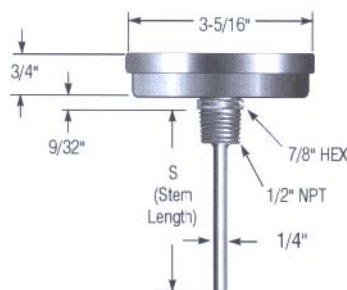
**ACCURACY** Guaranteed to 1 % of full scale (Grade A per ASME B40.3 Standard)

**CONNECTION:** 112" NPT, 304 Stainless Steel standard.

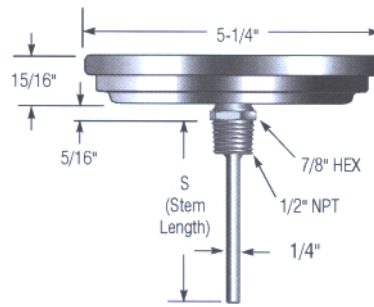
**OPTIONS:** Special ranges, custom dials, stems, connections and windows.

**OVER RANGE:** Temporary over or under range tolerance of 50% of scale up to 500°F (260°C).

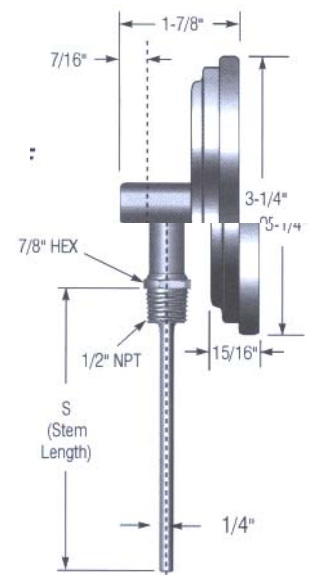
**Stem lengths are available from 2-1/2" to 24". Ranges from -100°F (-70 °C) to 1000 °F (550°C) are available.**



Back Connected Model 33



Back Connected Model 53



Bottom Connected (Models 34 & 54)

# Adjustable Angle Bimetal Thermometers Model 32 & 52

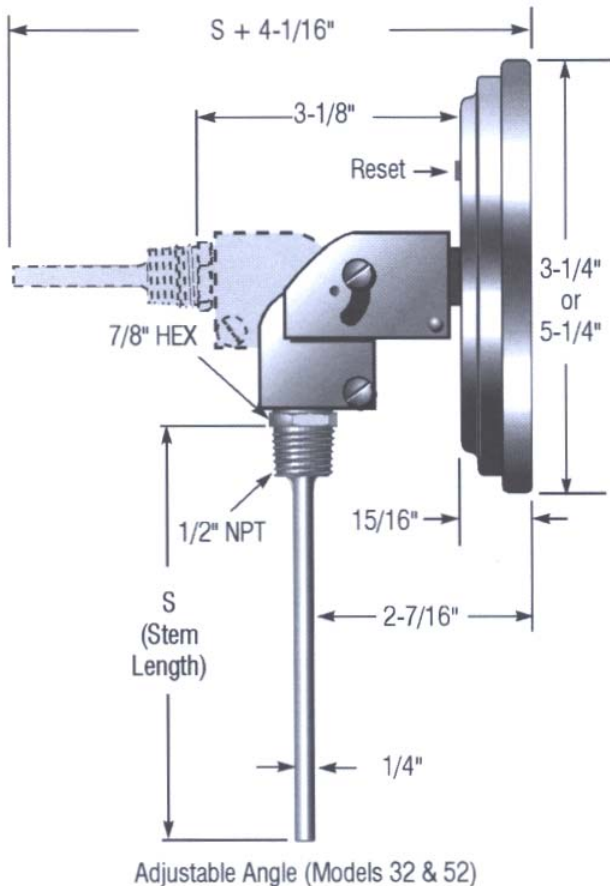


- *Dial Adjusts to Any Angle*
- *Stainless Steel Case*
- *Hermetically Sealed*
- *External Adjustment Screw Standard*



*TREND Model 32 and 52 Bimetal Thermometers offer the same features as the Model 30 and 50, with the added convenience of an all-angle swivel connection. The hermetically-sealed case offers protection from weather and dust, and is guaranteed against fogging up. The bimetal helix is coated with a viscous silicone to minimize pointer oscillation and improve temperature transmission. TREND Model 32 and 52 Thermometers are guaranteed for 7 years.*

## SPECIFICATIONS



**CASE:** 304 Stainless Steel

**DIAL:** Anti Parallax, heavy gauge aluminum with a white matte finish.

**EXTERNAL RESET:** Slotted hex adjustment

**CRYSTAL:** Fully gasketed glass standard. Lexan, acrylic and shatterproof available.

**HERMETIC SEAL:** Hermetically sealed per ASME B40.3 Standard. GUARANTEED NOT TO FOG UP

**STEM:** 304 Stainless Steel, TIG welded at tip and case connection. 1/4" diameter standard; 3/8" diameter available.

**DAMPENING:** Helix coated with viscous silicone to minimize pointer oscillation and improve sensitivity (ranges below 500°F).

**OVER RANGE:** Temporary over or under range tolerance of 50% of scale up to 500°F (260°C)

**ACCURACY:** Guaranteed to 1 % of full scale (Grade A per ASME 840.3 Standard)

**CONNECTION:** 1/2" NPT, 304 Stainless Steel standard, other connections and 316 Stainless Steel available.

**STEM LENGTHS:** (In Inches) 2-1/2, 4, 6, 9, 12, 15, 18, 24, up to 72" upon application.

**OPTIONS:** Silicone Fill, Custom Dials, Min-Max Pointer, Union Locknut, Union Connection and more available.

**JUST -RITE\* ADJUSTABLE ANGLE CASE:** Simple adjustment of the heavy duty stainless steel harness allows case rotation of 360° and stem variation of more than 180°. Flexible stainless steel bellows sealed at case and stem connector protects the temperature transmission mechanism and guarantees the hermetic seal.

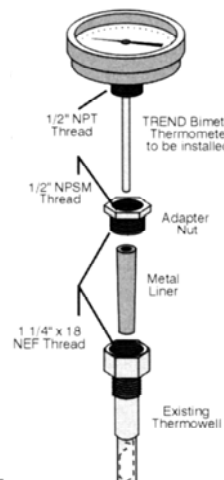


# Bimetal Thermometer Options

I

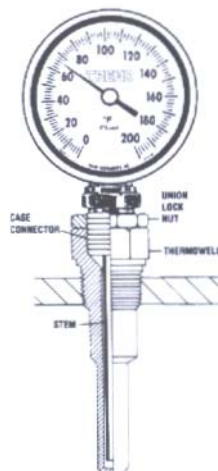
## T-85 Thermowell Conversion Kit

This conversion kit offers an easy, inexpensive way to install a TREND Bimetal thermometer in a glass industrial thermometer's thermowell. For more information, please consult factory. To order, specify Part Number TA800-0T85.



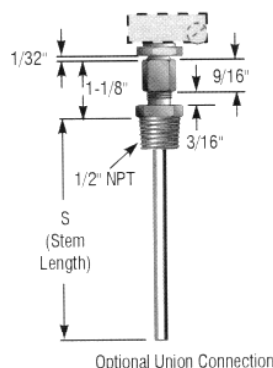
## Union Lock Nut

The TREND Union Lock Nut provides a simple and inexpensive means to mount WIKA Bimetal thermometers with 112 NPT so that the dial is oriented for proper viewing. For more information, please consult factory. To order, specify part number TA600-01 11.



## Adjustable Union Connection

The TREND Adjustable Union Connection allows for the installation of a Model 32 or 52 Adjustable Angle Thermometer without rotating the case. Ideal for use in a confined space. See "How To Order" on next page for this option.



## Maximum or Minimum Indicating Pointer

This option allows operator to view what the highest or lowest temperature has been in the process. High vibration environments are not recommended. Please see "How To Order" on next page for this option.



## Left, Right or Top Connection

All TREND 3" and 5" Bottom Connected thermometers are available with the connection oriented to the left, right or top. Please see "How to Order" on next page for this option.



## Silicone

All TREND 3" and 5" Process-Grade bimetal thermometers are available with Silicone Fill, for applications where severe vibration is a factor. The silicone dampens and lubricates the internal mechanism, reducing oscillation and premature wear. (Maximum temperature: 501500°F) Please see "How to Order" on next page

## Duct Flange

Part # TA800-0020



## Not Shown

- Heavy duty 3/8" stems and 3/8" stems with 2-1/2" x 1/4" OD sensitive portion available.
- Thermometers may be ordered with sharp tips for piercing media to be measured.
- 316 Stainless Steel wetted parts are available.
- Paper, Aluminum and Stainless Steel tags are available options.
- Please see these options on Table 8 of "How To Order" on next page.

Other options are available. Please consult factory.

## Tags and Certificates

| Part # | DESCRIPTION                     |
|--------|---------------------------------|
| 141100 | Stainless Steel Tag             |
| 776    | Certificate of Calibration      |
| 413    | Factory Certificate of Accuracy |



# How to Order Bimetal Thermometers

Specify Complete Model Number from the following tables:

| KEY      | MODEL NUMBER               | 30 | 060 | A | 0 | 01 | G | 4 | XX |
|----------|----------------------------|----|-----|---|---|----|---|---|----|
| TABLE 1: | BASIC MODEL                |    |     |   |   |    |   |   |    |
| TABLE 2: | STEM LENGTH                |    |     |   |   |    |   |   |    |
| TABLE 3: | DIAL TYPE (LOGO)           |    |     |   |   |    |   |   |    |
| TABLE 4: | SCALE TYPE (F, C OR F & C) |    |     |   |   |    |   |   |    |
| TABLE 5: | RANGE                      |    |     |   |   |    |   |   |    |
| TABLE 6: | CRYSTAL MATERIAL           |    |     |   |   |    |   |   |    |
| TABLE 7: | CONNECTION                 |    |     |   |   |    |   |   |    |
| TABLE 8: | OPTIONS (3" & 5" ONLY)     |    |     |   |   |    |   |   |    |

**Table 1 - Model**

| KEY | DESCRIPTION                      |
|-----|----------------------------------|
| 20  | 2" Back Connected (No Reset)     |
| 30  | 3" Back Connected (With Reset)   |
| 31  | 3" Bottom Connected (With Reset) |
| 32  | 3" Adjustable Angle (With Reset) |
| 33  | 3" Back Connected (No Reset)     |
| 34  | 3" Bottom Connected (No Reset)   |
| 50  | 5" Back Connected (With Reset)   |
| 51  | 5" Bottom Connected (With Reset) |
| 52  | 5" Adjustable Angle (With Reset) |
| 53  | 5" Back Connected (No Reset)     |
| 54  | 5" Bottom Connected (No Reset)   |

**Table 2 - Stem Length**

| KEY  | DESCRIPTION                             |
|------|-----------------------------------------|
| xx.x | Length in inches with one decimal place |

**Table 3 - Dial Type**

| KEY | DESCRIPTION    |
|-----|----------------|
| A   | TREND Standard |
| X   | Special        |

Proceed to Table 4, top of next column.

**Table 5 - Range**

| Key | Dual Scale |                  |                  |          |                  |                  | Single Scale |          |
|-----|------------|------------------|------------------|----------|------------------|------------------|--------------|----------|
|     | °F Range   | Figure Int. Div. | Figure Int. Div. | °C Range | Figure Int. Div. | Figure Int. Div. | °F Range     | °C Range |
| 01  | -100/150   | 20               | 2                | -70/70   | 10               | 1                | -100/150     | -70/70   |
| 02  | -40/120    | 20               | 2                | -40/50   | 10               | 1                | -40/120      | -50/50   |
| 14  | -20/120    | 20               | 2                | -30/50   | 10               | 1                | -20/120      | NA       |
| 19  | -40/160    | 20               | 2                | -40/70   | 10               | 1                | -40/160      | NA       |
| *23 | 0/100      | 10               | 1                | -20/40   | 5                | 1/2              | NA           | NA       |
| *03 | 25/125     | 10               | 1                | -5/50    | 5                | 1/2              | NA           | NA       |
| *15 | 30/130     | 10               | 1                | 0/55     | 5                | 1/2              | 30/130       | NA       |
| 04  | 0/140      | 10               | 1                | -20/60   | 5                | 1/2              | 0/140        | NA       |
| 05  | 0/200      | 20               | 2                | -15/90   | 10               | 1                | 0/200        | 0/100    |
| 06  | 0/250      | 20               | 2                | -20/120  | 10               | 1                | 0/250        | -20/120  |
| 07  | 20/240     | 20               | 2                | -5/115   | 10               | 1                | 20/240       | NA       |
| 08  | 50/300     | 20               | 2                | 10/150   | 10               | 1                | 50/300       | 0/150    |
| 09  | 50/400     | 50               | 5                | 10/200   | 20               | 2                | 50/400       | 0/200    |
| 10  | 50/500     | 50               | 5                | 10/260   | 20               | 2                | 50/500       | NA       |
| 16  | 50/550     | 50               | 5                | 10/290   | 20               | 2                | 50/550       | 0/250    |
| 17  | 0/600      | 100              | 10               | -20/315  | 50               | 5                | 0/600        | NA       |
| 11  | 150/750    | 100              | 10               | 65/400   | 50               | 5                | 150/750      | 0/300    |
| 18  | 100/800    | 100              | 10               | 40/425   | 50               | 5                | 100/800      | 0/450    |
| 12  | 200/1000   | 100              | 10               | 100/450  | 50               | 5                | 200/1000     | 100/550  |

**Table 4 - Scale Type**

| KEY | DESCRIPTION                       |
|-----|-----------------------------------|
| 0   | Dual Scale Fahrenheit and Celsius |
| 1   | Single Scale Celsius Only         |
| 2   | Single Scale Fahrenheit Only      |

**Table 5 - Range (See Bottom of Page)**

**Table 6 - Crystal Material**

| KEY | DESCRIPTION                                    |
|-----|------------------------------------------------|
| A   | Acrylic Plastic (Standard w/Silicone Fill)     |
| G   | Plain Glass (Standard)                         |
| L   | Lexan®                                         |
| S   | Shatterproof Safety Glass (3" & 5" Dials Only) |

**Table 7 - Connection**

|   |                                            |
|---|--------------------------------------------|
| 0 | Plain (Unthreaded)                         |
| 1 | 1/8" NPT                                   |
| 2 | 1/4" NPT (Standard on Model 20)            |
| 3 | 3/8" NPT                                   |
| 4 | 1/2" NPT (Standard on 3" & 5" Models)      |
| 5 | 1/2" BSP (Models 30 & 50 Only)             |
| 7 | 1/2" NPT Adjustable Union (Models 32 & 52) |

**Table 8 - Options (3" & 5" Models)**

|       |                                                            |
|-------|------------------------------------------------------------|
| Blank | None                                                       |
| SF*   | Silicone Filled - (Models 30, 31, 32, 50, 51, 52 Only)     |
| MM    | Min/Max Pointer (Models 30 and 50 Only)                    |
| LS    | Left Side Connection (Models 31, 34, 51, 54 Only)          |
| RS    | Right Side Connection (Models 31, 34, 51, 54 Only)         |
| TS    | Top Connection (Models 31, 34, 51, 54 Only)                |
| HD    | 3/8" Heavy Duty Stem with 2-1/2" x 1/4" O.D. Sensitive Tip |
| HA    | 3/8" Heavy Duty Stem Entire Length                         |
| ST    | Sharp Tip                                                  |
| SS    | 316 Stainless Steel Wetted Parts                           |
| DF    | Dry w/plug                                                 |

\*Requires Acrylic lens



**\*Not available with 2-1/2" stem on Models 31, 32, 34, 57, 52, 54**



## Bourdon Tube Pressure Gauges

All Stainless Steel Construction

Industrial Series Liquid Fillable • Type 23X.53

### Pressure Gauges

#### Application

Suitable for corrosive environments compatible with 316 stainless steel wetted parts, dry and liquid fillable case, where vibration and/or pressure pulsation occur in liquid or gaseous media which will not obstruct the pressure system.

#### Sizes (All sizes not stocked)

2", 2½" and 4" (50, 63 and 100 mm)

#### Accuracy

2", 2½" ± 1.5% of span

4" ± 1.0% of span (ASME B40.1 Grade 1A)

#### Ranges (All ranges not stocked)

Vacuum / Compound to 30"HG / 0 / 200 PSI

Pressure from 15 PSI to 15,000 PSI

or other equivalent units of pressure or vacuum

#### Working Range

2" & 2½" Steady: 3/4 of full scale value

Fluctuating: 2/3 of full scale value

Short time: full scale value

4" Steady: Full scale value

Fluctuating: 0.9 x full scale value

Short time: 1.3 x full scale value

#### Operating Temperature

Ambient: -40°F to 140°F (-40°C to 60°C) <sup>Note 1</sup>

Media: max. 212°F (+100°C)

#### Temperature Error

Additional error when temperature changes from reference temperature of 68°F (20°C) ±0.4% for every 18°F (10°C) rising or falling. Percentage of span.

### Standard Features

#### Connection

Material: 316 stainless steel

Lower mount (LM)

Center back mount (CBM) 2½"

Lower back mount (LBM) 4"

1/4" or 1/2" NPT limited to wrench flat area

#### Bourdon Tube

Material: 316 stainless steel

30"Hg (Vac) to 1000 PSI C-type - 2" & 2½"

30"Hg (Vac) to 1500 PSI C-type - 4"

1500 PSI to 15,000 PSI helical type - 2" & 2½"

2000 PSI to 15,000 PSI helical type - 4"

#### Movement

Stainless steel

#### Dial

White aluminum with black lettering. 2½" with stop pin.

#### Pointer

Black aluminum, non-adjustable

#### Case

304 stainless steel with vent plug and SS crimping ring.

Welded case/socket connection



#### Weather Protection

Weather resistant (NEMA 3 / IP 54) - dry case

Weather tight (NEMA 4X / IP 65) - liquid-filled case

#### Standard Scale

PSI

PSI, PSI/BAR, PSI/KPA, PSI/KG/CM<sup>2</sup> (2½" CBM)

#### Window Gasket

Buna-N

#### Case Filling

232.53 - None

233.53 - Glycerine

#### Window

Polycarbonate

Acrylic (4")

#### ORDER OPTIONS (min. order may apply)

Custom dial layout

Steel zinc plated u-clamp bracket (field installable)

Stainless steel u-clamp bracket (field installable)

Pressure compensating membrane window for filled gauges

Stainless steel polished front flange (CBM or LBM only)

Stainless steel rear flange

316 SS threaded restrictor

Glycerine, silicone, or fluorolube case filling (**Type 233.53**) <sup>(Note 1)</sup>

Special connections limited to wrench flat area

Other pressure scales available:

Bar, kPa, MPa, Kg/cm<sup>2</sup> and dual scales

DIN standards

Cleaned for oxygen service

Externally adjustable red drag pointer (max. hand)

Externally adjustable red mark pointer (set pointer)

<sup>Note 1</sup> Temperature Ranges (Liquid filled gauges)

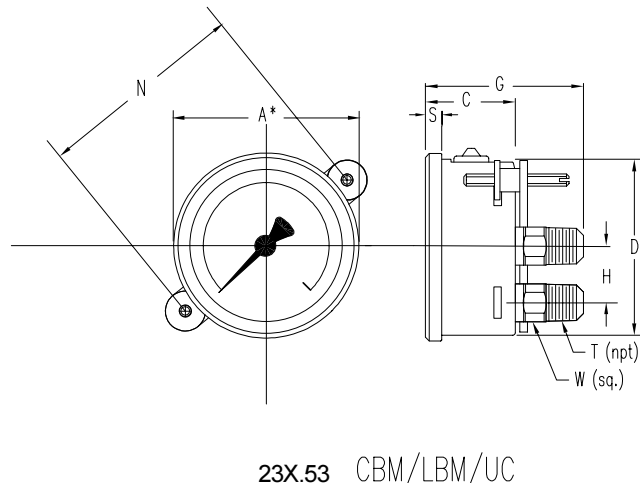
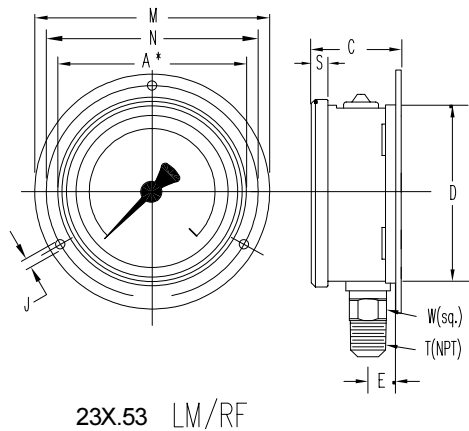
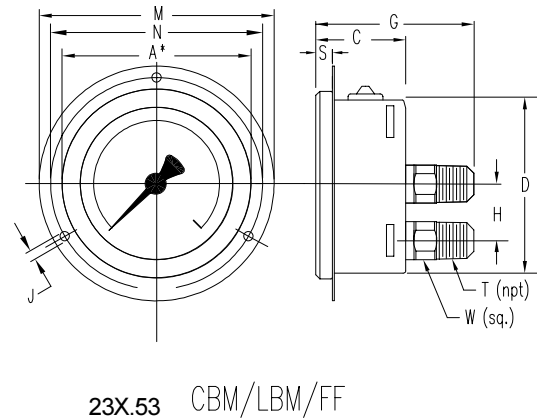
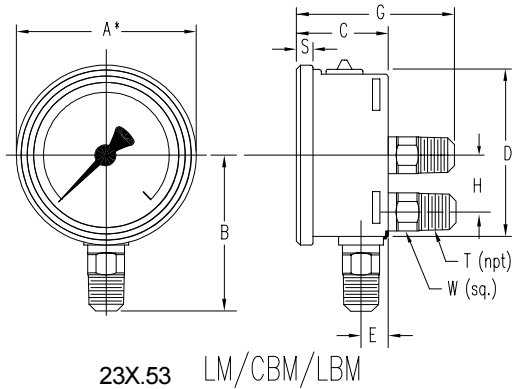
Glycerine: -4°F to 140°F (-20°C to 60°C)

Silicone: -40°F to 140°F (-40°C to 60°C)

**APM 23X.53**

**(APM 02.13)**

## Dimensions:



### A\* NOMINAL SIZE

| TYPE/SIZE      | WEIGHT                                | KEY | A*  | B    | C    | D    | E    | G    | H    | J    | L    | M    | N    | S    | T    | W    |
|----------------|---------------------------------------|-----|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 23X.53<br>2"   | 0.27 lbs.<br>+ 0.06 lbs.<br>if filled | mm  | 50  | 48   | 30   | 50   | 12   | 53   | --   | 3.6  | 6.5  | 71   | 60   | 5.5  | --   | 14   |
|                |                                       | in  | 2   | 1.89 | 1.18 | 1.97 | 0.47 | 2.09 |      | 0.14 | 0.26 | 2.80 | 2.36 | 0.22 | 1/4" | 0.55 |
| 23X.53<br>2.5" | 0.36 lbs.<br>+ 0.08 lbs.<br>if filled | mm  | 63  | 54   | 32   | 62   | 13   | 54   | --   | 3.6  | 7.5  | 85   | 75   | 6.5  | --   | 14   |
|                |                                       | in  | 2.5 | 2.13 | 1.26 | 2.44 | 0.51 | 2.13 |      | 0.14 | 0.30 | 3.35 | 2.95 | 0.26 | 1/4" | 0.55 |
| 23X.53<br>4"   | 1.10 lbs.<br>+ 0.66 lbs.<br>if filled | mm  | 100 | 87   | 48   | 100  | 15.5 | 79.5 | 30   | 4.8  | 9    | 132  | 116  | 8    | --   | 22   |
|                |                                       | in  | 4   | 3.43 | 1.89 | 3.94 | 0.61 | 3.13 | 1.18 | 0.19 | 0.35 | 5.20 | 4.57 | 0.31 | 1/2" | 0.87 |

NOTE: For 1/4" NPT connections on 3" and 4" gauges, reduce B\* dimension by 5 mm / 0.02 in.

Panel cut-out dimensions: D + 1mm

## THE MEASURE OF Total Performance™

### Ordering Information:

State computer part number (if available) / type number / size / range / connection size and location / options required.

Specifications given in this price list represent the state of engineering at the time of printing. Modifications may take place and the specified materials may change without prior notice.

05/02



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# Bourdon Tube Pressure Gauges Industrial Stainless Steel Gauge Type 232.54 - Dry Case Type 233.54 - Liquid-filled Case

WIKA Datasheet 23X.54

## Applications

- Intended for adverse service conditions where pulsating or vibration exists
- Process industry: chemical/petrochemical, power stations, mining, on and offshore, environmental technology, mechanical engineering and plant construction
- Suitable for gaseous or liquid media that will not obstruct the pressure system

## Special features

- Vibration and shock resistant (with liquid filling)
- All stainless steel construction
- Pressure ranges up to 15,000 psi

## Standard Features

### Design

ASME B40.100 & EN 837-1

### Sizes

2½" & 4" (63 & 100 mm)

### Accuracy class

2½": ± 2/1/2% of span (ASME B40.100 Grade A)

4": ± 1% of span (ASME B40.100 Grade 1A)

### Ranges

Vacuum / Compound to 200 psi

Pressure from 15 psi to 15,000 psi

or other equivalent units of pressure or vacuum

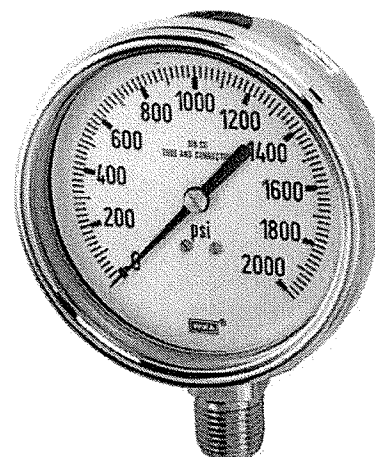
### Working pressure

2½":      Steady:      3/4 scale value  
             Fluctuating: 2/3 full scale value  
             Short time: full scale value

4":      Steady:      full scale value  
             Fluctuating: 0.9 x full scale value  
             Short time: 1.3 x full scale value

### Operating temperature

Ambient: -40°F to +140°F (-40°C to +60°C) - dry  
             -4°F to +140°F (-20°C to +60°C) - glycerine filled  
             -40°F to +140°F (-40°C to +60°C) - silicone filled  
Medium: +212°F (+100°C) maximum



Bourdon Tube Pressure Gauge Model 232.54

### Temperature error

Additional error when temperature changes from reference temperature of 68°F (20°C) ±0.4% for every 18°F (10°C) rising or falling. Percentage of span.

### Weather protection

Weather resistant (NEMA 3 / IP 54) - dry case

Weather tight (NEMA 4X / IP 65) - liquid-filled case

### Pressure connection

Material: 316L stainless steel

Lower mount (LM) or center back mount (CBM) - 2½"

Lower mount (LM) or lower back mount (LBM) - 4"

1/4" NPT or 1/2" NPT limited to wrench flat area

### Bourdon tube

Material: 316L stainless steel

2" & 2½": ≤ 1,000 PSI: C-type,  
                 ≥ 1,500 PSI: helical type

4":      ≤ 1,500 PSI: C-type,  
                 ≥ 2,000 PSI: helical type

### Movement

300-series stainless steel

### Dial

White aluminum with black lettering; 2½" size with stop pin



### Pointer

Black aluminum, friction adjustable

### Case

304 stainless steel with vent plug and polished stainless steel bayonet ring. Suitable for liquid filling. Welded case/socket connection

### Window

Laminated safety glass with Buna-N gasket

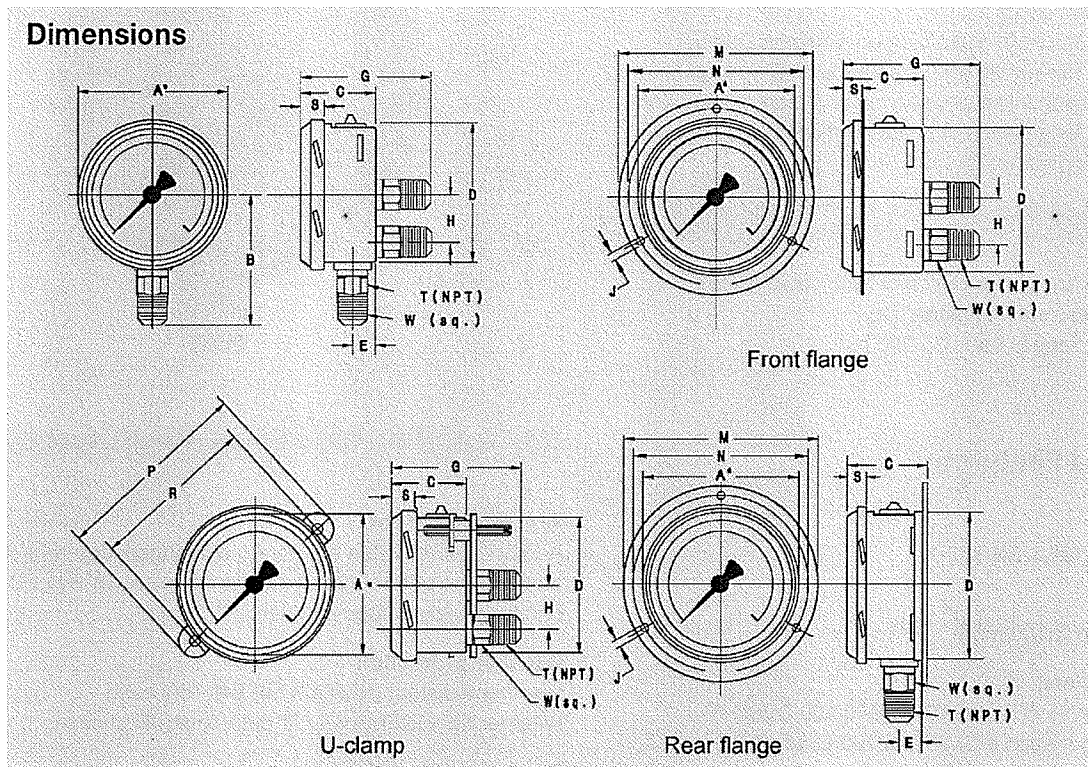
### Case fill

Glycerine 99.7% - Type 233.54

### Optional extras

- 316SS restrictor
- Accuracy  $\pm 1.0\%$  of full scale ( $2\frac{1}{2}$ " size)
- Stainless steel front or rear flange
- Zinc-plated steel or SS u-clamp bracket (field installable)
- Red drag pointer or mark pointer
- Silicone or fluorolube case filling
- Special connections limited to wrench flat area
- Custom dial layout
- Other pressure scales available  
bar, kPa, MPa, kg/cm<sup>2</sup> and dual scales

### Dimensions



| Size |    | A    | B    | C    | D    | E    | G    | H    | J    | M    | N    | P    | R    | S    | T    | W    | Weight   |        |
|------|----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|----------|--------|
| 2.5" | mm | 70   | 54   | 33.5 | 62   | 13   | 55.5 | -    | 3.6  | 85   | 75   | 87   | 72   | 12   |      | 14   | 0.36 lb. | dry    |
|      | in | 2.75 | 2.13 | 1.32 | 2.44 | 0.51 | 2.19 | -    | 0.14 | 3.35 | 2.95 | 3.43 | 2.83 | 0.47 | 1/4" | 0.55 | 0.44 lb. | filled |
| 4"   | mm | 110  | 87   | 49.5 | 100  | 15.5 | 81   | 30   | 4.8  | 132  | 116  | 125  | 110  | 15   |      | 22   | 1.10 lb. | dry    |
|      | in | 4.30 | 3.43 | 1.95 | 3.94 | 0.61 | 3.19 | 1.18 | 0.19 | 5.20 | 4.57 | 4.92 | 4.33 | 0.59 | 1/2" | 0.87 | 1.76 lb. | filled |

Recommended panel cutout is dimension D + 1 mm

#### Ordering information

Pressure gauge model / Nominal size / Scale range / Size of connection / Optional extras required  
Specifications and dimensions given in this leaflet represent the state of engineering at the time of printing.  
Modifications may take place and materials specified may be replaced by others without prior notice.



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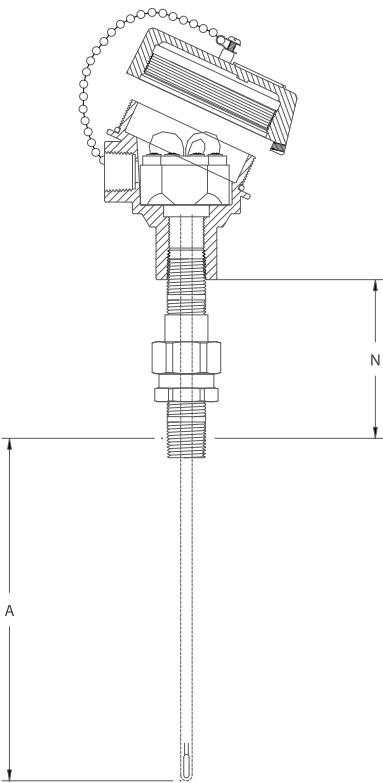
# TR10 Industrial RTD Assembly



# TR10 Industrial RTD Assembly

TR10 series resistance temperature detectors (RTDs) are industrial assemblies supplied with or without a temperature transmitter. An extensive range of elements, connection heads, insertion lengths, neck lengths, and process connections can be individually selected for the appropriate application. Replacement sensors can also be configured for this model.

RTDs in this series can be inserted directly into a process or combined with a variety of thermowell designs.



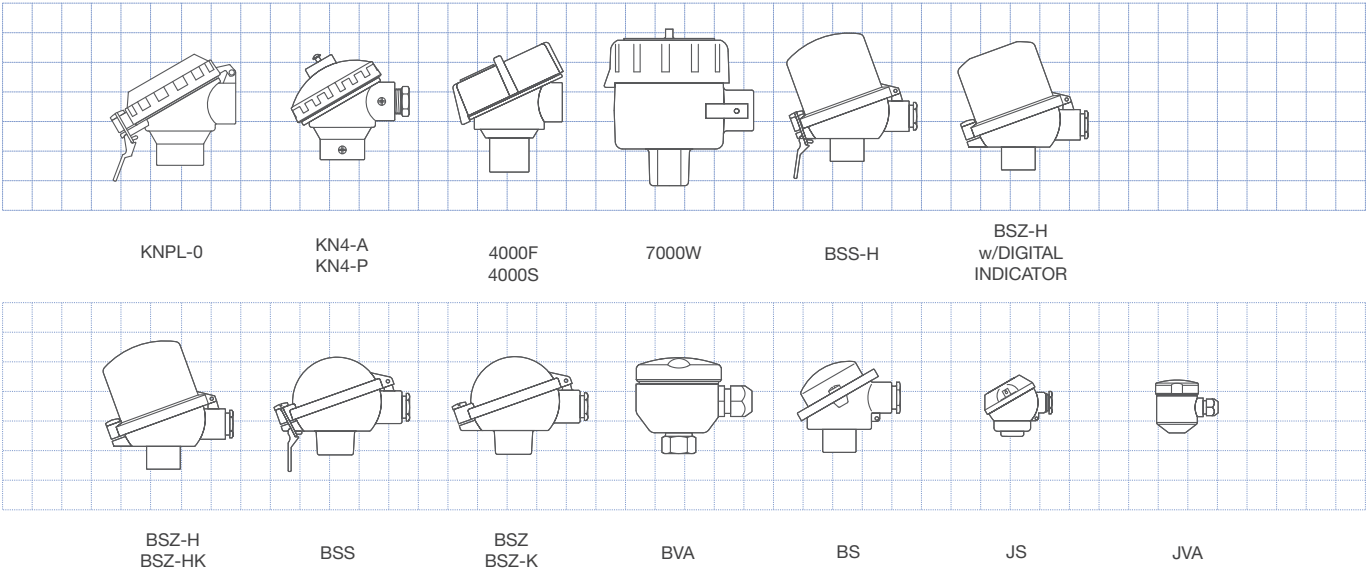
## Applications:

TR10 series assemblies are suitable for most industrial and commercial applications including:

- Air-conditioning and refrigeration systems
- Chemical and petrochemical industries
- Electronics and semiconductor industries
- Energy and power plant technology
- Machinery, plant and tank measurement
- Oil and gas industries
- Offshore exploration and drilling
- Pipeline control and custody transfer
- Power and utilities
- Pulp and paper
- Water and wastewater treatment

## Connection Heads

Imperial Grid 1" x 1"



# Resistance Temperature Detectors

## TR10 - Industrial RTD Assembly

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sensor Element:           | Pt100, Pt1000, Pt10, Cu10, or Ni120                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Measuring range:          | -200 °C to +1000 °C (depending upon element)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Wiring configuration:     | 2, 3, and 4 wire (single or dual)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Classification tolerance: | <ul style="list-style-type: none"> <li>■ Class B to DIN EN 60751</li> <li>■ Class A to DIN EN 60751</li> <li>■ 1/3 of DIN Class B</li> <li>■ 1/10 of DIN Class B</li> <li>■ Less than class B</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Electrical approvals:     | CSA, FM, ATEX/IEC, NAMUR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Options:                  | <ul style="list-style-type: none"> <li>■ Lengths and diameters standard or customer specific</li> <li>■ Transmitter mounted directly within connection head or on measuring insert DIN plate</li> <li>■ Calibration - single point, multiple points, and to Callendar-Van Dusen coefficients</li> <li>■ Material traceability of the conductors, metal sheath and mineral insulation</li> <li>■ Selectable accuracy tolerance</li> <li>■ Exchangeable measuring insert</li> <li>■ Special designs and materials</li> <li>■ Explosion protection: CSA, FM, ATEX (EEx-d)</li> <li>■ Intrinsically safe version: ATEX (EEx-i)</li> <li>■ Non-sparking version: ATEX (EEx-n)</li> <li>■ RTD transmitter matching</li> </ul> |

## Features:

- The sensor can be mounted into a thermowell or directly into a process with the use of a fixed, spring loaded or compression process fitting.
- The assembly can be supplied with or without a transmitter. Transmitters convert the resistance signal from the RTD to a linear analogue or digital output (commonly 4-20 mA). This signal reduces potential inaccuracies by negating the need for compensating output lead wires.
- The assembly has electrical approvals for explosion proof hazardous locations, intrinsic safety, ingress protection and general purpose areas.
- Electrical authorities that have registered these approvals include CSA, FM, ATEX/IEC and NAMUR. The approvals can be with or without an attached thermowell. A specially designed and patented integral flame path fitting makes it possible when supplied without a thermowell.
- The RTD sensors available for this assembly consist of a variety of sheath materials including stainless steels, corrosion resistant and high temperature oxidation resistant alloys. For temperatures greater than 600°C it is advisable to utilize an Inconel 600 sheath in place of stainless steel.
- RTD diameters range from 0.125 inch to 0.250 inch and 2 mm to 8 mm. Standard diameters are 0.125 inch & 0.250 inch and 3 mm & 6 mm.
- The RTD sensor can be spring-loaded ensuring a positive contact to the base of a thermowell bore.
- RTD temperature ranges are dependent on the RTD element, sheath material, element accuracy and the tip construction:
  - ☐ General purpose, the temperature range is -200°C to 1000°C
  - ☐ Fast response copper tip, the temperature range is -200°C to 250°C
  - ☐ Tip sensitive thin film, the temperature range is -50°C to 1000°C
  - ☐ Fast response/tip sensitive copper tip including the vibration proof construction, the temperature range is -50°C to 250°C
- A variety of neck extensions are possible. They provide a fixture from the enclosure (connection head) to the process or thermowell. The standard neck extensions are the nipple-union-nipple or the male threaded neck tube. These extensions allow for directional rotation of the head for field wiring as well as a positive quick disconnection of the assembly from the process or thermowell.





# TR10

Create your product part number by selecting the appropriate assembly items from each of the categories below. Enter the item code into the applicable box to generate the part number.

|   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|
|   |   |   |   |   |   |   |   |   |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

|             |                                                |
|-------------|------------------------------------------------|
| Part Number | TR10-X-X-XXXXXX-X-XXXXX-XXX-XXXX-XX-X-XXXXX-XX |
|-------------|------------------------------------------------|

## 1 Assembly description

|      |                                                                            |
|------|----------------------------------------------------------------------------|
| Code |                                                                            |
| 0    | Industrial assembly configured                                             |
| 1    | Industrial sensor configured                                               |
| A    | Measuring insert [TR002]                                                   |
| B    | RTD assembly with neck tube [TR200]                                        |
| C    | DIN RTD assembly with threaded protection tube [TR201]                     |
| D    | RTD assembly with protection tube [TR211 / TR212]                          |
| F    | DIN RTD assembly with flanged protection tube [TR401]                      |
| H    | RTD assembly without thermowell [TR750 / TR760]                            |
| J    | RTD assembly with perforated protection tube [TR820]                       |
| K    | Measuring insert EEx-d [TRD02] (Replacement insert, for use in TRD20 only) |
| L    | RTD assembly EEx-d [TRD20]                                                 |

## 2 Unit of measure

|   |          |
|---|----------|
| I | Imperial |
| M | Metric   |

## 3 Insert design

|   |                                                    |
|---|----------------------------------------------------|
| S | Self gripping spring                               |
| N | Fixed to the fitting                               |
| D | Spring loaded plate (removable insert)             |
| M | Fixed miniature terminal plate (not removable)     |
| T | Spring loaded miniature terminal plate (removable) |

## 4 Electrical approval

|   |                                                  |
|---|--------------------------------------------------|
| C | CSA Ex-proof                                     |
| F | FM Ex-proof                                      |
| A | EEx-i (ATEX) gas, acc. to directive 94/9/EC      |
| B | EEx-i (ATEX) gas/dust, acc. to directive 94/9/EC |
| J | EEx-d (ATEX) acc. to directive 94/9/EC           |
| H | EEx-n (ATEX) acc. to directive 94/9/EC           |
| D | EEx-i, confirmation NAMUR NE24                   |
| Z | Without                                          |

## 5 Flame path fitting

|   |         |
|---|---------|
| 1 | Yes     |
| Z | Without |

## 6 Connection head

|   |                                                                           |
|---|---------------------------------------------------------------------------|
| 1 | 4000 F (Aluminum)                                                         |
| 2 | 4000 S (Stainless steel)                                                  |
| 3 | 7000 W (Aluminum)                                                         |
| 7 | KN4-A (Aluminum)                                                          |
| 8 | KN4-P (Polypropylene)                                                     |
| 9 | KNPL-0 (Aluminum)                                                         |
| A | BS (Aluminum)                                                             |
| B | BSZ (Aluminum)                                                            |
| D | BSZ-H (Aluminum)                                                          |
| J | BSZ-K (anti static Polyamide)                                             |
| K | BSZ-HK (anti static Polyamide)                                            |
| N | BSZ-H with digital temperature indicator DIH10 (set to transmitter range) |
| E | BSS (Aluminum)                                                            |
| F | BSS-H (Aluminum)                                                          |
| I | BVA (Stainless steel)                                                     |
| R | JS (Aluminum)                                                             |
| S | JVA (Stainless steel)                                                     |
| Z | Without                                                                   |

## 7 Cable entry

|   |           |
|---|-----------|
| S | 1/2 NPT   |
| F | 3/4 NPT   |
| T | M20 x 1.5 |
| P | M16 x 1.5 |
| L | M12 x 1.5 |
| Z | Without   |

## 8 Head instrument connection

|   |                        |
|---|------------------------|
| S | 1/2 NPT                |
| F | 3/4 NPT                |
| B | G 1/2 B (BSP 1/2 inch) |
| T | M20 x 1.5              |
| A | M24 x 1.5              |
| J | M10 x 1.0              |
| Z | Without                |

## 9 Terminal block / Transmitter

|   |                                                     |
|---|-----------------------------------------------------|
| 1 | Crastin terminal block                              |
| 2 | Ceramic terminal block                              |
| 3 | T12 (Programmable Digital Transmitter)              |
| 8 | T19 (Analogue Transmitter)                          |
| 4 | T24 (Programmable Analogue Transmitter)             |
| 6 | T32 (HART® Transmitter)                             |
| 9 | T53 (Fieldbus Foundation / PROFIBUS PA Transmitter) |
| B | T91.10 (Analogue Transmitter, DIN form B)           |
| C | T91.20 (Analogue Transmitter, form J)               |
| X | Without / prepared for transmitter                  |
| Y | Without / flying leads                              |

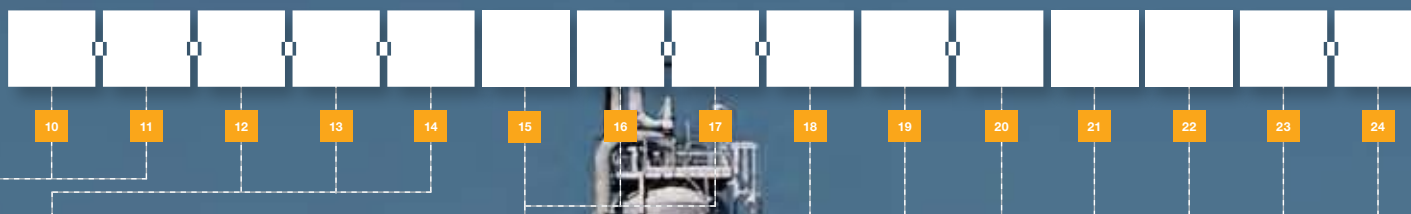
## 10 Neck extension

|   |                                                           |
|---|-----------------------------------------------------------|
| F | Nipple-Union-Nipple                                       |
| E | Nipple                                                    |
| D | Fixed double threaded hex bushing                         |
| R | Spring loaded Bushing-Union-Nipple                        |
| G | Fixed single threaded hex bushing                         |
| K | Spring loaded bushing without oil seal                    |
| H | Spring loaded bushing with oil seal                       |
| 5 | Bushing with oil seal                                     |
| U | Nipple-Union (Protection tube only)                       |
| L | Adjustable lock nut                                       |
| C | Fixed single threaded hex bushing with additional fitting |
| X | Neck tube unthreaded, diam. 12 x 1.5 mm                   |
| V | Neck tube unthreaded, diam. 12 x 2.5 mm                   |
| S | Neck tube male threaded, diam. 12 x 1.5 mm (DIN 43772)    |
| T | Neck tube male threaded, diam. 12 x 2.5 mm (DIN 43772)    |
| Q | Neck tube male threaded, diam. 14 x 2.5 mm (DIN 43772)    |
| Z | Without                                                   |

## 11 Neck material

|   |                                 |
|---|---------------------------------|
| G | Galvanized steel                |
| S | Stainless steel 316 (1.4401)    |
| F | Stainless steel 316 Ti (1.4571) |
| Z | Without                         |

Note: Some configurations are unavailable. Your WIKA sales person will notify you if you have made an incorrect selection



| 12 | Fitting style                                                    |  |
|----|------------------------------------------------------------------|--|
| A  | Fixed fitting, threaded hex bushing                              |  |
| B  | Compression fitting with stainless steel ferrule                 |  |
| C  | Compression fitting with Teflon® ferrule                         |  |
| D  | Compression fitting, spring loaded, with stainless steel ferrule |  |
| Z  | Without                                                          |  |

| 13 | Fitting material                |  |
|----|---------------------------------|--|
| A  | Stainless steel 316 (1.4401)    |  |
| B  | Stainless steel 316 Ti (1.4571) |  |
| Z  | Without                         |  |

| 14 | Thread size |  |
|----|-------------|--|
| K  | 1/2 NPT     |  |
| J  | 3/4 NPT     |  |
| N  | 1/4 NPT     |  |
| M  | M20 x 1.5   |  |
| F  | G 1/2 B     |  |
| C  | G 3/4 B     |  |
| R  | G 1/4 B     |  |
| D  | G 1/8 B     |  |
| V  | G 3/8 B     |  |
| B  | G 1 B       |  |
| A  | M8 x 1.0    |  |
| T  | M10 x 1.0   |  |
| S  | M12 x 1.5   |  |
| P  | M14 x 1.5   |  |
| O  | M18 x 1.5   |  |
| Z  | Without     |  |

| 15       | N-Dimension (N) Imperial |          | Continued |
|----------|--------------------------|----------|-----------|
| Imperial | 005                      | 0.5 inch |           |
|          | 010                      | 1.0 inch |           |
|          | 015                      | 1.5 inch |           |
|          | 020                      | 2.0 inch |           |
|          | 025                      | 2.5 inch |           |
|          | 030                      | 3.0 inch |           |
|          | 035                      | 3.5 inch |           |
|          | 040                      | 4.0 inch |           |
|          | 045                      | 4.5 inch |           |
|          | 050                      | 5.0 inch |           |
|          | 055                      | 5.5 inch |           |
|          | 060                      | 6.0 inch |           |
|          | 065                      | 6.5 inch |           |
|          | 080                      | 8.0 inch |           |

| 15     | N-Dimension (N) Metric |                                      |
|--------|------------------------|--------------------------------------|
| Metric | 012                    | 12 mm                                |
|        | 025                    | 25 mm                                |
|        | 030                    | 30 mm                                |
|        | 037                    | 37 mm                                |
|        | 050                    | 50 mm                                |
|        | 062                    | 62 mm                                |
|        | 065                    | 65 mm                                |
|        | 075                    | 75 mm                                |
|        | 087                    | 87 mm                                |
|        | 100                    | 100 mm                               |
|        | 112                    | 112 mm                               |
|        | 125                    | 125 mm                               |
|        | 130                    | 130 mm                               |
|        | 138                    | 138 mm                               |
|        | 140                    | 140 mm                               |
|        | 150                    | 150 mm                               |
|        | 163                    | 163 mm                               |
|        | 200                    | 200 mm                               |
|        | 210                    | 210 mm                               |
|        | ***                    | N-Dimension in mm (e.g. 84 mm = 084) |
|        | ZZZ                    | Without                              |

| 16 | Element                            |  |
|----|------------------------------------|--|
| D  | Pt100, class B                     |  |
| C  | Pt100, class A                     |  |
| F  | Pt100, 1/10 DIN of class B at 0 °C |  |
| E  | Pt10, class A                      |  |
| A  | Cu10, class B                      |  |
| B  | Ni120, class B                     |  |
| K  | Pt1000, class B                    |  |
| J  | Pt1000, class A                    |  |
| L  | Pt100, accuracy less than class B  |  |
| I  | Pt100, 1/3 DIN of class B at 0 °C  |  |

| 17 | Wiring configuration |  |
|----|----------------------|--|
| A  | Single 2-wire        |  |
| B  | Single 3-wire        |  |
| C  | Single 4-wire        |  |
| D  | Single 4B-wire       |  |
| E  | Dual 2-wire          |  |
| F  | Dual 3-wire          |  |
| G  | Dual 4-wire          |  |
| H  | Dual 4B-wire         |  |

| 18 | Temperature range |  |
|----|-------------------|--|
| K  | -50...+250 °C     |  |
| S  | -50...+450 °C     |  |
| M  | -200...+250 °C    |  |
| T  | -200...+450 °C    |  |
| H  | -200...+600 °C    |  |
| L  | 0...+850 °C       |  |
| 5  | 0...+1000 °C      |  |

| 19 | Tip construction                         |  |
|----|------------------------------------------|--|
| C  | General purpose                          |  |
| F  | Fast response (copper tip)               |  |
| G  | Tip sensitive (thin-film)                |  |
| T  | Fast response tip sensitive (copper tip) |  |
| V  | Vibration proof tip (max. 10 g force)    |  |

| 20 | Sensor diameter                                                            |  |
|----|----------------------------------------------------------------------------|--|
| 1  | 1/4 inch / 0.250 inch (6.35 mm)                                            |  |
| 4  | 3/16 inch / 0.188 inch (4.75 mm)                                           |  |
| 2  | 1/8 inch / 0.125 inch (3.17 mm)                                            |  |
| J  | 1/4 inch / 0.250 inch (6.35 mm) reduced to 1/8 inch / 0.125 inch (3.17 mm) |  |
| 3  | 0.215 inch (5.46 mm)                                                       |  |
| A  | 2.0 mm                                                                     |  |
| B  | 3.0 mm                                                                     |  |
| G  | 4.0 mm                                                                     |  |
| D  | 6.0 mm                                                                     |  |
| H  | 6.0 mm reduced to 3.0 mm                                                   |  |
| F  | 6.0 mm with 8.0 mm tip                                                     |  |
| E  | 8.0 mm                                                                     |  |

| 21 | Sheath material                               |  |
|----|-----------------------------------------------|--|
| P  | Stainless steel 316 / 316 L (1.4401 / 1.4435) |  |
| J  | Inconel® 600 (2.4816)                         |  |
| Q  | Stainless steel 316 Ti (1.4571)               |  |

| 22    | A-Dimension (A)                                             |  |
|-------|-------------------------------------------------------------|--|
| ***** | Please specify (e.g. 84 mm = 00084) (e.g. 9.5 inch = 00950) |  |

| 23 | Certificates         |  |
|----|----------------------|--|
| 1  | Quality certificates |  |
| Z  | Without              |  |

| 24 | Additional order details |  |
|----|--------------------------|--|
| T  | Additional text          |  |
| Z  | Without                  |  |



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Part of your business

# Thermowells

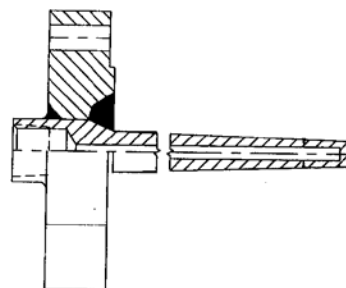
## Type TW.FL/TW10

WIKA Datasheet TW.FL/TW10

### Application

Thermowells for temperature instruments are recommended for all process systems where pressure, velocity or viscous, abrasive and corrosive materials are present individually or in combination. A properly selected thermowell will protect the temperature instrument from possible damage resulting from these process variables.

Furthermore, a thermowell permits removal of the temperature instrument for replacement, repair or testing without effecting the process media or the system.



Flanged Configuration

### Standard Features

#### Process connections

Flanged

#### Instrument connection

½" NPSM Standard

#### Bore diameter

.260", .385"

#### Materials

Brass, AISI 304, AISI 316  
(Other materials available upon request)

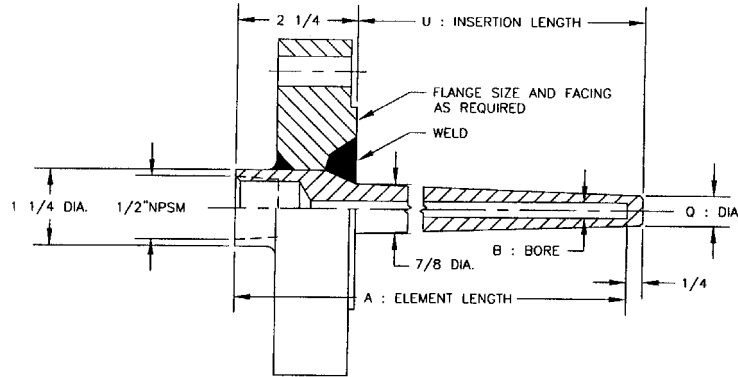
#### Surface finish

Brass: 60-100 Ra  
AISI 304 & AISI 316: 60-100 Ra  
Sanitary (AISI 304 & AISI 316): 16-20 Ra

### Ordering Information

See current WIKA Catalog or WIKA Price List for ordering information

## WIKA type FL2T & FL3T (.260 bore, .385 bore)



| Type FL2T and FL3T |       |
|--------------------|-------|
| U Dim              | A Dim |
| 2"                 | 4"    |
| 4"                 | 6"    |
| 7"                 | 9"    |
| 10"                | 12"   |
| 13"                | 15"   |
| 16"                | 18"   |
| 22"                | 24"   |

| Type FLT2T | Type FLT3T |
|------------|------------|
| Q Dim      |            |
| 5/8"       | 49/64"     |

**Flange sizes available:**  
1", 1½", 2"

**Flange ratings available:**  
150#  
300#  
600#  
900#  
1500#  
2500#

**Flange facings available:**  
Flat Face (FF)  
Raised Face (RF)  
Ring Joint (RTJ)

| Flange | Minimum head lengths flange size |       |       |       |       |       |
|--------|----------------------------------|-------|-------|-------|-------|-------|
| Rating | 1"                               | 1½"   | 2"    | 2½"   | 3"    | 4"    |
| 150#   | 2.25"                            | 2.25" | 2.25" | 2.25" | 2.25" | 2.25" |
| 300#   | 2.25"                            | 2.25" | 2.25" | 2.25" | 3.25" | 3.25" |
| 400#   | 2.25"                            | 2.25" | 3.25" | 3.25" | 3.25" | 3.25" |
| 600#   | 2.25"                            | 2.25" | 3.25" | 3.25" | 3.25" | 3.25" |
| 900#   | 3.25"                            | 3.25" | 3.25" | 3.25" | 3.25" | 3.25" |
| 1500#  | 3.25"                            | 3.25" | 3.25" | 3.25" | 3.25" | 3.25" |
| 2500#  | 3.25"                            | 3.25" | 4.25" | 4.25" | 4.25" | 4.25" |

### NOTES:

1. Flanges are manufactured in accordance with ANSI B16.5.
2. Raised face flange supplied as standard ANSI serrated.  
125 RMS smooth face available.
3. Full penetration welds standard; specify on order if partial required.
4. Wrench flats used on wells with a stem length of more than 21" long.
5. Bar diameter on flanged wells: 1.125" thru 600# rating.  
1.375" for and over 900#.



|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

| 1 - Welding options (W) |                                                   |
|-------------------------|---------------------------------------------------|
| Code                    |                                                   |
| F                       | Full penetration welded                           |
| P                       | Partial penetration, fillet<br>a = 3 mm (minimum) |
| R                       | Partial penetration, fillet<br>a = 6 mm (minimum) |
| S                       | Screwed and welded                                |
| B                       | Screwed and welded both<br>side of flange         |

| 2 - Thermowell style |          |
|----------------------|----------|
| A                    | Tapered  |
| B                    | Straight |
| C                    | Stepped  |

| 3 - Unit of measure |          |
|---------------------|----------|
| I                   | Imperial |
| M                   | Metric   |

| 4 - Flange size (Fs) |                      |
|----------------------|----------------------|
| A                    | ASME 1"              |
| B                    | ASME 1 1/4"          |
| C                    | ASME 1 1/2"          |
| D                    | ASME 2"              |
| E                    | ASME 2 1/2"          |
| F                    | ASME 3"              |
| G                    | ASME 4"              |
| I                    | EN 1092-1 DN 25      |
| K                    | EN 1092-1 DN 40      |
| L                    | EN 1092-1 DN 50      |
| N                    | EN 1092-1 DN 80      |
| P                    | EN 1092-1 DN 100     |
| S                    | DIN 2526/2527 DN 25  |
| U                    | DIN 2526/2527 DN 40  |
| W                    | DIN 2526/2527 DN 50  |
| Y                    | DIN 2526/2527 DN 80  |
| 1                    | DIN 2526/2527 DN 100 |

| 5 - Pressure rating |            |
|---------------------|------------|
| D                   | 150 psig   |
| E                   | 300 psig   |
| F                   | 400 psig   |
| H                   | 600 psig   |
| J                   | 900 psig   |
| K                   | 1,500 psig |
| L                   | 2,500 psig |
| M                   | PN 6       |
| P                   | PN 16      |
| Q                   | PN 40      |
| R                   | PN 63      |
| S                   | PN 64      |
| T                   | PN 100     |

| 6 - Flange face |                                     |
|-----------------|-------------------------------------|
| A               | FF (flat face)                      |
| B               | RF (raised face)                    |
| C               | RTJ (ring type joint)               |
| D               | RFSF (raised face smooth<br>finish) |
| E               | DIN 2526 Form C                     |
| F               | DIN 2526 Form E                     |
| G               | DIN 2526 Form N                     |
| H               | DIN 2526 Form F                     |
| K               | EN 1092-1 Form B1                   |
| L               | EN 1092-1 Form B2                   |
| M               | EN 1092-1 Form C                    |
| N               | EN 1092-1 Form D                    |

| 7 - Instrument connection |                    |
|---------------------------|--------------------|
| UD                        | 1/2 NPT female     |
| UF                        | 1/2 NPT-CSA female |
| GF                        | 1/2 NPSM           |
| UE                        | 3/4 NPT female     |
| GD                        | G 1/2 B male       |
| TD                        | G 1/2 male         |
| GE                        | G 3/4 B male       |
| TE                        | G 3/4 male         |
| SD                        | M14 x 1.5 female   |
| SG                        | M18 x 1.5 female   |
| SI                        | M20 x 1.5 female   |
| MC                        | M20 x 1.5 male     |
| MK                        | M24 x 1.5 female   |
| MJ                        | M24 x 1.5 male     |
| TH                        | M27 x 2.0 female   |
| MD                        | M27 x 2.0 male     |

| 8 - Pipe schedule / Intern. nozzle dia. |                             |
|-----------------------------------------|-----------------------------|
| 2                                       | Schedule 40 (Standard N.A.) |
| 3                                       | Schedule 80                 |
| 1                                       | Schedule 160                |
| 4                                       | Schedule XXS                |
| N                                       | WIKA (Standard Germany)     |

| 9 - Insertion length (U) |                                                                                      |
|--------------------------|--------------------------------------------------------------------------------------|
| *****                    | Please specify; maximum 62"<br>1575 mm) (e.g. 8.5" = 08500)<br>(e.g. 240 mm = 00240) |

| 10- Head length (H) |                                                            |
|---------------------|------------------------------------------------------------|
| 01770               | 1.77"                                                      |
| 02250               | 2.25"                                                      |
| 02360               | 2.36"                                                      |
| 03250               | 3.25"                                                      |
| 04250               | 4.25"                                                      |
| 05250               | 5.25"                                                      |
| 00045               | 45 mm                                                      |
| 00057               | 57 mm                                                      |
| 00060               | 60 mm                                                      |
| 00083               | 83 mm                                                      |
| 00102               | 102 mm                                                     |
| 00108               | 108 mm                                                     |
| 00133               | 133 mm                                                     |
| *****               | Please specify (e.g. 3.5" =<br>03500) (e.g. 84 mm = 00084) |



**TW-10-**

|   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|
|   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |

| 16 - Tip diameter (V) |                                                       |
|-----------------------|-------------------------------------------------------|
| 0500                  | 500"                                                  |
| 0625                  | 0.625"                                                |
| 0750                  | 0.750"                                                |
| 1000                  | 1.000"                                                |
| 0127                  | 12.7 mm                                               |
| 0160                  | 16 mm                                                 |
| 0190                  | 19 mm                                                 |
| 0220                  | 22 mm                                                 |
| 0250                  | 25 mm                                                 |
| ****                  | Please specify (e.g. 1.5" = 1500) (e.g. 24 mm = 0240) |

| 17 - RTD / TC / Thermometer assembly |                                              |
|--------------------------------------|----------------------------------------------|
| 1A                                   | TR10 Industrial RTD assembly                 |
| 1B                                   | TC10 Industrial TC assembly                  |
| 1C                                   | TR15 Remote RTD assembly                     |
| 1D                                   | TC15 Remote TC assembly                      |
| 1F                                   | TR75 DiwiTherm®                              |
| YY                                   | Dial thermometer<br>(Bimetal / Gas actuated) |
| ZZ                                   | Without                                      |

| 18 - Certificates |                      |
|-------------------|----------------------|
| 1                 | Quality certificates |
| Z                 | Without              |

| 19 - Additional order details |                 |
|-------------------------------|-----------------|
| T                             | Additional text |
| Z                             | Without         |



# TW15

Threaded Thermowell (Solid Machined)

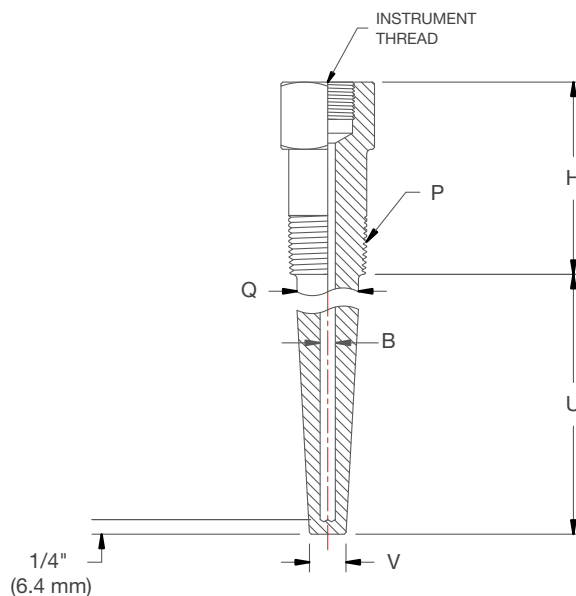




## TW15 Threaded Thermowell

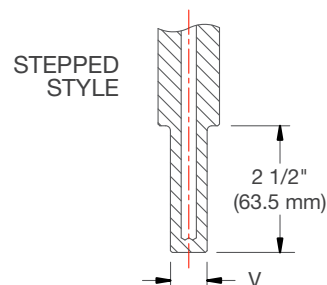
(solid machined)

Model TW15 thermowells are machined from solid bar stock. The thermowell profile is tapered, straight or stepped. The process connections are NPT (tapered) for installation into a mating connection. This design of thermowell will accept thermocouples (TC), resistance temperature detectors (RTD), as well as mechanical and digital thermometers.

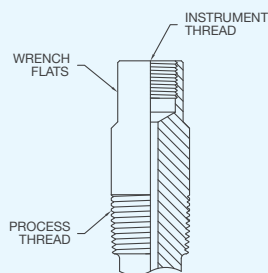


### Applications:

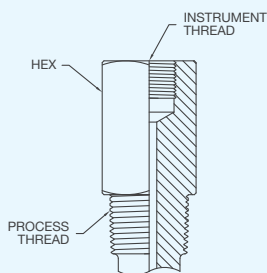
- Chemical, process, apparatus and plant engineering; petrochemical; on offshore
- High chemical loads
- High process loads



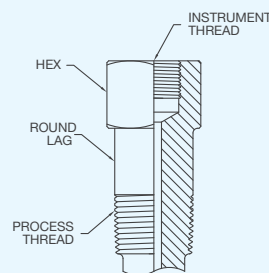
### Head Designs



ROUND with WRENCH FLATS



HEXAGON



ROUND with HEXAGON

# Thermowells

## TW15 Threaded Thermowell (Solid Machined)

|                       |                                                                                                                                                                                                                                                                                                  |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Head Design:          | Hexagon, Round with hexagon, or Round with wrench flats                                                                                                                                                                                                                                          |
| Thermowell Style:     | Tapered, Straight, or Stepped                                                                                                                                                                                                                                                                    |
| Process Thread:       | 1/2 NPT, 3/4 NPT, or 1 NPT                                                                                                                                                                                                                                                                       |
| Insertion Length:     | Up to 62 inch (1575 mm) for single piece construction                                                                                                                                                                                                                                            |
| Bore Size:            | 0.260 to 0.702 inch (6.6 to 17.8 mm)                                                                                                                                                                                                                                                             |
| Bore Depth:           | Up to 72 inch (1828 mm)                                                                                                                                                                                                                                                                          |
| Electrical Approvals: | CSA, FM                                                                                                                                                                                                                                                                                          |
| Options:              | <ul style="list-style-type: none"><li>■ Wake frequency calculations</li><li>■ Quality certificates</li><li>■ Metallic hard coatings</li><li>■ Stainless steel plug or cap with chain</li><li>■ Product tagging</li><li>■ Multi-piece construction for bore depths greater than 72 inch</li></ul> |

## Threaded Tapered



## Threaded Straight



## Threaded Stepped



# TW15

Create your product part number by selecting the appropriate assembly items from each of the categories below. Enter the item code into the applicable box to generate the part number.

|   |   |   |   |   |   |   |   |   |    |
|---|---|---|---|---|---|---|---|---|----|
|   |   |   |   |   |   |   |   |   |    |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

Part Number TW15-X-X-X-XX-XX-XXXX-XXXX-XX-X-XXXX-XXXX-XX-XX

## 1 Head design

|      |                         |
|------|-------------------------|
| Code |                         |
| H    | Hexagon                 |
| M    | Round with hexagon      |
| R    | Round with wrench flats |

## 2 Thermowell style

|   |          |
|---|----------|
| A | Tapered  |
| B | Straight |
| C | Stepped  |

## 3 Unit of measure

|   |          |
|---|----------|
| I | Imperial |
| M | Metric   |

## 4 Process thread [P]

|    |         |
|----|---------|
| ND | 1/2 NPT |
| NE | 3/4 NPT |
| NF | 1 NPT   |

## 5 Instrument connection

|    |                    |
|----|--------------------|
| UD | 1/2 NPT female     |
| UF | 1/2 NPT-CSA female |
| GF | 1/2 NPSM           |
| UE | 3/4 NPT female     |
| TD | G 1/2 female       |

## 6 Insertion length [U]

|       |                                                                                         |
|-------|-----------------------------------------------------------------------------------------|
| ***** | Please specify; maximum 62 inch (1575 mm) (e.g. 8.5 inch = 08500) (e.g. 240 mm = 00240) |
|-------|-----------------------------------------------------------------------------------------|

## 7 Head length [H]

|       |                                                             |
|-------|-------------------------------------------------------------|
| 01750 | 1.75 inch                                                   |
| 02000 | 2.00 inch                                                   |
| 00045 | 45 mm                                                       |
| 00050 | 50 mm                                                       |
| ***** | Please specify (e.g. 1.5 inch = 01500) (e.g. 48 mm = 00048) |

## 8 Material

|    |                                   |
|----|-----------------------------------|
| G3 | Stainless steel 316/316L          |
| G1 | Stainless steel 304/304L          |
| F1 | Carbon steel A105                 |
| G5 | Stainless steel 310               |
| G6 | Stainless steel 321               |
| G8 | Stainless steel 347               |
| G4 | Stainless steel 316H              |
| G2 | Stainless steel 304H              |
| H1 | Carbon steel F11                  |
| H2 | Carbon steel F22                  |
| H3 | Carbon steel F5                   |
| H4 | Carbon steel F9                   |
| H5 | Carbon steel F91                  |
| B1 | Inconel® 600                      |
| B2 | Inconel® 601                      |
| B3 | Inconel® 625                      |
| C1 | Incoloy® 800H/HT                  |
| C2 | Incoloy® 825                      |
| A5 | Titanium Grade II                 |
| D1 | Monel® 400                        |
| E1 | Nickel 200                        |
| E2 | Nickel 201                        |
| A2 | Hastelloy® C-276                  |
| A1 | Hastelloy® B-2                    |
| A3 | Hastelloy® C-4                    |
| I1 | Stainless steel 410               |
| I2 | Stainless steel 446               |
| A4 | Hastelloy® C-22                   |
| L6 | Stainless steel duplex (1.4462)   |
| L5 | Stainless steel 1.4571            |
| L1 | Carbon steel 1.7335 (13CrMo44)    |
| L4 | Carbon steel 1.5415 (15Mo3/16Mo3) |
| L2 | Carbon steel 1.7380 (10CrMo910)   |
| L3 | Carbon steel 1.0460 (C22.8)       |
| F2 | Carbon steel 1018                 |

## 9 Bore size [B]

|   |                      |
|---|----------------------|
| A | 0.260 inch (6.6 mm)  |
| B | 0.385 inch (9.8 mm)  |
| C | 0.512 inch (13 mm)   |
| D | 0.702 inch (17.8 mm) |
| M | 0.335 inch (8.5 mm)  |

## 10 Root diameter [Q]

|      |                                                           |
|------|-----------------------------------------------------------|
| 0625 | 0.625 inch                                                |
| 0750 | 0.750 inch                                                |
| 0875 | 0.875 inch                                                |
| 1000 | 1.000 inch                                                |
| 1063 | 1.063 inch                                                |
| 0160 | 16 mm                                                     |
| 0220 | 22 mm                                                     |
| 0270 | 27 mm                                                     |
| **** | Please specify (e.g. 1.5 inch = 1500) (e.g. 24 mm = 0240) |

*Nota: Some configurations are unavailable. Your WIKA sales person will notify you if you have made an incorrect selection*



11

12

13

14

#### 11 Tip diameter [V]

|      |                                                              |
|------|--------------------------------------------------------------|
| 0500 | 0.500 inch                                                   |
| 0625 | 0.625 inch                                                   |
| 0750 | 0.750 inch                                                   |
| 0875 | 0.875 inch                                                   |
| 0130 | 13 mm                                                        |
| 0160 | 16 mm                                                        |
| 0190 | 19 mm                                                        |
| 0220 | 22 mm                                                        |
| **** | Please specify (e.g. 1.5 inch = 1500)<br>(e.g. 24 mm = 0240) |

#### 12 RTD / TC / Thermometer assembly

|    |                                           |
|----|-------------------------------------------|
| 1A | TR10 Industrial RTD assembly              |
| 1B | TC10 Industrial TC assembly               |
| 1C | TR15 Remote RTD assembly                  |
| 1D | TC15 Remote TC assembly                   |
| 1F | TR75 DiwiTherm®                           |
| YY | Dial Thermometer (Bimetal / Gas actuated) |
| ZZ | Without                                   |

#### 13 Certificates

|   |                      |
|---|----------------------|
| 1 | Quality certificates |
| Z | Without              |

#### 14 Additional order details

|   |                 |
|---|-----------------|
| T | Additional text |
| Z | Without         |



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www.wika.com.mx

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www.manometry.com.pl

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www.wika.kz

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Fax: (+971) 4-883 91 98  
E-mail: wikame@emirates.net.ae

## Australia

### Australia

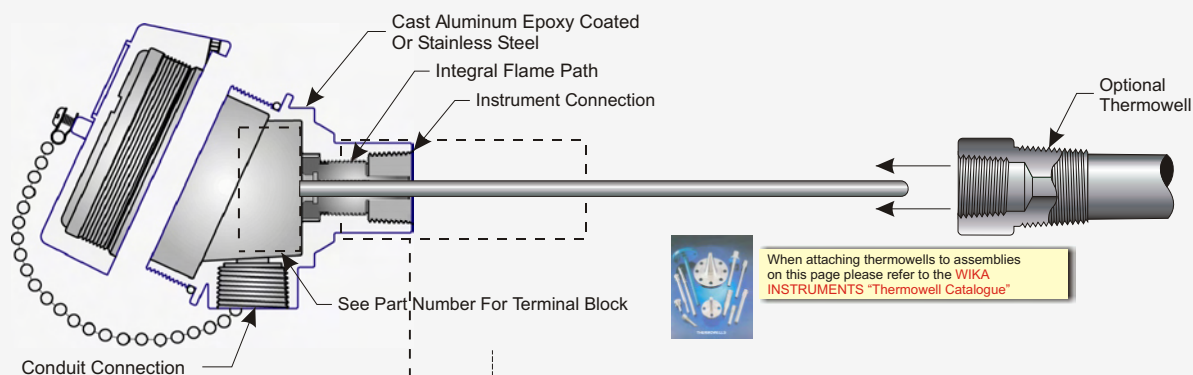
WIKI Australia Pty. Ltd.  
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E-mail: sales@wika.com.au  
www.wika.com.au



 Part of your business



# 4000 Series Explosion Proof RTD Assemblies with Integral Flame Path



When attaching thermowells to assemblies on this page please refer to the WIKA INSTRUMENTS "Thermowell Catalogue"

## REPLACEMENT SENSOR LENGTH CRASTIN TERMINAL BLOCK

|      | HT/UT     | LT        |
|------|-----------|-----------|
| 4AP1 | A+2 3/8   | A+3 3/8   |
| 4AP2 | A+N+2 3/8 | A+N+3 3/8 |
| 4AP3 | A+N+2 3/8 | A+N+3 3/8 |
| 4AP4 | A+N+2 3/8 | A+N+3 3/8 |
| 4AP5 | A+N+2 3/8 | A+N+3 3/8 |

## REPLACEMENT SENSOR LENGTH CERAMIC TERMINAL BLOCK

|      | HT/UT     | LT        |
|------|-----------|-----------|
| 4AP1 | A+1 7/8   | A+1 7/8   |
| 4AP2 | A+N+1 7/8 | A+N+1 7/8 |
| 4AP3 | A+N+1 7/8 | A+N+1 7/8 |
| 4AP4 | A+N+1 7/8 | A+N+1 7/8 |
| 4AP5 | A+N+1 7/8 | A+N+1 7/8 |



**Certified with or without a thermowell**

Class I Division I Groups BCD  
Class II Division I Groups EFG  
Class III; Encl. Type 4X / IP66



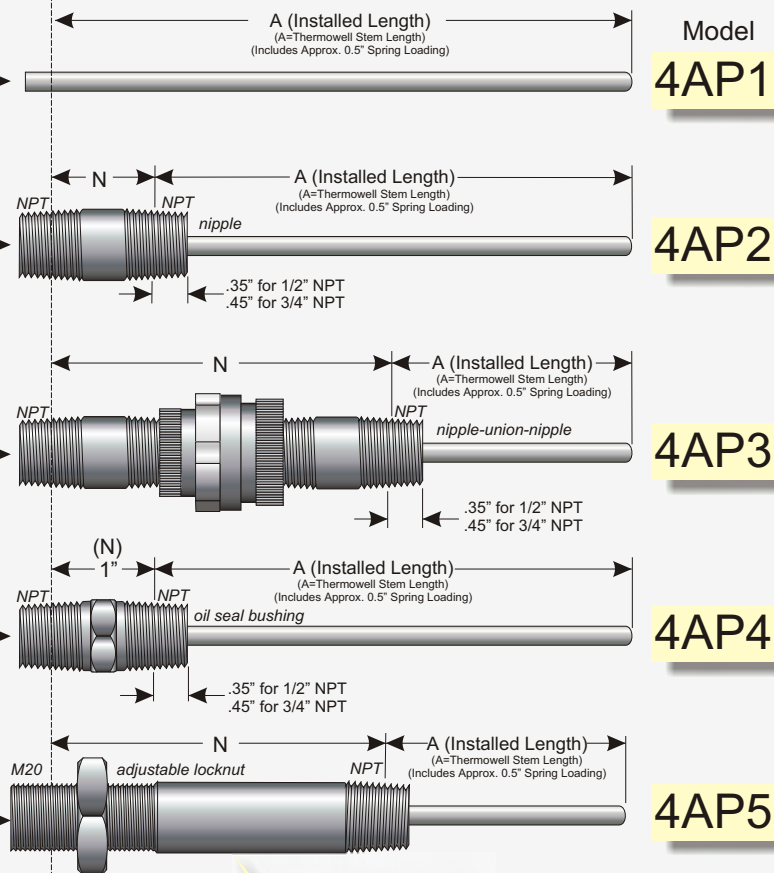
Ex d IIB+H2 T6  
Encl. Type 4X / IP66



EEEx d IIB+H2 T6  
Encl. Type 4X / IP66

### Note:

These RTD assemblies are suitable for retrofit or replacement applications where a full assembly certification is required with or without a thermowell.



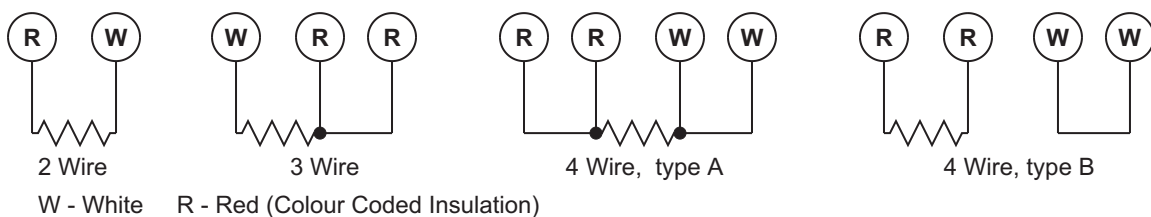
Standard lengths are from 2"-6"  
Special lengths are available



# 4000 Series Explosion Proof RTD Assemblies with Integral Flame Path

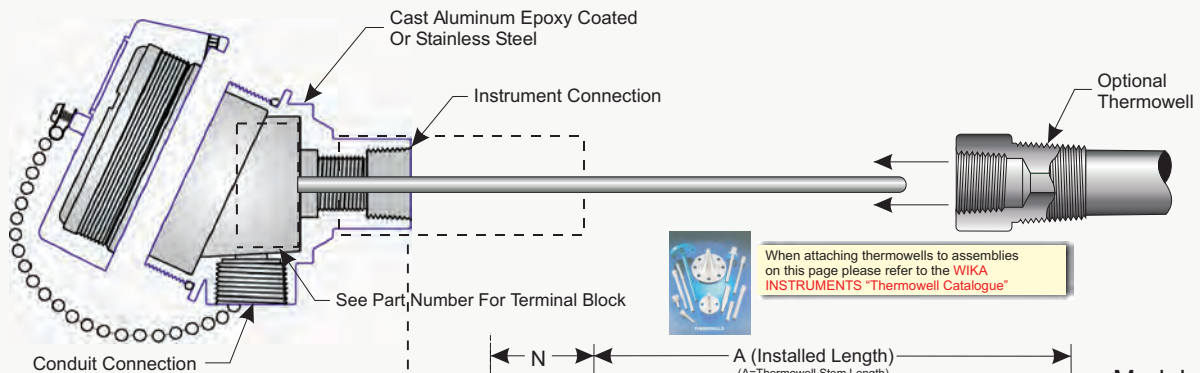
|                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Model</b> - See Page 2-1 for Model Types</p> <p><b>Conduit Connection</b><br/>         1 - 1/2" NPT<br/>         2 - M20 x 1.5<br/>         3 - 3/4" NPT<br/>         O - Other*</p> <p><b>Instrument Connection</b><br/>         1 - 1/2" NPT<br/>         2 - M20 x 1.5 (Model 4 AP1 &amp; 4AP5 Only)<br/>         3 - 3/4" NPT<br/>         O - Other*</p> <p><b>Head Material</b><br/>         1 - Stainless Steel<br/>         3 - Aluminum</p> | <p><b>Terminal Block</b><br/>         2B - Two Pole Crastin<br/>         3B - Three Pole Crastin<br/>         4B - Four Pole Crastin<br/>         6B - Six Pole Crastin<br/>         2C - Two Pole Ceramic<br/>         3C - Three Pole Ceramic<br/>         4C - Four Pole Ceramic<br/>         6C - Six Pole Ceramic</p> <p><b>Circuit</b><br/>         S - Single<br/>         D - Dual (2 or 3 Wire)</p> <p><b>Sensor Diameter</b><br/>         14 - 1/4" (standard)<br/>         06 - 6mm<br/>         O - Other*</p> <p><b>Sensor Material</b><br/>         R - 316 S.S.<br/>         J - Inconel 600 (Required for 'UT' Sensors)<br/>         O - Other*</p> <p><b>"N" Dimension (Inches)</b><br/>         Galvanized Steel (Standard) Add 'SS' for<br/>         Stainless Steel Fittings (ie. 6SS)</p> <p><b>RTD Type</b><br/>         1 - 100 Ohm Pt (1/10 DIN), =0.00385<br/>         2 - 100 Ohm Pt (Class A), =0.00385<br/>         3 - 100 Ohm Pt, =0.00392<br/>         4 - 10 Ohm Cu, =0.00427<br/>         5 - 120 Ohm Ni, =0.00672</p> <p><b>Number of Lead Wires</b><br/>         2, 3, 4A, 4B (See Bottom of Page)</p> <p><b>Temperature Rating</b><br/>         LT - Low Temp. (Max 250°C)<br/>         HT - High Temp.<br/>         (High Vibration Max 600°C)<br/>         UT - Ultra High Temp.<br/>         (High Vibration Max 750°C)<br/>         O - Other*</p> <p><b>"A" Length (Inches)</b></p> | <p><b>Approvals</b><br/>         CSA - 01<br/>         FM - 02<br/>         ATEX - 04<br/>         IEC - 05<br/>         General Purpose - 06<br/>         See Page 2-37 &amp; 2-38 for Hazardous<br/>         Locations General Information</p> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Connection Diagrams



**Sample Order Code: 4AP3 - 4313 - 3B - S - 14 - R - 6 - 2 - 3 - HT - 12 - 01**  
**\* Consult Factory for Non-Standard or Non-Stocked Items**

# 4000 Series Explosion Proof RTD Assemblies



When attaching thermowells to assemblies on this page please refer to the WIKA INSTRUMENTS "Thermowell Catalogue"

## REPLACEMENT SENSOR LENGTH

|     | HT/UT     | LT        |
|-----|-----------|-----------|
| 4AE | A+N+1 7/8 | A+N+2 7/8 |
| 4AF | A+N+1 7/8 | A+N+2 7/8 |
| 4AH | A+1/2     | A+1 1/2   |
| 4AK | A+1/2     | A+1 1/2   |
| 4AR | A+N-1/2   | A+N+1/2   |
| 4AG | A         | A         |
| 4AI | A         | A         |
| 4AM | A+3       | A+3       |



### Certified with a thermowell

Class I Division I Groups BCD  
Class II Division I Groups EFG  
Class III; Encl. Type 4X / IP66



Ex d IIC T6  
Encl. Type 4X / IP66



EEEx d IIC T6  
Encl. Type 4X / IP66



### Certified without a thermowell

Class I Division I Groups BCD  
Class II Division I Groups EFG  
Class III; Encl. Type 4X / IP66



Ex d IIC T6  
Encl. Type 4X / IP66

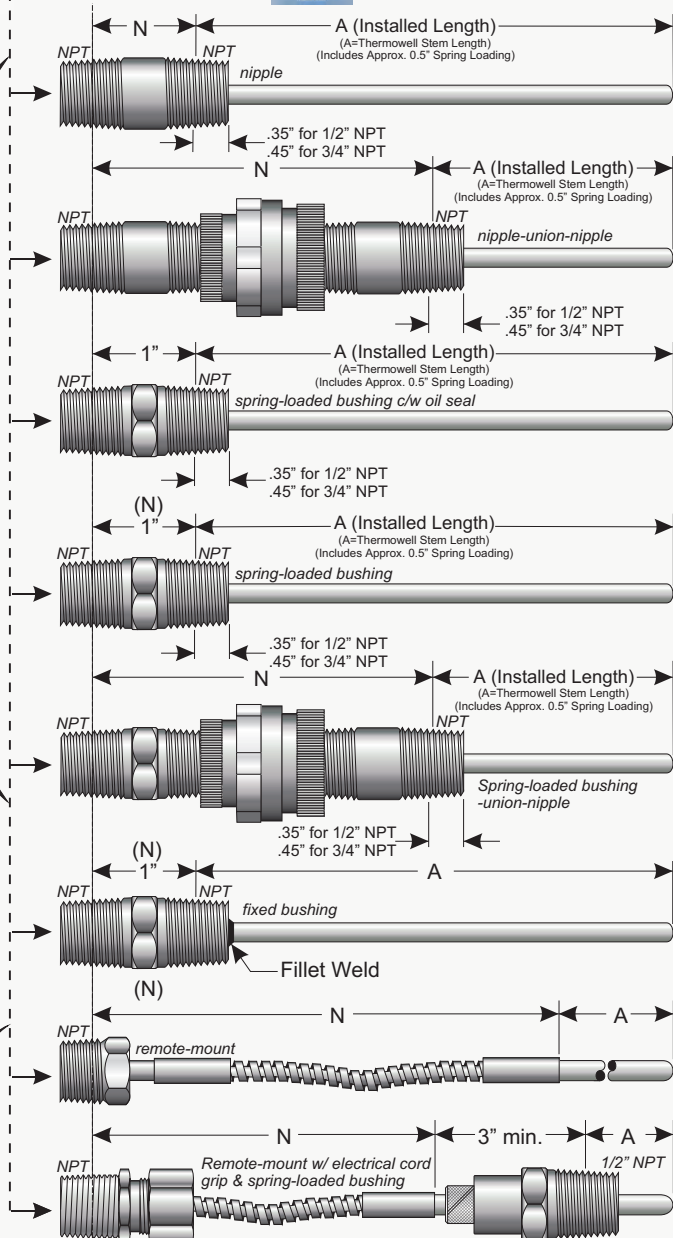


EEEx d IIC T6  
Encl. Type 4X / IP66



### Certified without a thermowell

Class I Division II Groups BCD  
Encl. Type 4X / IP66



Model  
**4AE**

**4AF**

**4AH**

**4AK**

**4AR**

**4AG**

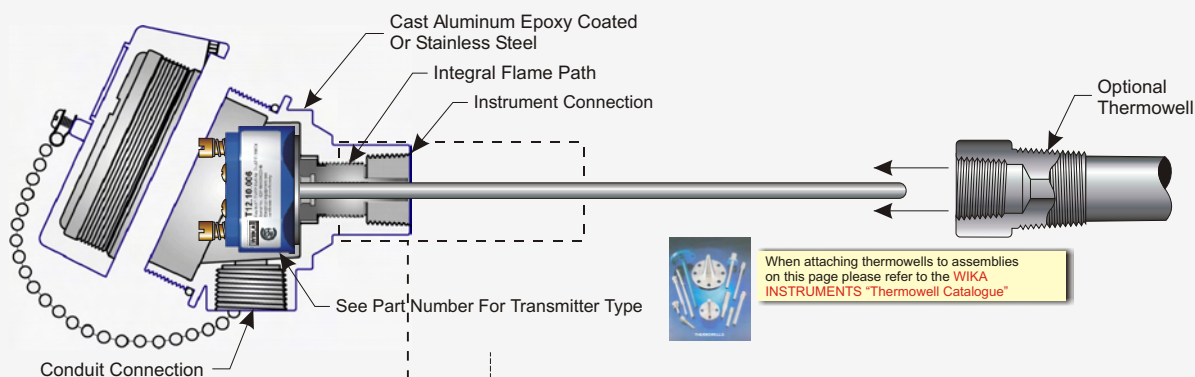
**4AI**

**4AM**





# 4000 Series Explosion Proof RTD Transmitter Assemblies with Integral Flame Path



When attaching thermowells to assemblies on this page please refer to the WIKA INSTRUMENTS "Thermowell Catalogue"

## REPLACEMENT SENSOR LENGTH

|      | HT/UT     | LT        |
|------|-----------|-----------|
| 4RX1 | A+1 7/8   | A+1 7/8   |
| 4RX2 | A+N+1 7/8 | A+N+1 7/8 |
| 4RX3 | A+N+1 7/8 | A+N+1 7/8 |
| 4RX4 | A+N+1 7/8 | A+N+1 7/8 |
| 4RX5 | A+N+1 7/8 | A+N+1 7/8 |



**Certified with or without a thermowell**

Class I Division I Groups BCD  
Class II Division I Groups EFG  
Class III; Encl. Type 4X / IP66



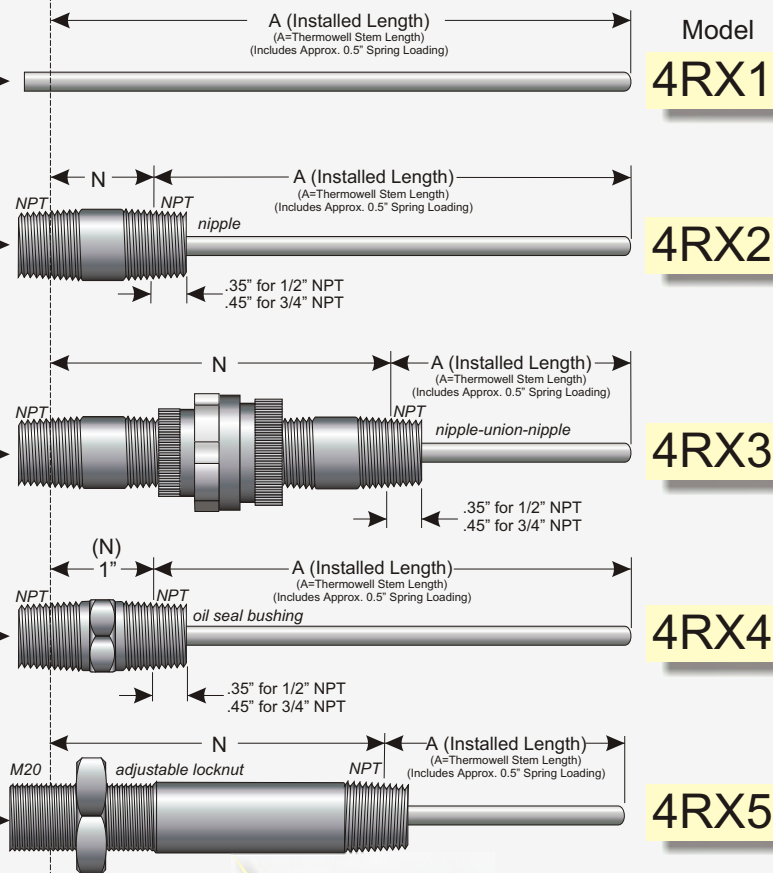
Ex d IIB+H2 T6  
Encl. Type 4X / IP66



EEx d IIB+H2 T6  
Encl. Type 4X / IP66

### Note:

These RTD assemblies are suitable for retrofit or replacement applications where a full assembly certification is required with or without a thermowell.

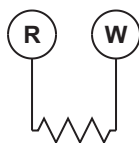


Standard lengths are from 2"-6"  
Special lengths are available

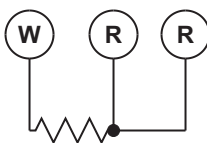


**Model** - See Page 2-5 for Model Types

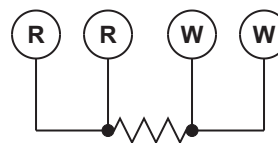
## Connection Diagrams



## 2 Wire



### 3 Wire



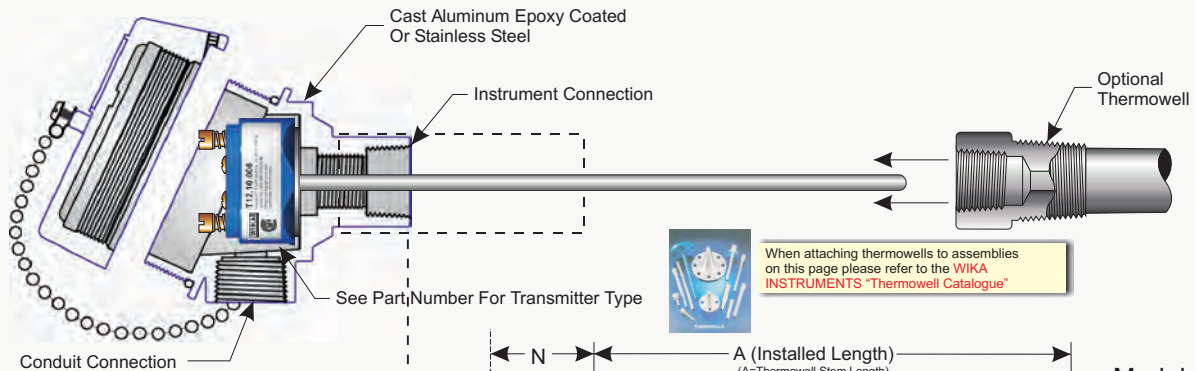
4 Wire

W - White      R - Red (Colour Coded Insulation)

**Sample Order Code: 4RX3 - 4313 - 4 - 0 - 100 - 14 - R - 6 - 2 - 3 - HT - 12 - 01**

**\* Consult Factory for Non-Standard or Non-Stocked Items**

# 4000 Series Explosion Proof RTD Transmitter Assemblies



## REPLACEMENT SENSOR LENGTH

|      | HT/UT     | LT        |
|------|-----------|-----------|
| 4RXE | A+N+1 7/8 | A+N+1 7/8 |
| 4RXF | A+N+1 7/8 | A+N+1 7/8 |
| 4RXH | A+1/2     | A+1 1/2   |
| 4RXK | A+1/2     | A+1 1/2   |
| 4RXR | A+N-1/2   | A+N+1/2   |
| 4RXG | A         | A         |
| 4RXI | A         | A         |
| 4RXM | A+3       | A+3       |



### Certified with a thermowell

Class I Division I Groups BCD  
Class II Division I Groups EFG  
Class III; Encl. Type 4X / IP66



Ex d IIC T6  
Encl. Type 4X / IP66



EEEx d IIC T6  
Encl. Type 4X / IP66



### Certified without a thermowell

Class I Division I Groups BCD  
Class II Division I Groups EFG  
Class III; Encl. Type 4X / IP66



Ex d IIC T6  
Encl. Type 4X / IP66

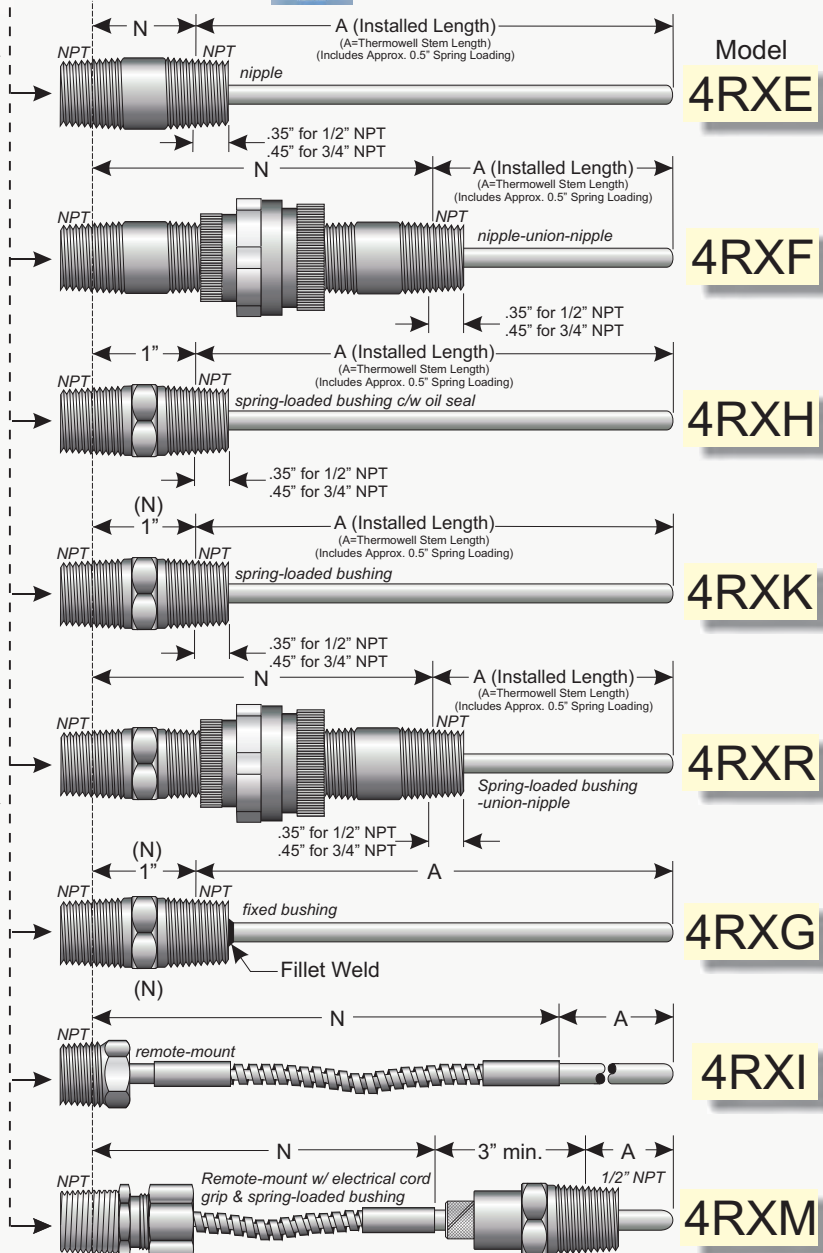


EEEx d IIC T6  
Encl. Type 4X / IP66



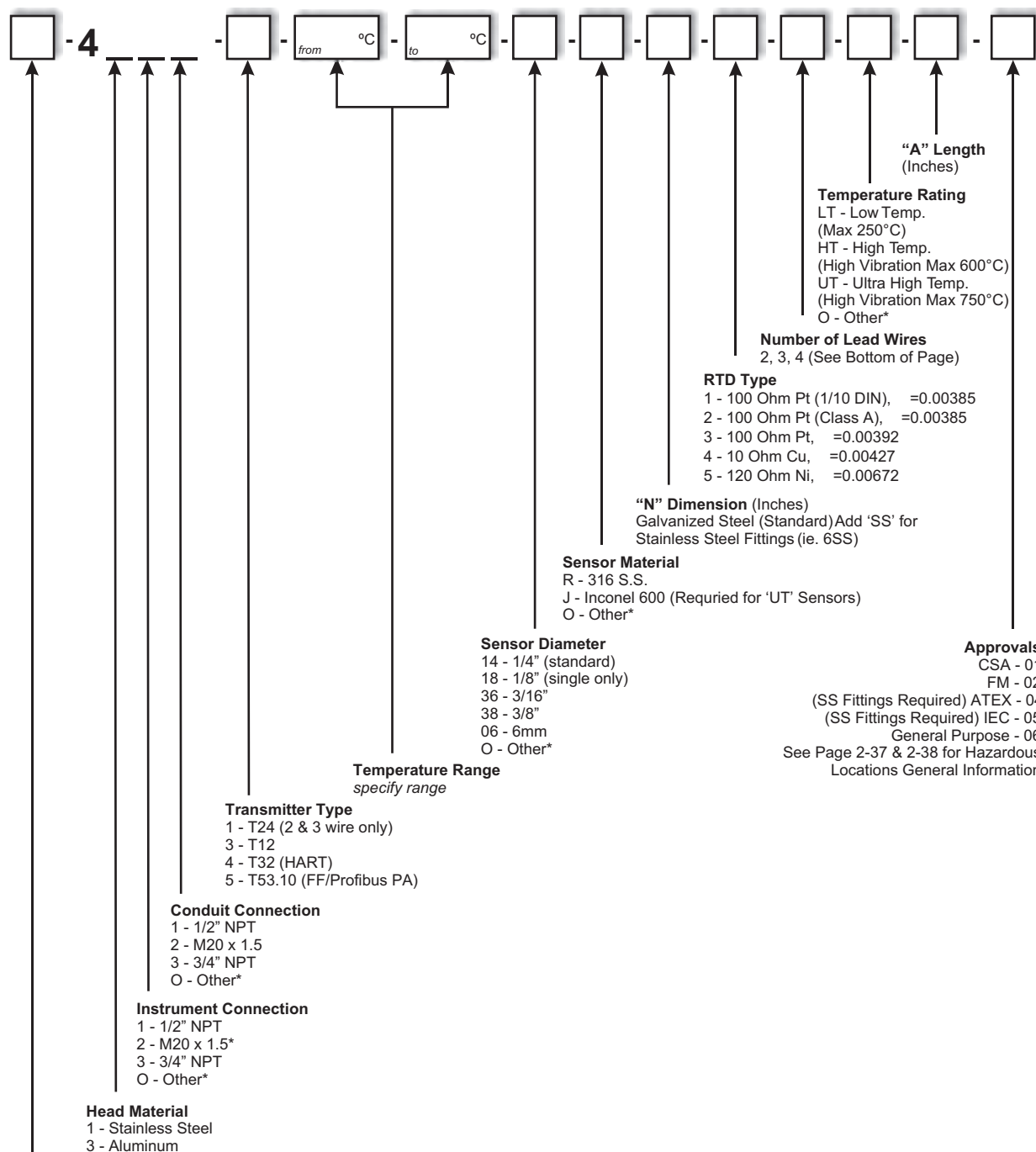
### Certified without a thermowell

Class I Division II Groups BCD  
Encl. Type 4X / IP66



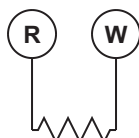


# 4000 Series Explosion Proof RTD Transmitter Assemblies



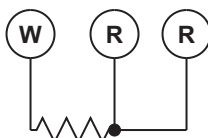
Model - See Page 2-7 for Model Types

## Connection Diagrams

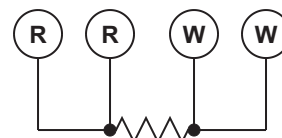


2 Wire

W - White R - Red (Colour Coded Insulation)



3 Wire

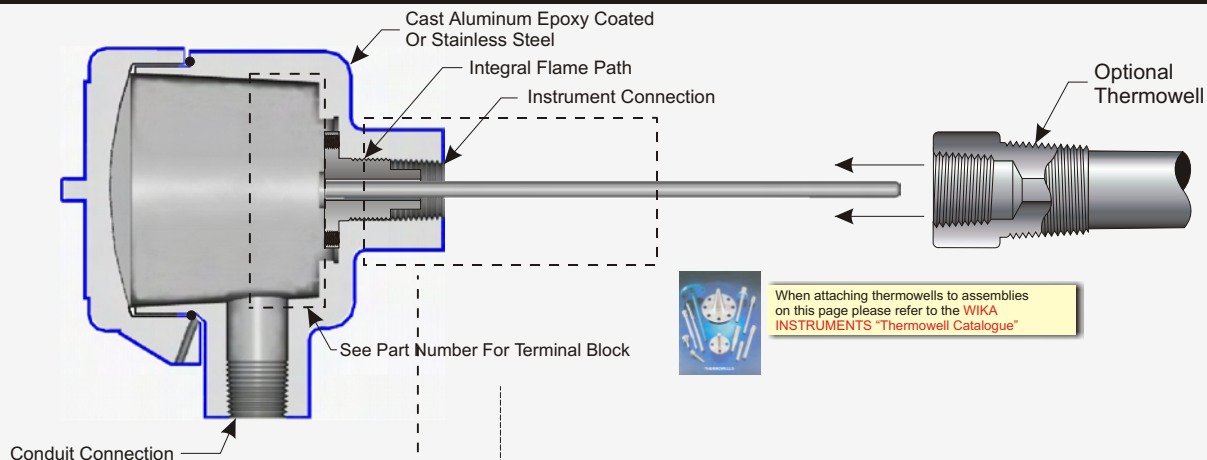


4 Wire

**Sample Order Code: 4RXF - 4313 - 4 - 0 - 100 - 14 - R - 6 - 2 - 3 - HT - 12 - 01**

**\* Consult Factory for Non-Standard or Non-Stocked Items**

# 7000 Series Explosion Proof RTD Assemblies with Integral Flame Path



When attaching thermowells to assemblies on this page please refer to the WIKA INSTRUMENTS "Thermowell Catalogue"



**Certified with or without a thermowell**

Class I Division I Groups BCD  
Class II Division I Groups EFG  
Class III; Encl. Type 4X / IP66



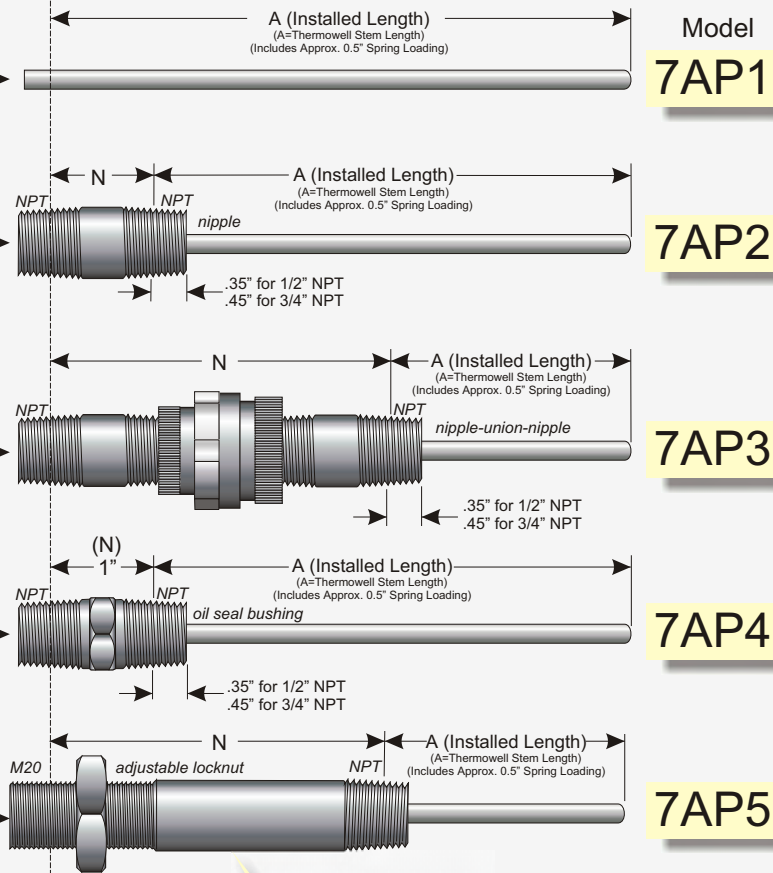
Ex d IIB+H2 T6  
Encl. Type 4X / IP66



Ex d IIB+H2 T6  
Encl. Type 4X / IP66

**Note:**

These RTD assemblies are suitable for retrofit or replacement applications where a full assembly certification is required with or without a thermowell.



Standard lengths are from 2"-6"  
Special lengths are available

**REPLACEMENT SENSOR LENGTH  
CRASTIN TERMINAL BLOCK**

|      | HT/UT     | LT        |
|------|-----------|-----------|
| 7AP1 | A+2 3/8   | A+3 3/8   |
| 7AP2 | A+N+2 3/8 | A+N+3 3/8 |
| 7AP3 | A+N+2 3/8 | A+N+3 3/8 |
| 7AP4 | A+N+2 3/8 | A+N+3 3/8 |
| 7AP5 | A+N+2 3/8 | A+N+3 3/8 |

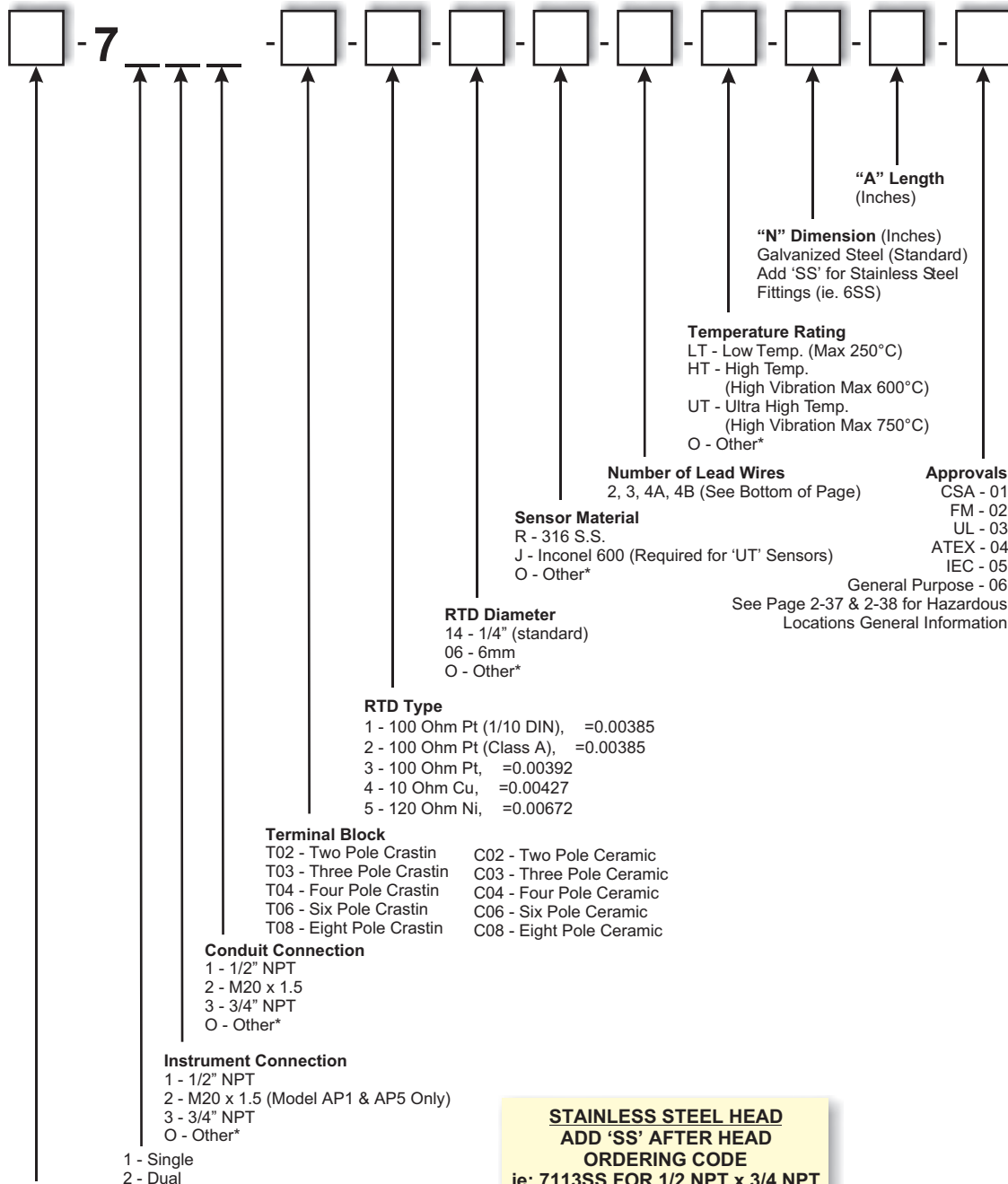
**REPLACEMENT SENSOR LENGTH  
CERAMIC TERMINAL BLOCK**

|      | HT/UT     | LT        |
|------|-----------|-----------|
| 7AP1 | A+1 7/8   | A+1 7/8   |
| 7AP2 | A+N+1 7/8 | A+N+1 7/8 |
| 7AP3 | A+N+1 7/8 | A+N+1 7/8 |
| 7AP4 | A+N+1 7/8 | A+N+1 7/8 |
| 7AP5 | A+N+1 7/8 | A+N+1 7/8 |



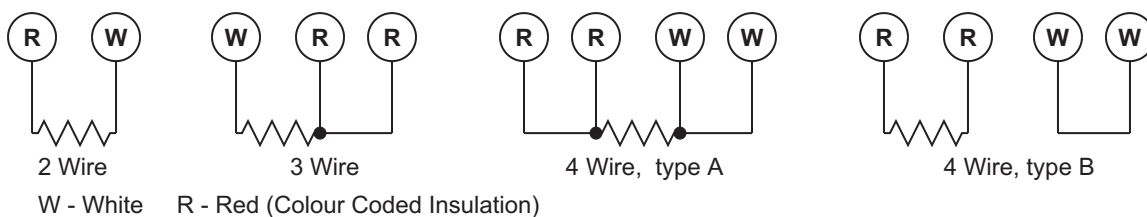


# 7000 Series Explosion Proof RTD Assemblies with Integral Flame Path



Model - See Page 2-9 for Model Types

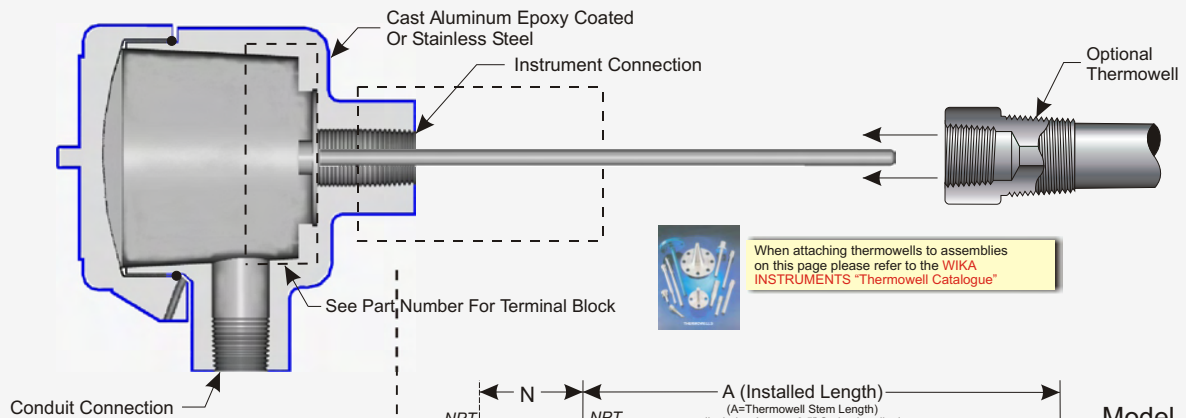
## Connection Diagrams



Sample Order Code: AP3 - 7113 - T03 - 2 - 14 - R - 3 - HT - 6 - 12 - 01  
\* Consult Factory for Non-Standard or Non-Stocked Items

2-10

# 7000 Series Explosion Proof RTD Assemblies



## REPLACEMENT SENSOR LENGTH

|     | HT/UT     | LT        |
|-----|-----------|-----------|
| 7AE | A+N+1 7/8 | A+N+2 7/8 |
| 7AF | A+N+1 7/8 | A+N+2 7/8 |
| 7AH | A+N-1/2   | A+N+1/2   |
| 7AK | A+N-1/2   | A+N+1/2   |
| 7AR | A+N-1/2   | A+N+1/2   |
| 7AG | A         | A         |
| 7AI | A         | A         |
| 7AM | A+3       | A+3       |



### Certified with a thermowell

Class I Division I Groups BCD  
Class II Division I Groups EFG  
Class III; Encl. Type 4X / IP66



Ex d IIC T6  
Encl. Type 4X / IP66



EEx d IIC T6  
Encl. Type 4X / IP66



### Certified without a thermowell

Class I Division I Groups BCD  
Class II Division I Groups EFG  
Class III; Encl. Type 4X / IP66



Ex d IIC T6  
Encl. Type 4X / IP66

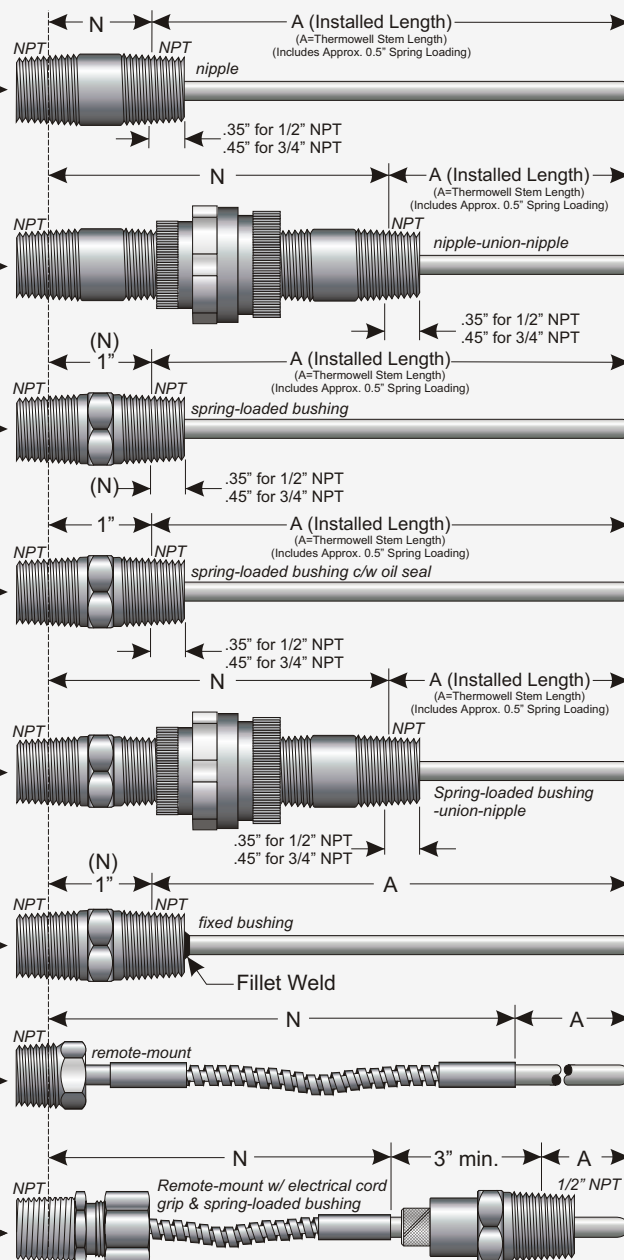


EEx d IIC T6  
Encl. Type 4X / IP66



### Certified without a thermowell

Class I Division II Groups BCD  
Encl. Type 4X / IP66



Model  
**7AE**

**7AF**

**7AK**

**7AH**

**7AR**

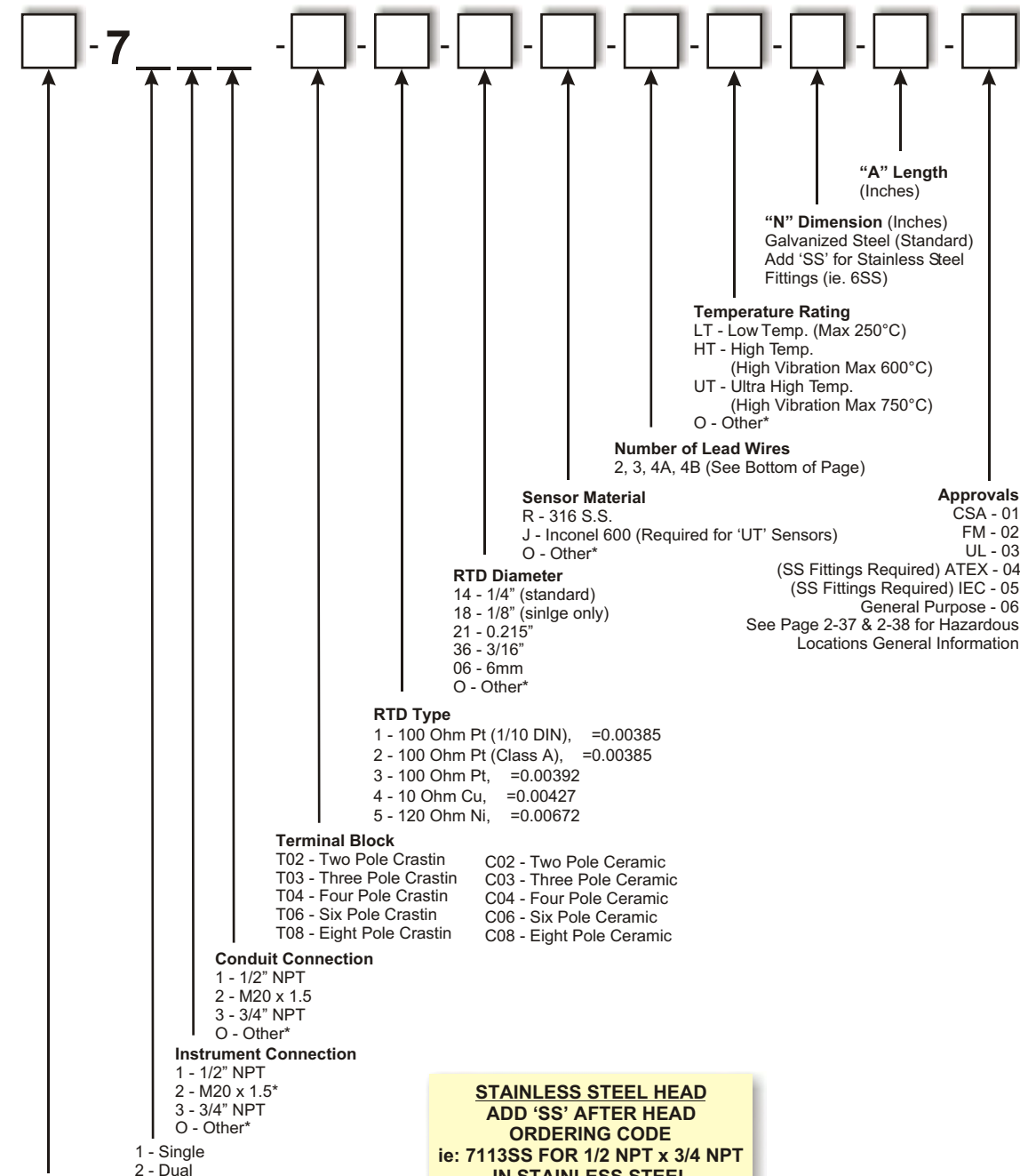
**7AG**

**7AI**

**7AM**

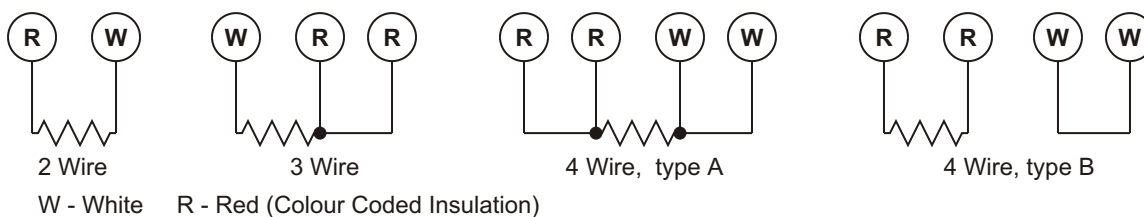


# 7000 Series Explosion Proof RTD Assemblies



Model - See Page 2-11 for Model Types

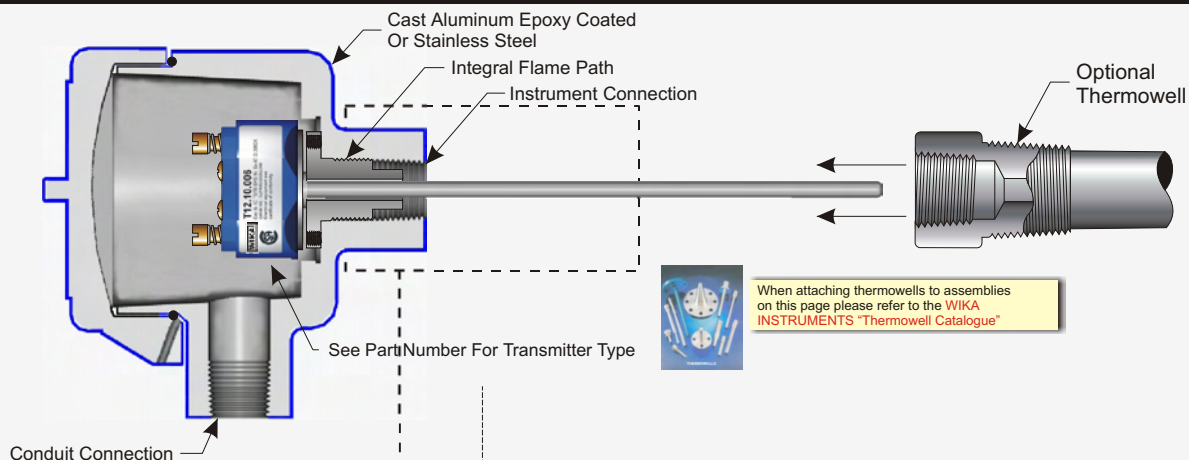
## Connection Diagrams



Sample Order Code: 7AF - 7113 - T03 - 2 - 14 - R - 3 - HT - 6 - 12 - 01

\* Consult Factory for Non-Standard or Non-Stocked Items

# 7000 Series Explosion Proof RTD Transmitter Assemblies with Integral Flame Path



## REPLACEMENT SENSOR LENGTH

|      | HT/UT     | LT        |
|------|-----------|-----------|
| 7TX1 | A+1 7/8   | A+1 7/8   |
| 7TX2 | A+N+1 7/8 | A+N+1 7/8 |
| 7TX3 | A+N+1 7/8 | A+N+1 7/8 |
| 7TX4 | A+N+1 7/8 | A+N+1 7/8 |
| 7TX5 | A+N+1 7/8 | A+N+1 7/8 |



**Certified with or without a thermowell**

Class I Division I Groups BCD  
Class II Division I Groups EFG  
Class III; Encl. Type 4X / IP66



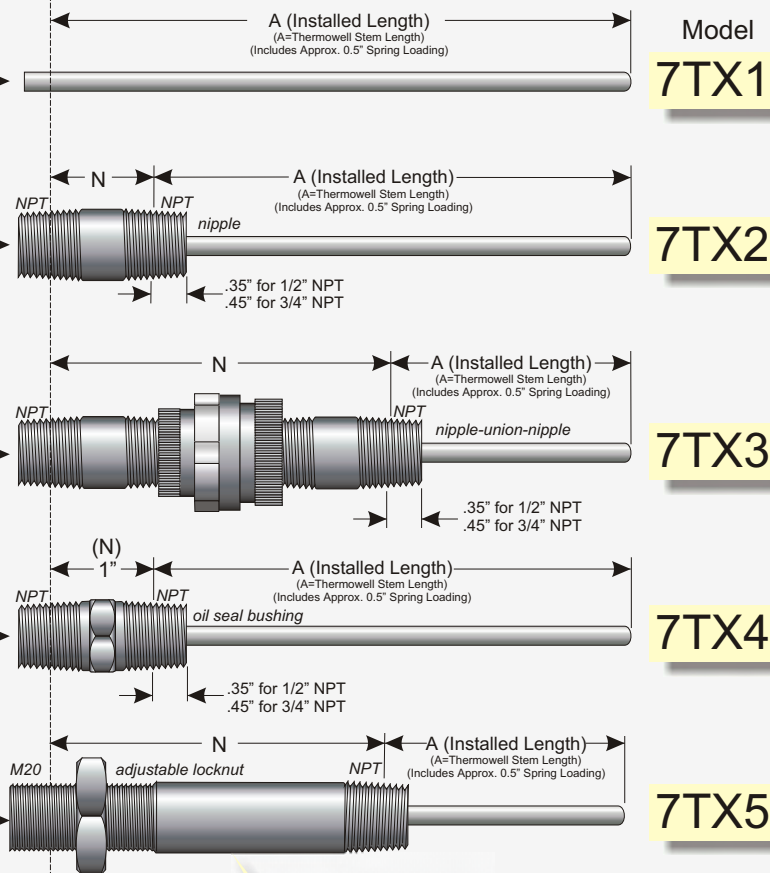
Ex d IIB+H2 T6  
Encl. Type 4X / IP66



EEx d IIB+H2 T6  
Encl. Type 4X / IP66

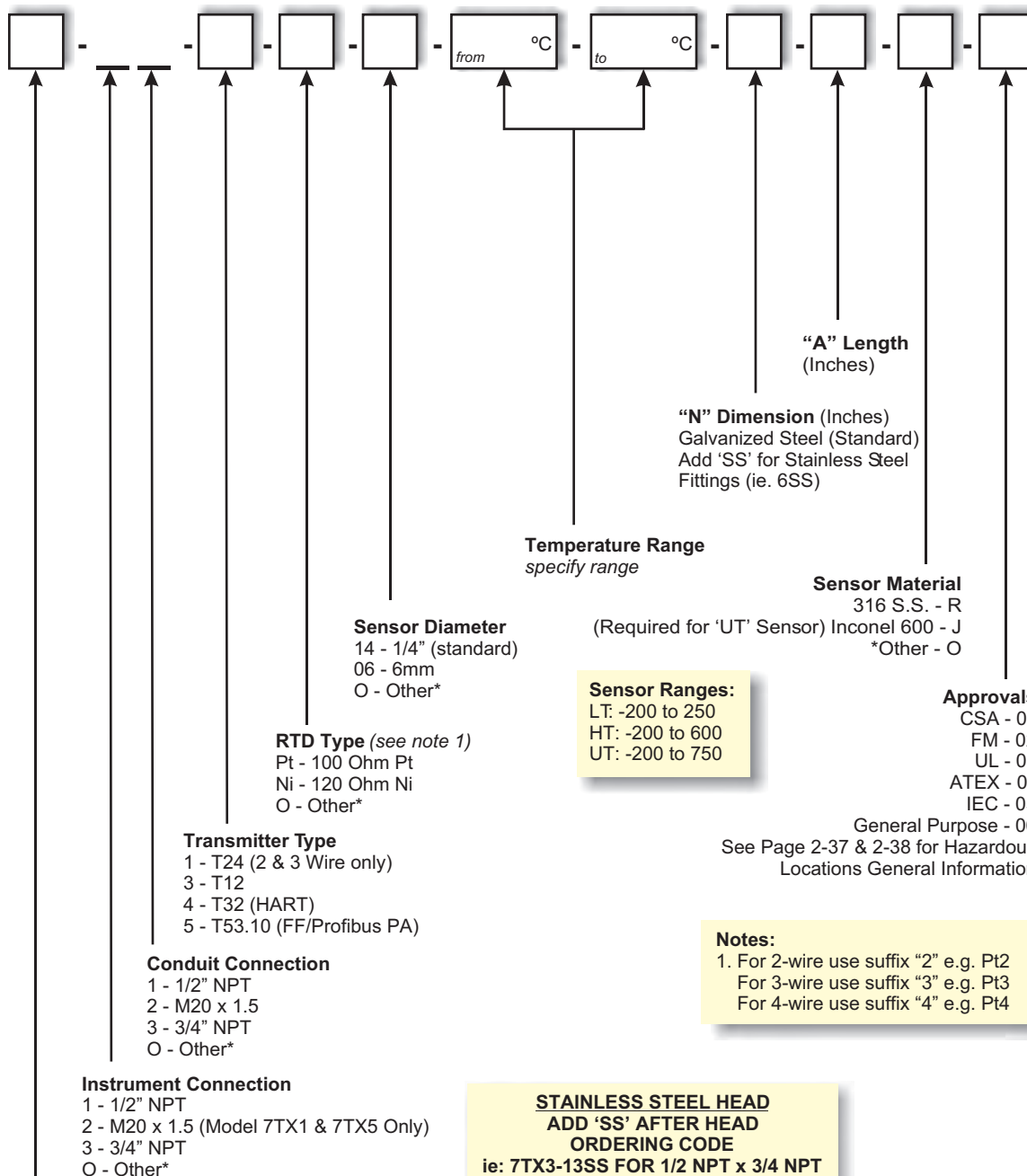
### Note:

These RTD assemblies are suitable for retrofit or replacement applications where a full assembly certification is required with or without a thermowell.



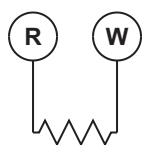


# 7000 Series Explosion Proof RTD Transmitter Assemblies with Integral Flame Path

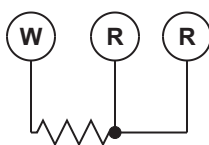


Model - See Page 2-13 for Model Types

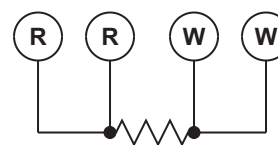
## Connection Diagrams



2 Wire



3 Wire



4 Wire

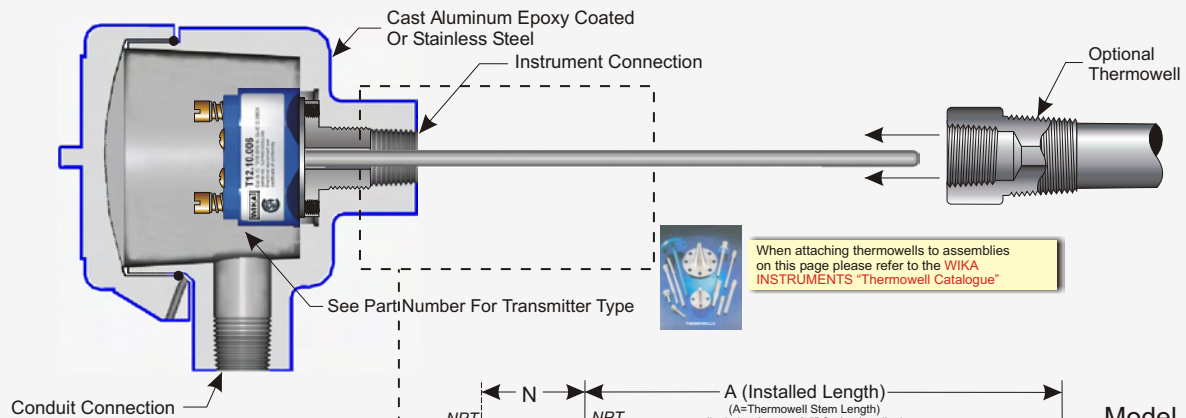
W - White R - Red (Colour Coded Insulation)

**Sample Order Code: 7TX3 - 13 - 4 - Pt3 - 14 - 0 - 100 - 6 - 12 - R - 01**

**\* Consult Factory for Non-Standard or Non-Stocked Items**



# 7000 Series Explosion Proof RTD Transmitter Assemblies



## REPLACEMENT SENSOR LENGTH

|      | HT/UT     | LT        |
|------|-----------|-----------|
| 7TXE | A+N+1 7/8 | A+N+1 7/8 |
| 7TXF | A+N+1 7/8 | A+N+1 7/8 |
| 7TXK | A+N-1/2   | A+N+1/2   |
| 7TXH | A+N-1/2   | A+N+1/2   |
| 7TXR | A+N-1/2   | A+N+1/2   |
| 7TXG | A         | A         |
| 7TXI | A         | A         |
| 7TXM | A+3       | A+3       |



### Certified with a thermowell

Class I Division I Groups BCD  
Class II Division I Groups EFG  
Class III; Encl. Type 4X / IP66



Ex d IIC T6  
Encl. Type 4X / IP66



EEx d IIC T6  
Encl. Type 4X / IP66



### Certified without a thermowell

Class I Division I Groups BCD  
Class II Division I Groups EFG  
Class III; Encl. Type 4X / IP66



Ex d IIC T6  
Encl. Type 4X / IP66

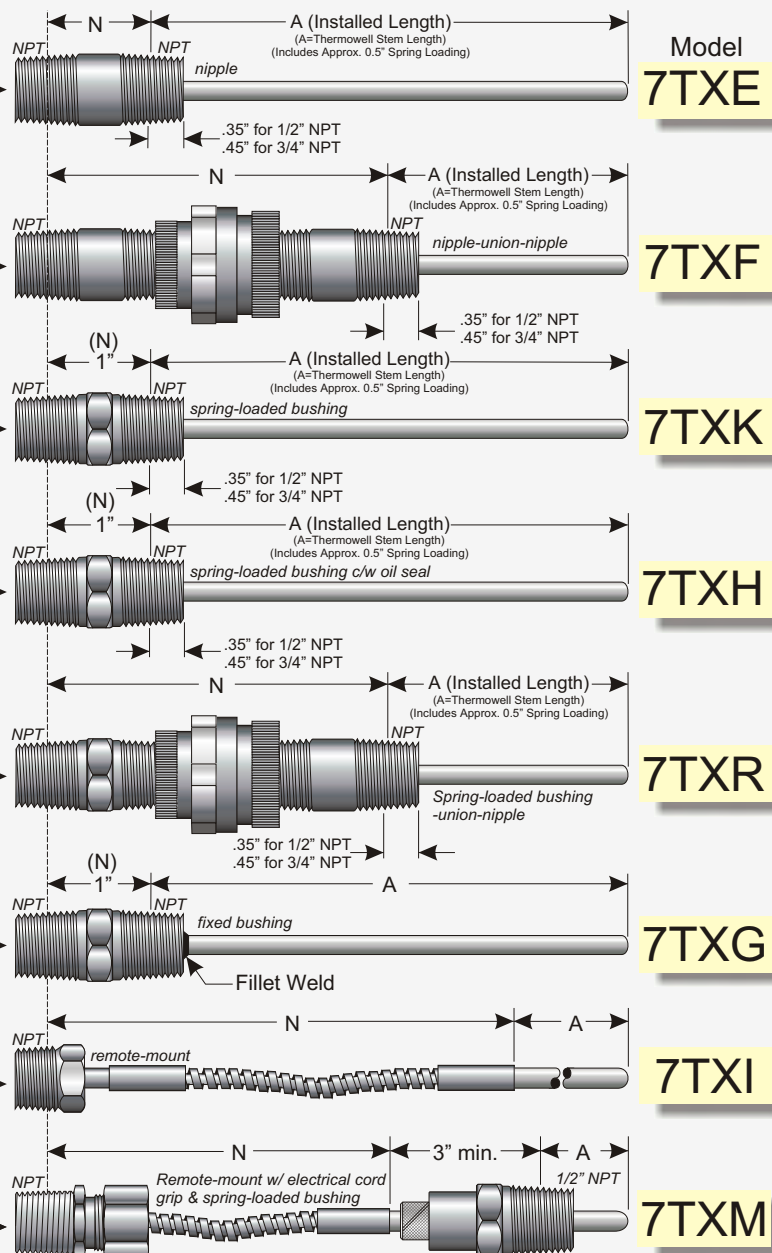


EEx d IIC T6  
Encl. Type 4X / IP66



### Certified without a thermowell

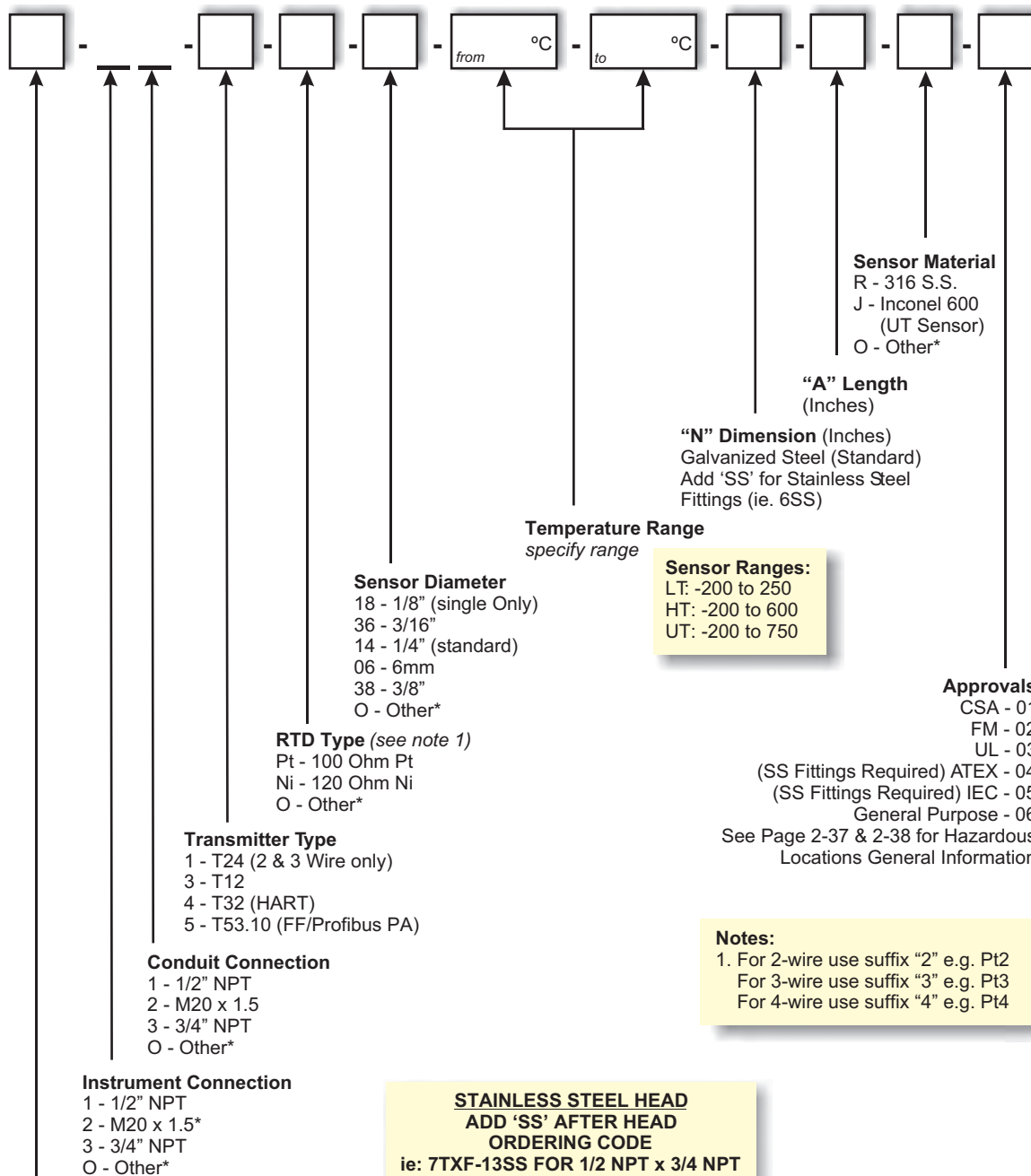
Class I Division II Groups BCD  
Encl. Type 4X / IP66



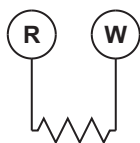
Refer to Page 2-16 for Complete Assembly Ordering Schedule  
Refer to Page 2-23 & 2-24 for Replacement Sensors



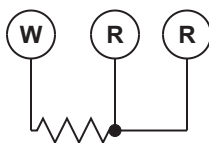
# 7000 Series Explosion Proof RTD Transmitter Assemblies



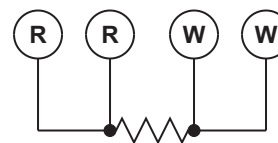
## Connection Diagrams



2 Wire



3 Wire



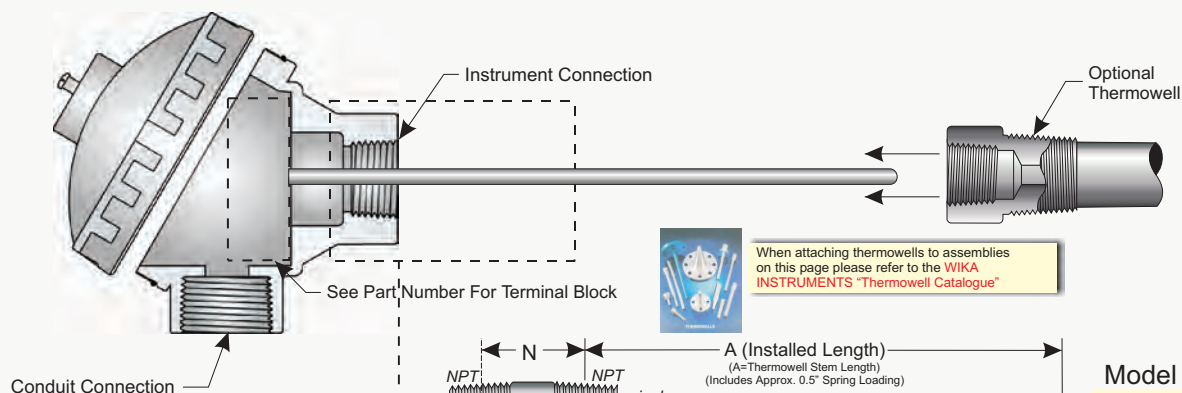
4 Wire

W - White R - Red (Colour Coded Insulation)

**Sample Order Code: 7TXF - 13 - 4 - Pt3 - 14 - 0 - 100 - 6 - 12 - R - 01**

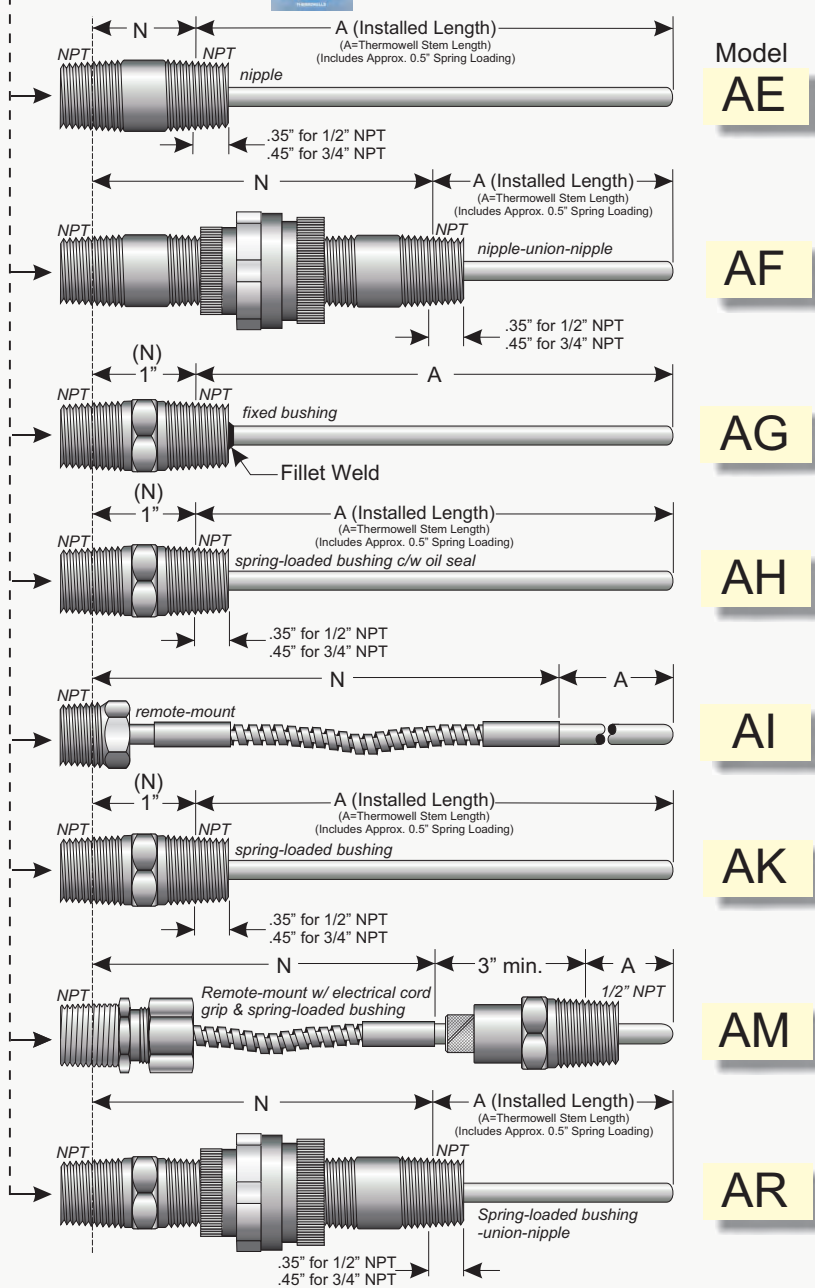
**\* Consult Factory for Non-Standard or Non-Stocked Items**

# General Purpose RTD Assemblies



## REPLACEMENT SENSOR LENGTH

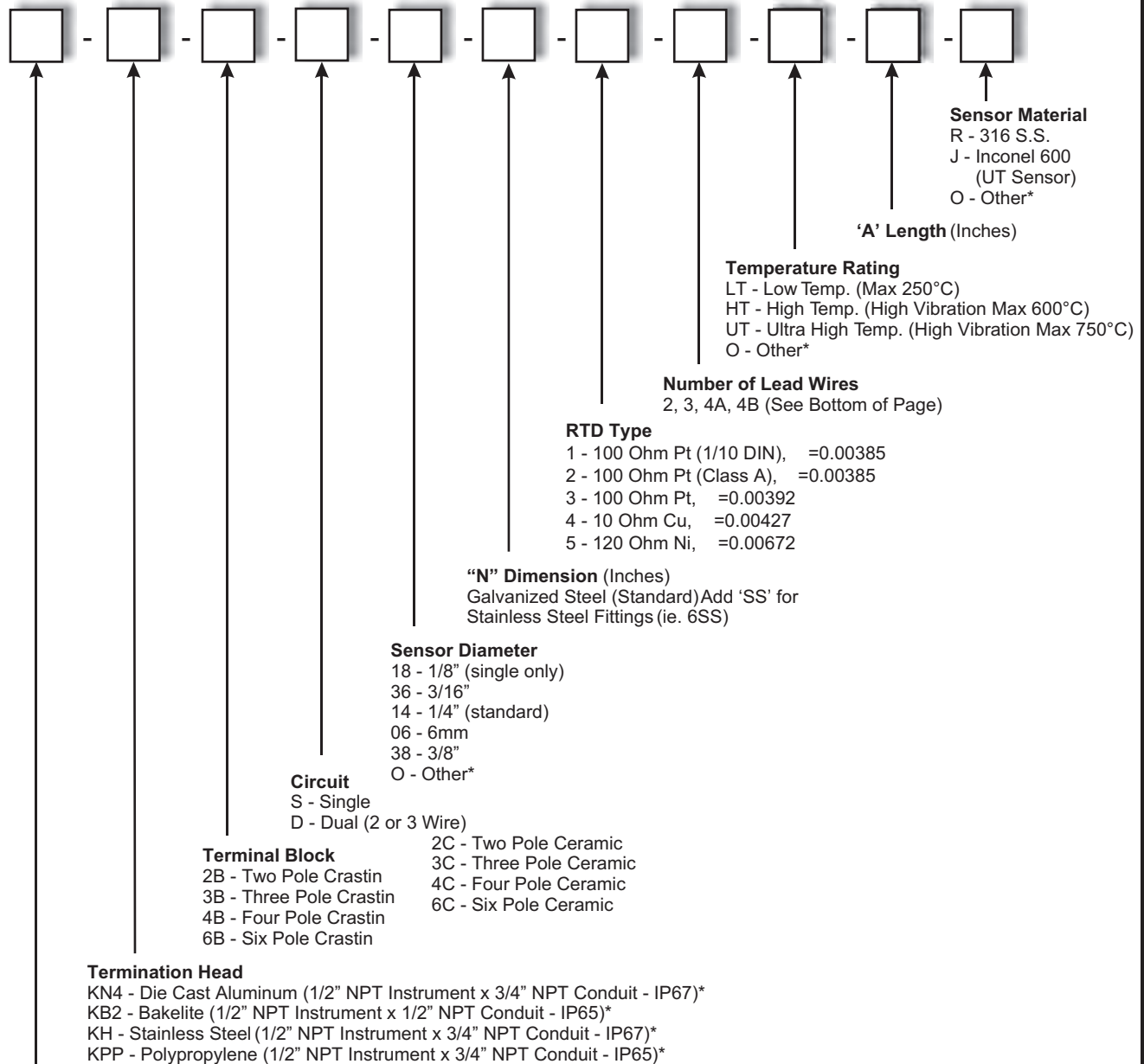
|    | HT/UT     | LT        |
|----|-----------|-----------|
| AE | A+N+1 1/4 | A+N+2 1/4 |
| AF | A+N+1 1/4 | A+N+2 1/4 |
| AG | A         | A         |
| AH | A+N-1/2   | A+N+1/2   |
| AI | A         | A         |
| AK | A+N-1/2   | A+N+1/2   |
| AM | A+3       | A+3       |
| AR | A+N-1/2   | A+N+1/2   |



Refer to Page 2-18 for Complete Assembly Ordering Schedule  
Refer to Page 2-23 & 2-24 for Replacement Sensors

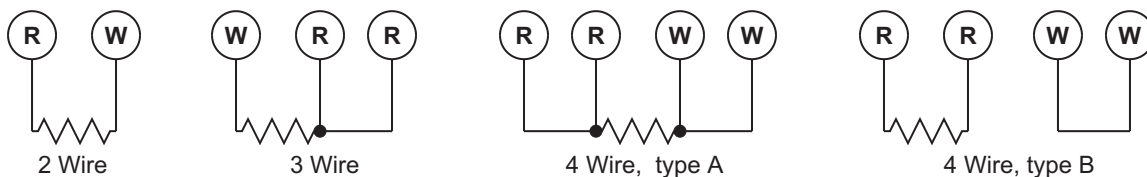


# General Purpose RTD Assemblies



**Model** - See Page 2-17 for Model Types

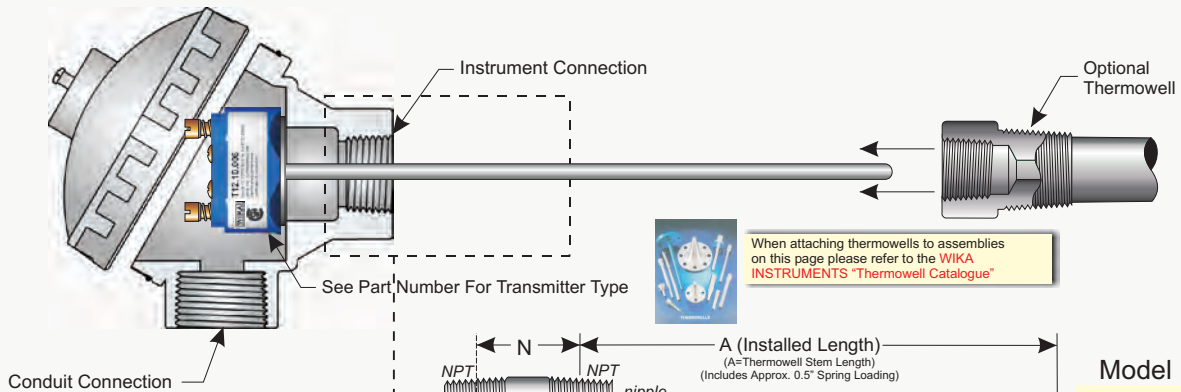
## Connection Diagrams



W - White R - Red (Colour Coded Insulation)

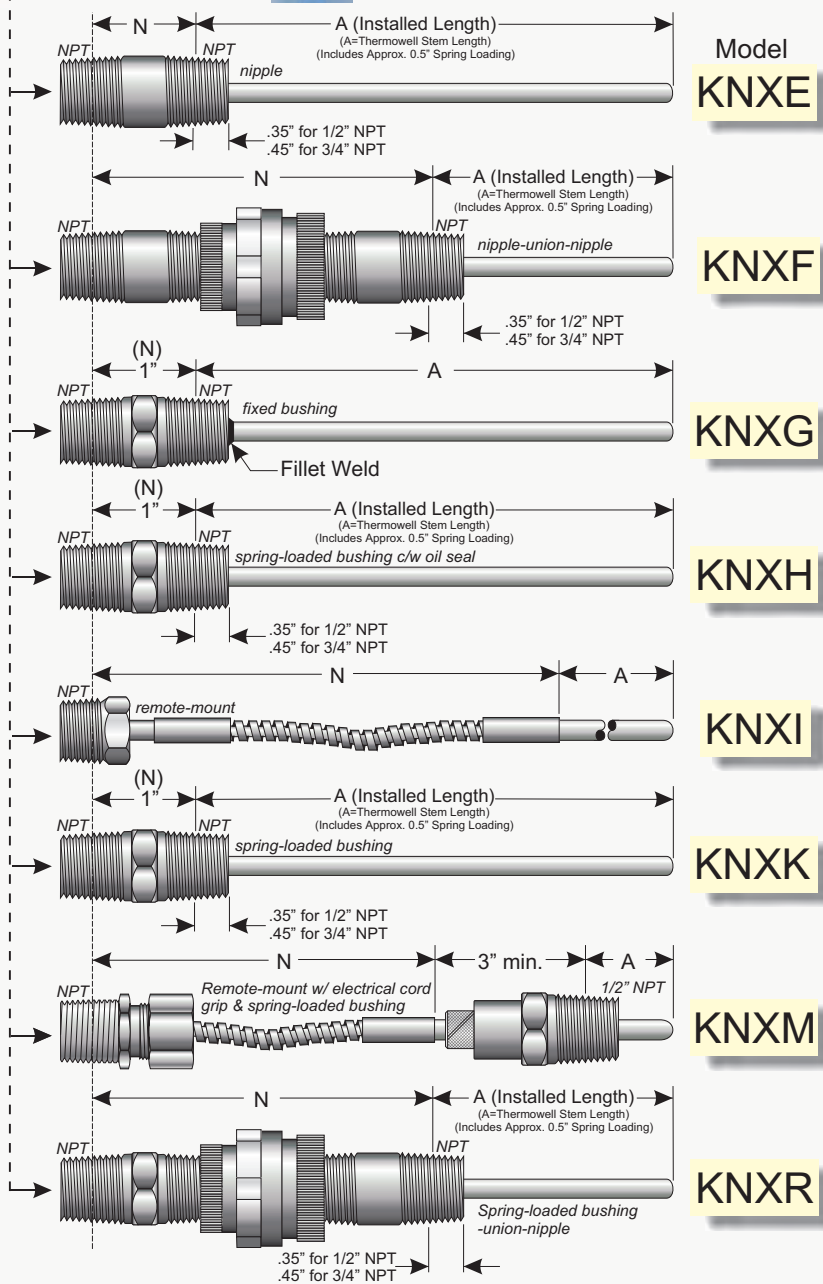
**Sample Order Code: AF - KN4 - 3B - S - 14 - 6 - 2 - 3 - HT - 12**  
\* Consult Factory for Non-Standard or Non-Stocked Items

# General Purpose RTD Transmitter Assemblies



## REPLACEMENT SENSOR LENGTH

|      | HT/UT     | LT        |
|------|-----------|-----------|
| KNXE | A+N+1 1/2 | A+N+1 1/2 |
| KNXF | A+N+1 1/2 | A+N+1 1/2 |
| KNXG | A         | A         |
| KNXH | A+N-1/2   | A+N+1/2   |
| KNXI | A         | A         |
| KNXK | A+N-1/2   | A+N+1/2   |
| KNXM | A+3       | A+3       |
| KNXR | A         | A         |

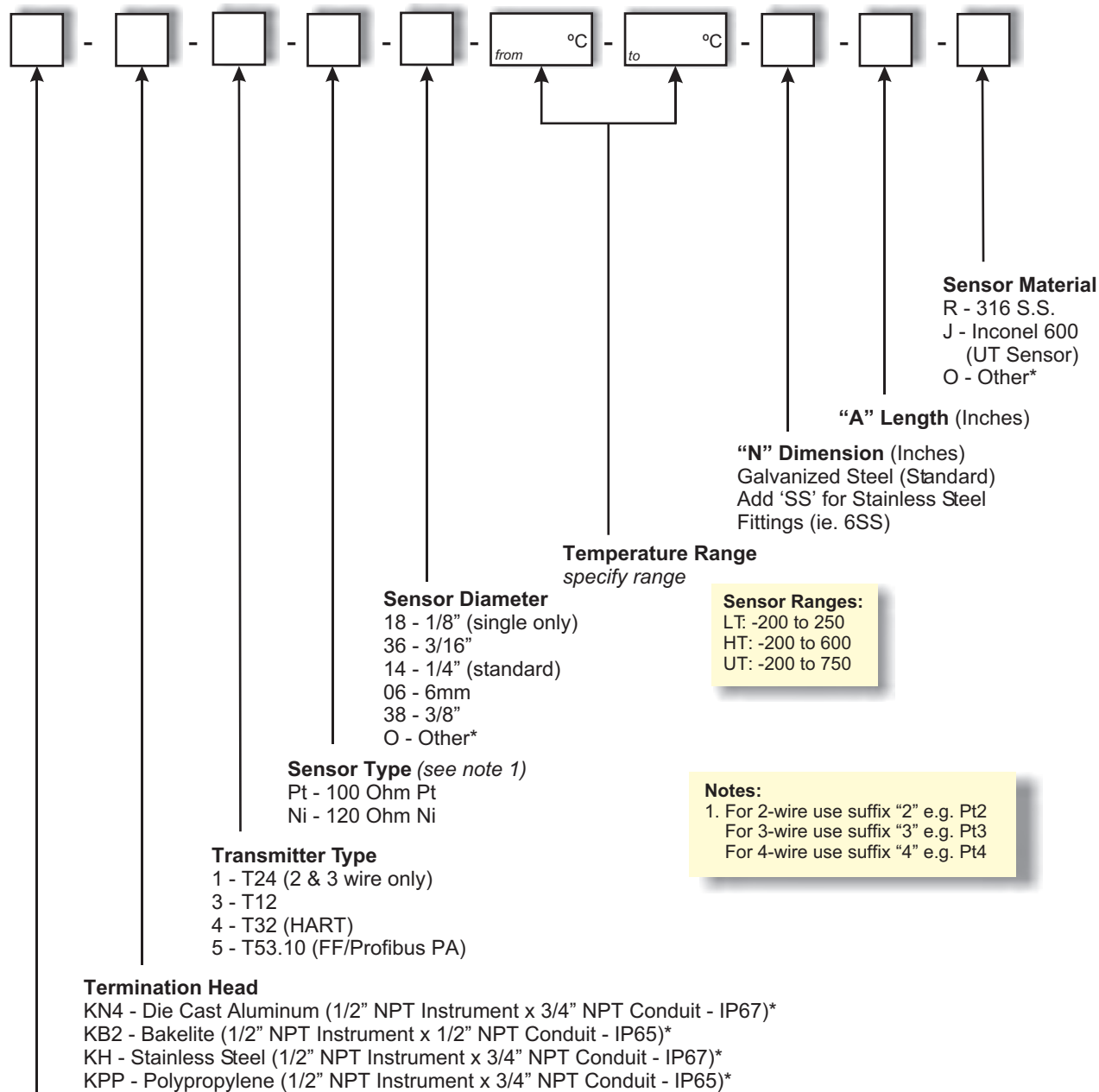


Refer to Page 2-20 for Complete Assembly Ordering Schedule  
Refer to Page 2-23 & 2-24 for Replacement Sensors



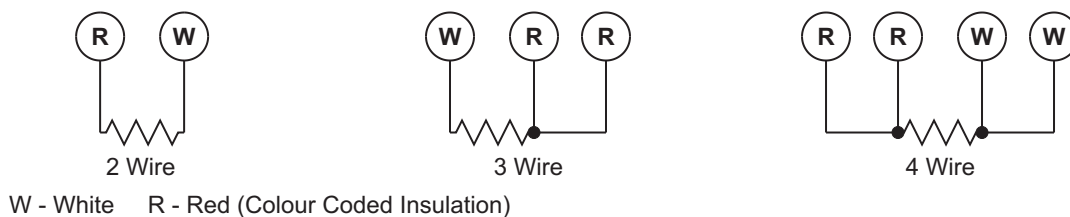


# General Purpose RTD Transmitter Assemblies



**Model** - See Page 2-19 for Model Types

## Connection Diagrams



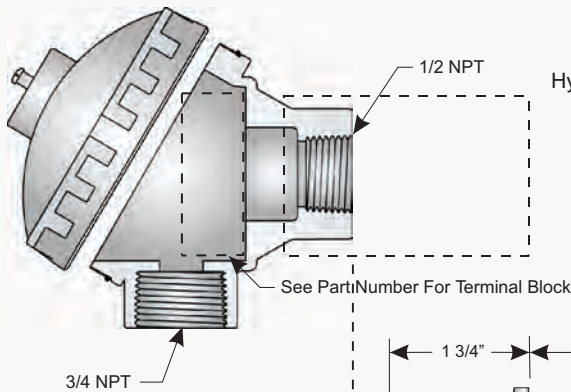
**Sample Order Code:** KNXF - KN4 - 4 - Pt3 - 14 - 0 - 100 - 6 - 12 - R  
 \* Consult Factory for Non-Standard or Non-Stocked Items

# Hygienic (Sanitary) RTD Assemblies



**\*Hygienic Assemblies are primarily used in the Dairy, Food, Beverage, Chemical and Pharmaceutical Industries\***

Hygienic Assemblies meet **USDA** and **3A** sanitary standard 74-03. Standard Finish 16-22 RA on all wetted parts.

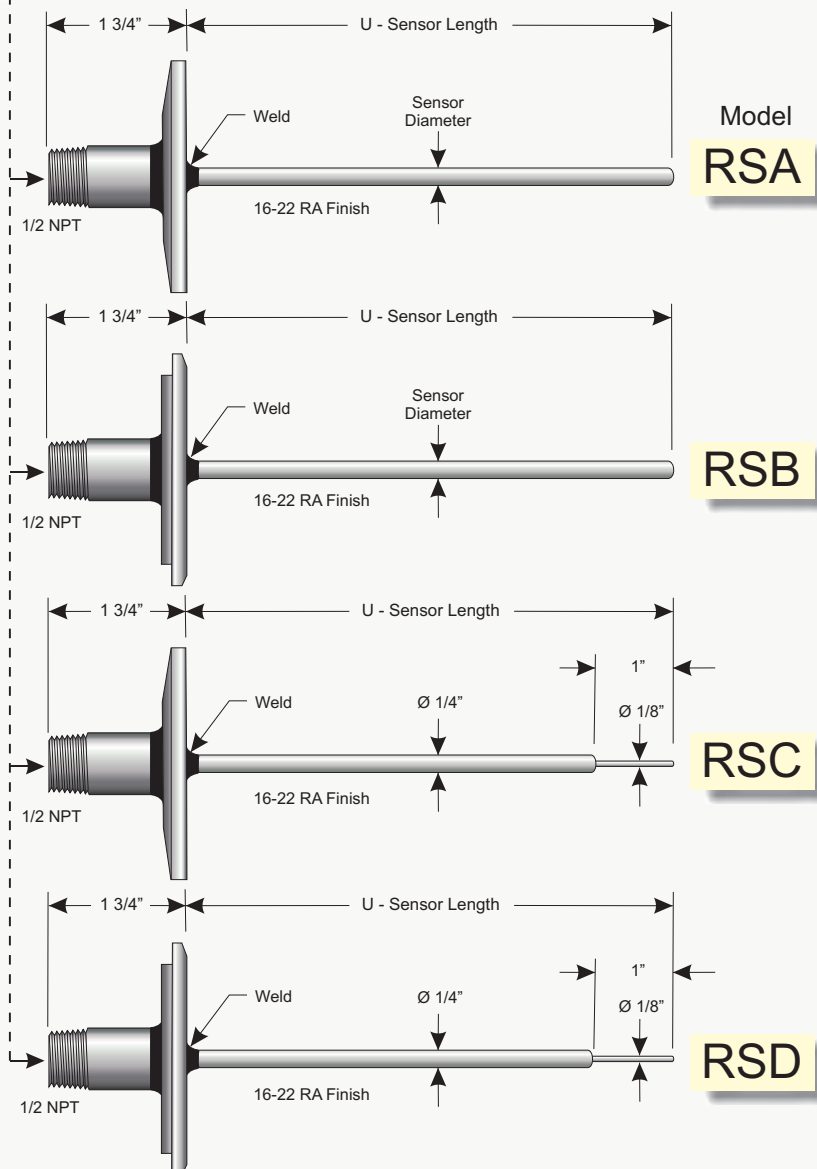


**Hygienic Tri-Clamp Flanged RTD Assembly**

**Hygienic Bevel Seat Flanged RTD Assembly**

**Hygienic Tri-Clamp Flanged RTD Assembly With Reduced Tip**

**Hygienic Bevel Seat Flanged RTD Assembly With Reduced Tip**



Refer to Page 2-22 for Complete Assembly Ordering Schedule



# Hygienic (Sanitary) RTD Assemblies



**Flange Material**  
P/PL - 304 S.S.  
R/RL - 316 S.S.  
Other - Refer to table 2.0  
on page 3-29 in Thermowell  
section for other materials.

**Flange Size**  
10 - 1"  
15 - 1-1/2"  
20 - 2"  
25 - 2-1/2"  
30 - 3"

**Temperature Rating**  
LT - Low Temp. (Max 250°C)  
HT - High Temp. (High Vibration Max 600°C)  
UT - Ultra High Temp. (High Vibration Max 750°C)  
O - Other\*

**Number of Lead Wires**  
2, 3, 4A, 4B (See Bottom of Page)

**Sheath Material**  
P - 304 S.S.  
R - 316 S.S.  
L - Monel  
J - Inconel 600 (Required for 'UT' Sensor)  
H - Hastelloy C276

**RTD Type**  
1 - 100 Ohm Pt (1/10 DIN),  $\pm 0.00385$   
2 - 100 Ohm Pt (Class A),  $\pm 0.00385$   
3 - 100 Ohm Pt,  $\pm 0.00392$   
4 - 10 Ohm Cu,  $\pm 0.00427$   
5 - 120 Ohm Ni,  $\pm 0.00672$

**U - Sensor Length (Inches)**

**Sensor Diameter**  
14 - 1/4"  
18 - 1/8" (single only)  
36 - 3/16"  
48 - 1/4" x 1/8" (RSC & RSD Models Only)  
06 - 6 mm

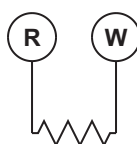
**Circuit**  
S - Single  
D - Dual (2 or 3 Wire)

**Terminal Block**  
2B - Two Pole Crastin      2C - Two Pole Ceramic  
3B - Three Pole Crastin    3C - Three Pole Ceramic  
4B - Four Pole Crastin      4C - Four Pole Ceramic  
6B - Six Pole Crastin        6C - Six Pole Ceramic

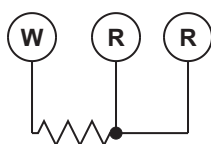
**Termination Head**  
KPP - Polypropylene (1/2" NPT Instrument x 3/4" NPT Conduit Only - IP65)\*  
KN4 - Die Cast Aluminum (1/2" NPT Instrument x 3/4" NPT Conduit Only - IP67)\*  
KH - Stainless Steel (1/2" NPT Instrument x 3/4" NPT Conduit Only - IP67)\*

Model - See Page 2-21 for Model Types

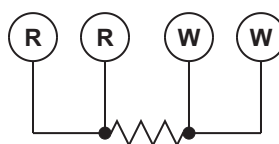
## Connection Diagrams



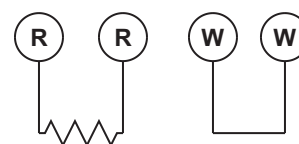
2 Wire



3 Wire



4 Wire, type A



4 Wire, type B

W - White    R - Red (Colour Coded Insulation)

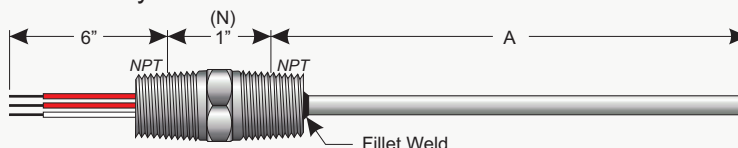
**Sample Order Code: RSA - KN4 - 3B - S - 14 - 12 - 2 - R - 3 - HT - 10 - R/RL**  
\* Consult Factory for Non-Standard or Non-Stocked Items

**2-22**

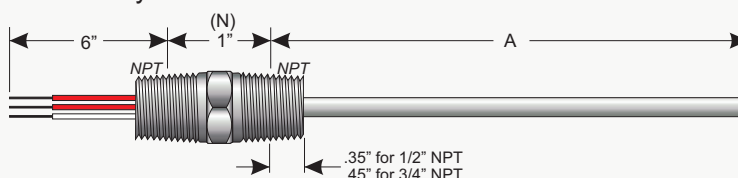
# Replacement Sensors for RTD Assemblies



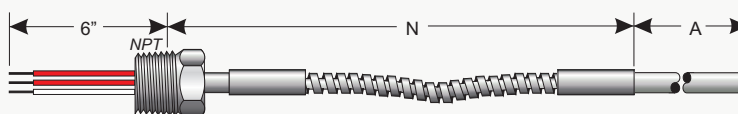
## Model RAG - Fixed Hex Bushing RTD Sensor for Assembly Model AG Style



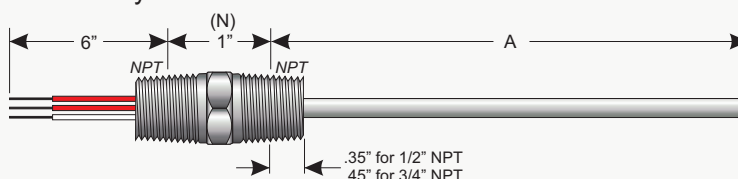
## Model RAH - Oil Seal Spring-Loaded RTD Sensor for Assembly Model AH Style



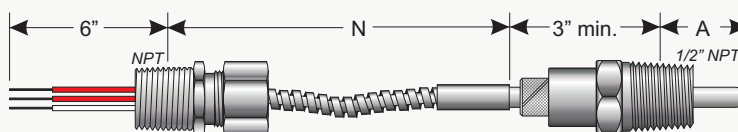
## Model RAI - Remote RTD Sensor (Fixed Fitting) for Assembly Model AI Style



## Model RAK - Adjustable Spring-Loaded Hex Bushing RTD Sensor for Assembly Model AK Style



## Model RAM - Remote RTD Sensor w/ Electrical Cord Grip & Spring Loaded Bushing for Assembly Model AM Style



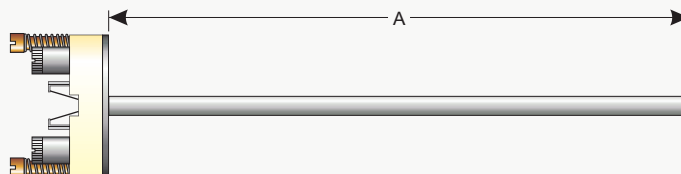
### ORDERING CODE -

| Model<br>(Above) | Instrument<br>Connection                                     | Sensor Diameter                                                            | Sensor Material                                              | "N" Dimension<br>(Inches) | RTD Type                                                                                                        | Number of Lead Wires | Temperature Rating                                                                                                                               | "A" Length<br>(Inches) |
|------------------|--------------------------------------------------------------|----------------------------------------------------------------------------|--------------------------------------------------------------|---------------------------|-----------------------------------------------------------------------------------------------------------------|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
|                  | 1 - 1/2" NPT<br>2 - M20 x 1.5*<br>3 - 3/4" NPT<br>O - Other* | 14 - 1/4" (standard)<br>18 - 1/8" (single only)<br>36 - 3/16"<br>38 - 3/8" | R - 316 S.S.<br>J - Inconel 600<br>(UT Sensor)<br>O - Other* |                           | 1 - 100 Ohm Pt (1/10 DIN),<br>2 - 100 Ohm Pt (Class A),<br>3 - 100 Ohm Pt,<br>4 - 10 Ohm Cu,<br>5 - 120 Ohm Ni, | 2, 3, 4A, 4B         | LT - Low Temp. (Max 250°C)<br>HT - High Temp.<br>(High Vibration Max 600°C)<br>UT - Ultra High Temp.<br>(High Vibration Max 750°C)<br>O - Other* |                        |
|                  |                                                              | S - Single<br>D - Dual                                                     |                                                              |                           | =0.00385<br>=0.00385<br>=0.00392<br>=0.00427<br>=0.00672                                                        |                      |                                                                                                                                                  |                        |

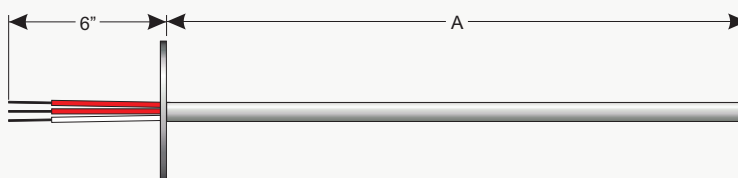


# Replacement Sensors for RTD Assemblies

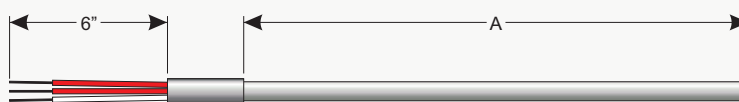
## Model RAE - Metal Sheathed RTD Sensor (DIN Style) Ceramic Terminal Block for Assembly Models AE & AF Style



## Model RFL - Metal Sheathed RTD Sensor (DIN Style) Flying Leads for Assembly Models AE, AF Style



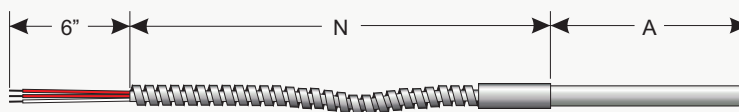
## Model RAF - Metal Sheathed RTD Sensor for Assembly Models AE, AF, AH, AK & AR Style



### ORDERING CODE -

|                  |   |                        |   |                                                                                                                                |   |                                                                                        |   |                                                                                                                                                                                 |   |                                             |  |                            |  |                                                                                                                                                                               |
|------------------|---|------------------------|---|--------------------------------------------------------------------------------------------------------------------------------|---|----------------------------------------------------------------------------------------|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---------------------------------------------|--|----------------------------|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div></div>      | - | <div></div>            | - | <div></div>                                                                                                                    | - | <div></div>                                                                            | - | <div></div>                                                                                                                                                                     | - | <div></div>                                 |  |                            |  |                                                                                                                                                                               |
| Model<br>(Above) |   | S - Single<br>D - Dual |   | <b>Sensor Diameter</b><br>14 - 1/4" (standard)<br>18 - 1/8" (single only)<br>36 - 3/16"<br>38 - 3/8"<br>06 - 6mm<br>O - Other* |   | <b>Sensor Material</b><br>R - 316 S.S.<br>J - Inconel 600<br>(UT Sensor)<br>O - Other* |   | <b>RTD Type</b><br>1 - 100 Ohm Pt (1/10 DIN), =0.00385<br>2 - 100 Ohm Pt (Class A), =0.00385<br>3 - 100 Ohm Pt, =0.00392<br>4 - 10 Ohm Cu, =0.00427<br>5 - 120 Ohm Ni, =0.00672 |   | <b>Number of Lead Wires</b><br>2, 3, 4A, 4B |  | <b>"A" Length (Inches)</b> |  | <b>Temperature Rating</b><br>LT - Low Temp. (Max 250°C)<br>HT - High Temp.<br>(High Vibration Max 600°C)<br>UT - Ultra High Temp.<br>(High Vibration Max 750°C)<br>O - Other* |

## Model RAN - Remote RTD Sensor for Assembly Model AM Style



### ORDERING CODE -

|       |                        |   |                                                                                                                         |   |                        |   |                                                                                 |   |                                                                                                                                                                          |   |                                      |   |                      |   |                                                                                                                                                                        |
|-------|------------------------|---|-------------------------------------------------------------------------------------------------------------------------|---|------------------------|---|---------------------------------------------------------------------------------|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|--------------------------------------|---|----------------------|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RAN - | <input type="text"/>   | - | <input type="text"/>                                                                                                    | - | <input type="text"/>   | - | <input type="text"/>                                                            | - | <input type="text"/>                                                                                                                                                     | - | <input type="text"/>                 | - | <input type="text"/> | - | <input type="text"/>                                                                                                                                                   |
|       | S - Single<br>D - Dual |   | Sensor Diameter<br>14 - 1/4" (standard)<br>18 - 1/8" (single only)<br>36 - 3/16"<br>38 - 3/8"<br>06 - 6mm<br>O - Other* |   | "N" Dimension (Inches) |   | Sensor Material<br>R - 316 S.S.<br>J - Inconel 600<br>(UT Sensor)<br>O - Other* |   | RTD Type<br>1 - 100 Ohm Pt (1/10 DIN), =0.00385<br>2 - 100 Ohm Pt (Class A), =0.00385<br>3 - 100 Ohm Pt, =0.00392<br>4 - 10 Ohm Cu, =0.00427<br>5 - 120 Ohm Ni, =0.00672 |   | Number of Lead Wires<br>2, 3, 4A, 4B |   | "A" Length (Inches)  |   | Temperature Rating<br>LT - Low Temp. (Max 250°C)<br>HT - High Temp.<br>(High Vibration Max 600°C)<br>UT - Ultra High Temp.<br>(High Vibration Max 750°C)<br>O - Other* |

\* Consult Factory for Non-Standard or Non-Stocked Items



# RTD - Transmitter Matching (Callendar-Van Dusen Coefficients)



Use the order code below to specify requirements for RTD-transmitter matching. First, specify the RTD sensor part number. Attach the order code below to obtain Callendar-Van Dusen Coefficient (see sample part number). The order code may be used for customer supplied sensors.

Notes:

- (1) When minimum temperature is above 0°C,  $\beta$  and C are 0.
- (2) Standard sensor ranges are: LT : -200°C to 250°C. (-392°F to 480°F)  
HT : -200°C to 600°C. (-392°F to 1112°F)  
UT : -200°C to 750°C. (-392°F to 1382°F)
- (3) RTD must be 100 $\Omega$  at 0°C with nominal  $\alpha$  of 0.00385 (EN 60751/IEC 751)  
or 0.003916 (US standard curve/JIS 1604)
- (4) Each sensor is stamped with a unique serial number for traceability to tag and table.
- (5) All calibration equipment is traceable to national standards (NIST / NRC).
- (6) A certificate of calibration is supplied with each sensor.

Ordering Code \_\_\_\_\_

CVD -   -   -   -   -   -   -  

**Coefficients Type:**

|   |                              |
|---|------------------------------|
| 1 | $R_0, \alpha, \beta, \delta$ |
| 2 | $R_0, A, B, C$               |

**Tag with Coefficients and Serial No.:**

|   |        |
|---|--------|
| 1 | Paper  |
| 2 | Metal  |
| X | No tag |

**Table Temperature Increment:**

|   |                 |
|---|-----------------|
| 1 | 1 degree        |
| 2 | 0.5 degree      |
| 3 | 0.1 degree      |
| 4 | other (specify) |
| X | none            |

**Table Units**

|   |    |
|---|----|
| C | °C |
| F | °F |

**Max Temperature (specify)**

**Min Temperature (specify)**

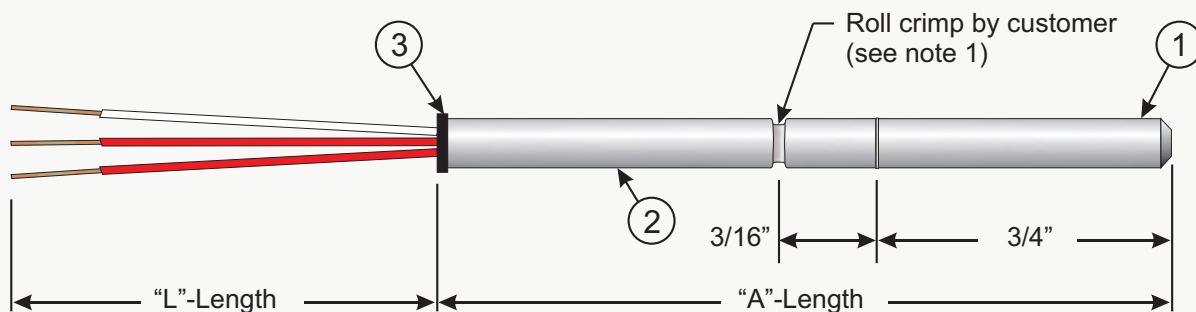
**Sample Order Code: CVD-1-1-50-150-C-1**

SAMPLE TAG

|                |              |
|----------------|--------------|
| S/N            | = 48765-4    |
| R <sub>0</sub> | = 100.0010   |
| ALPHA          | = 0.00385218 |
| DELTA          | = 1.51729    |
| BETA           | = 0.1293     |



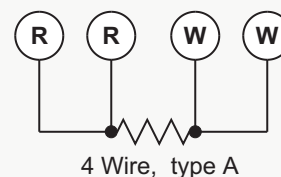
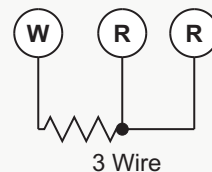
# RTD Cut -to-Length (CTL Sensor)



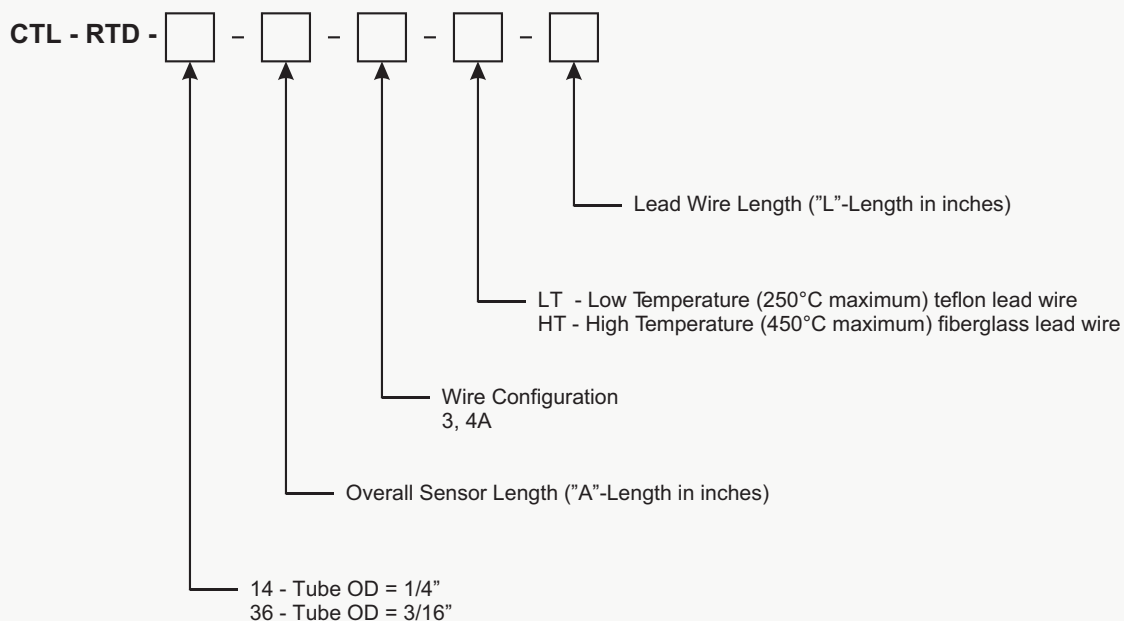
- Element (Item 1) is 100 ohm platinum, thin film, single.
- Tube (Item 2) wall thickness is 0.020", 316 S.S. Only.
- Plastic grommet (item 3) supplied with 1/4" sensor.
- Heat shrink supplied with 3/16" sensor (PVC).
- Available in 3 or 4A wire formats only.

## Notes:

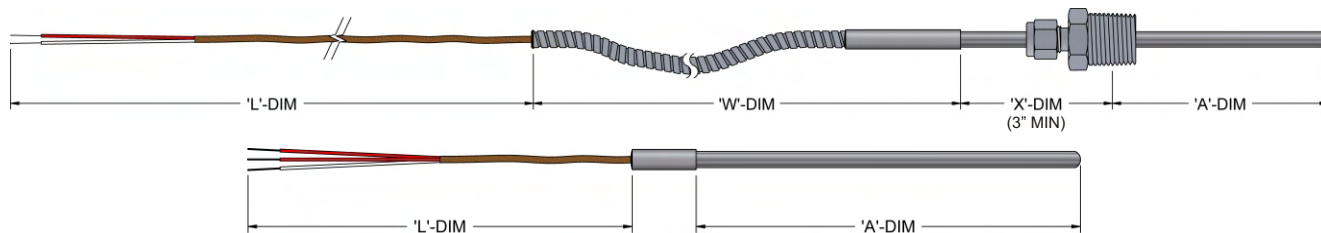
- 1) Tube is not assembled or crimped unless specified otherwise.
- 2) Lead wire is 22 AWG stranded.



## ORDERING CODE:

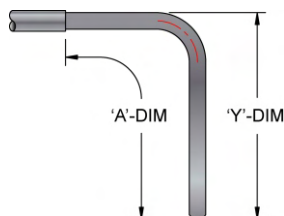


# Custom Metal Sheath RTD Sensors

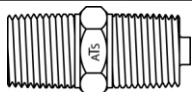
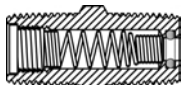
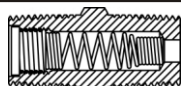
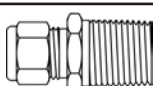
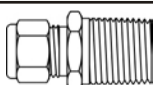


## Step 1:

| Code | Degrees            |
|------|--------------------|
| 00   | 0° Bend (Straight) |
| 45   | 45° Bend           |
| 90   | 90° Bend           |



## Step 2:

| Code | Connector Style                                                                                                                 |
|------|---------------------------------------------------------------------------------------------------------------------------------|
| AG-  | Fixed Bushing<br>                              |
| AGP- | Fixed Bushing - Process<br>                   |
| AH-  | Spring Loaded with Oil Seal<br>              |
| AK-  | Spring Loaded without Oil Seal<br>           |
| AKP- | Spring Loaded without Oil Seal Plain End<br> |
| AS-  | Compression Fitting SS Ferrule<br>           |
| AT-  | Compression Fitting Teflon Ferrule<br>       |
| X-   | No Fitting Required                                                                                                             |

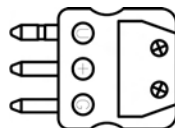
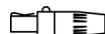
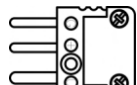
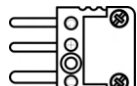
## Step 3:

| Code | Fitting Instrument Connection |
|------|-------------------------------|
| 01-  | 1/8 NPT                       |
| 02-  | 1/4 NPT                       |
| 03-  | 3/8 NPT                       |
| 04-  | 1/2 NPT                       |
| 06-  | 3/4 NPT                       |
| 08-  | 1 NPT                         |
| X-   | Not Required                  |

## Step 4:

| Code | Lead Wire                               |
|------|-----------------------------------------|
| AF-  | Armoured Fiberglass                     |
| AT-  | Armoured Teflon                         |
| FI-  | Individual Fiberglass Leads             |
| FJ-  | Fiberglass Jacket                       |
| PT-  | PVC Armoured Teflon                     |
| SC-  | Silicon Jacket                          |
| ST-  | Stainless Steel Braid over Teflon Leads |
| TI-  | Individual Teflon Leads                 |
| TJ-  | Teflon Jacket                           |
| TT-  | Teflon Armour over Teflon               |
| X-   | No Leadwire Required                    |

## Step 5:

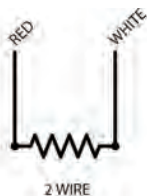
| Code | Termination                                                                                                           |
|------|-----------------------------------------------------------------------------------------------------------------------|
| 01-  | Stripped Leads (standard)                                                                                             |
| 02-  | Spade Lug<br>                    |
| 03-  | Standard Male Plug<br>           |
| 19-  | 3-Pin DIN (barnant)<br>          |
| 20-  | 3-Pin DIN (tegam/keithley)<br>   |
| 21-  | 4-Pin DIN (tegam/keithley)<br>   |
| 22-  | Mini 3-Pin Male Plug<br>         |
| 23-  | Hi-Temp Mini 3-Pin Male Plug<br> |

## Step 6:

| Code | Termination Accessory Options       |
|------|-------------------------------------|
| 61-  | Cable Clamp (flex armour)           |
| 62-  | Wire Clamp (jacketed wire)          |
| 63-  | Braze Adapter (mi cable)            |
| 64-  | Hex Crimp Adapter (mi cable)        |
| 65-  | Compression Adapter (mi cable)      |
| 66-  | Dual Compression Adapter (mi cable) |
| 69-  | Wire Clamp Mini (jacketed wire)     |
| X-   | Not Required                        |

### Step 13:

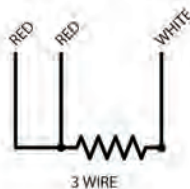
X-Dimension in Inches



A-Dimension in Inches

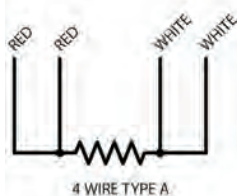
### Step 15:

| Code | Temperature Range               |
|------|---------------------------------|
| LT-  | Low Temp (-200 to 250°C)        |
| HT-  | High Temp (-200 to 600°C)       |
| UT-  | Ultra High Temp (-200 to 750°C) |



Step 16:

| Code | Calibration                             |
|------|-----------------------------------------|
| BC   | 10 Ohm Copper                           |
| BN   | 120 Ohm Nickel                          |
| PA   | 100 Ohm Pt, Cl.A ( $\pm 0.06\%$ ) (std) |
| PB   | 100 Ohm Pt, Cl.B ( $\pm 0.12\%$ )       |
| PI   | 10 Ohm Platinum                         |
| PT   | 100 Ohm 1/10 DIN ( $\pm 0.01\%$ )       |
| TA   | Class A, Thin Film (Tip Sensitive)      |
| TB   | Class B, Thin Film (Tip Sensitive)      |

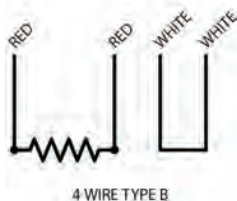


### Step 17:

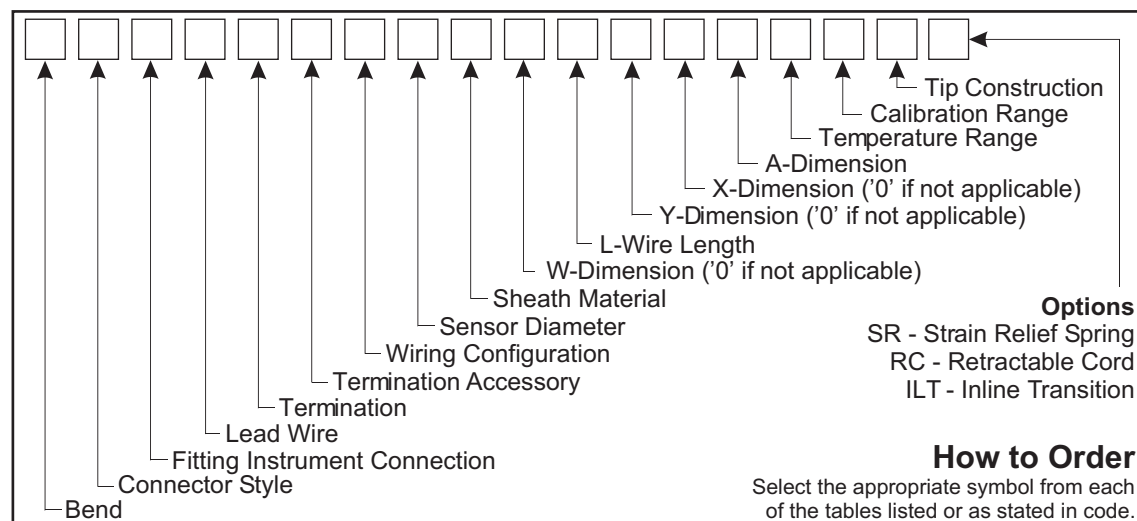
W-Dimension in Inches

| Code | Tip Construction                    |
|------|-------------------------------------|
| A    | Air Temperature (LT Only)           |
| C    | Copper Tip (Fast Response, LT Only) |
| G    | General Purpose (standard)          |
| P    | Pointed Tip                         |
| R    | Reduced Tip 1/4" X 1/8"             |

L-Dimension in Inches - Wire Length



## Y-Dimension in Inches



# Thermal Ribbons



## Miniature Platinum Thermal-Ribbons

Only .3" (7.6mm) square, model S651 takes up no more space than a ceramic resistance thermometer element. Yet it conforms to flat or curved surfaces, has faster response, and is more rugged for reliability in critical applications.

| Dimensions | Model Number   | Element  | TCR<br>(ohm/ohm/°C)       | Insulation      | Temperature<br>Range*          | No. of<br>Leads | Time<br>Constant<br>(Sec.) | Self-Heating (mW/°C) |                 | Max. Thickness** |               |
|------------|----------------|----------|---------------------------|-----------------|--------------------------------|-----------------|----------------------------|----------------------|-----------------|------------------|---------------|
|            |                |          |                           |                 |                                |                 |                            | Still<br>Air         | Self-<br>Adhere | Over<br>Element  | Over<br>Leads |
|            | D10-S651PDY24A | Platinum | 100 ohms $\pm$ 12% at 0°C | Kapton<br>(FEP) | -40 to 200°C<br>(-40 to 392°F) | 2               | .15                        | 1.6                  | 10              | .020<br>(0.5)    | .025<br>(0.7) |
|            | D10-S651PDZ24A |          |                           |                 |                                | 3               |                            |                      |                 |                  |               |
|            | D10-S651PDX24A |          |                           |                 |                                | 4               |                            |                      |                 |                  |               |

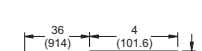
## Element Spot Sensing Thermal-Ribbons

The sensing elements are spiral wound in a single plane for fast response. Choose Kapton or silicone rubber insulation, platinum or nickel-iron element, and number of leads.

| Dimensions                                          | Model Number     | Element                              | TCR<br>(ohm/ohm/°C) | Insulation        | Temperature<br>Range*            | No. of<br>Leads | Time<br>Constant<br>(Sec.) | Self-Heating (mW/°C) |                 | Max. Thickness* |               |
|-----------------------------------------------------|------------------|--------------------------------------|---------------------|-------------------|----------------------------------|-----------------|----------------------------|----------------------|-----------------|-----------------|---------------|
|                                                     |                  |                                      |                     |                   |                                  |                 |                            | Still<br>Air         | Self-<br>Adhere | Over<br>Element | Over<br>Leads |
|                                                     | D10-S32PB11Y36A  | Platinum<br>100 ohms ±.11% at 0°C    | .00391              | Silicone          | -62 to 220°C<br>(-80 to 428°F)   | 3               | .17                        | 3.9                  | 28.5            | .035<br>(0.9)   | .090<br>(2.3) |
|                                                     | D10-S32PB22Y36A  | Platinum<br>100 ohms ±.22% at 0°C    |                     |                   |                                  |                 |                            |                      |                 |                 |               |
|                                                     | D10-S385PD10Y36A | Platinum<br>100 ohms ±.10% at 0°C    | .00385              |                   |                                  |                 |                            |                      |                 |                 |               |
|                                                     | D10-S385PE22Y36A | Platinum<br>100 ohms ±.22% at 0°C    |                     |                   |                                  |                 |                            |                      |                 |                 |               |
|                                                     | D10-S385PD10Z36A | Platinum<br>100 ohms ±.10% at 0°C    |                     |                   |                                  |                 |                            |                      |                 |                 |               |
|                                                     | D10-S385PE22Z36A | Platinum<br>100 ohms ±.22% at 0°C    |                     |                   |                                  |                 |                            |                      |                 |                 |               |
| Model D10-S39 leads are<br>AWG 26, Teflon Insulated | D10-S39FAY36A    | Nickel-Iron<br>604 ohms ±.26% at 0°C | .00518              | Kapton<br>(Epoxy) | -200 to 200°C<br>(-328 to 392°F) | 2               | .15                        | 10.3                 | 146             | .015<br>(0.4)   | .065<br>(1.7) |

## Strip Sensing Thermal-Ribbons

These Thermal-Ribbons sense average temperatures along their length, eliminating point measurement errors. Wrap them around pipes or other cylinders or adhere them to flat surfaces.

| Dimensions                                                                          | Model Number     | Element                              | TCR<br>(ohm/ohm/°C) | Insulation         | Temperature<br>Range*            | No. of<br>Leads | Time<br>Constant<br>(Sec.) | Self-Heating (mW/°C) |                 | Max. Thickness* |               |
|-------------------------------------------------------------------------------------|------------------|--------------------------------------|---------------------|--------------------|----------------------------------|-----------------|----------------------------|----------------------|-----------------|-----------------|---------------|
|                                                                                     |                  |                                      |                     |                    |                                  |                 |                            | Still<br>Air         | Self-<br>Adhere | Over<br>Element | Over<br>Leads |
|  | D10-S34PBY36A    | Platinum<br>100 ohms ±.22% at 0°C    | .00391              | Silicone<br>Rubber | -62 to 220°C<br>(-80 to 428°F)   | 2               | .6                         | 16                   | 150             | .035<br>(0.9)   | .075<br>(1.9) |
|                                                                                     | D10-S336PD12Z36A | Platinum<br>100 ohms ±.10% at 0°C    | .00385              |                    |                                  |                 |                            |                      |                 |                 |               |
|                                                                                     | D10-S386PE22Z36A | Platinum<br>100 ohms ±.22% at 0°C    |                     |                    |                                  |                 |                            |                      |                 |                 |               |
|                                                                                     | D10-S35FAY36A    | Nickel-Iron<br>604 ohms ±.26% at 0°C | .00518              | Kapton<br>(FEP)    | -200 to 200°C<br>(-328 to 392°F) | 2               | .2                         | 20                   | 198             | .020<br>(0.7)   | .065<br>(1.7) |
| Model D10-S42 leads are<br>42" (1067) Long                                          | D10-S42FAY42A    | Nickel-Iron<br>676 ohms ±.5% at 25°C | .00518              | Mylar              | -100 to 150°C<br>(-148 to 302°F) | 2               | .3                         | 11                   | 85              | .025<br>(0.7)   | .065<br>(1.7) |

## Thermal-Ribbons for Electric Machinery

Model D10-S3238 senses stator temperatures to protect motors and generators from burnout. Because you can mount it on the ends of stator windings instead of inside them, D10-S3238 is ideal.

| Dimensions                                                                          | Model Number    | Element                          | TCR<br>(ohm/ohm/°C) | Insulation        | Temperature<br>Range*           | No. of<br>Leads | Time<br>Constant<br>(Sec.) | Self-Heating (mW/°C) |                 | Max. Thickness* |               |  |  |  |  |  |
|-------------------------------------------------------------------------------------|-----------------|----------------------------------|---------------------|-------------------|---------------------------------|-----------------|----------------------------|----------------------|-----------------|-----------------|---------------|--|--|--|--|--|
|                                                                                     |                 |                                  |                     |                   |                                 |                 |                            | Still<br>Air         | Self-<br>Adhere | Over<br>Element | Over<br>Leads |  |  |  |  |  |
|  | D10-S3238PAZ36A | Platinum<br>100 ohms ±.5% at 0°C | .00392              | Kapton<br>(Epoxy) | -73 to 200°C<br>(-100 to 392°F) | 3               | .17                        | 11                   | 117             | .020<br>(0.5)   | .050<br>(1.3) |  |  |  |  |  |
|                                                                                     | D10-S3238CAZ36A | Copper<br>10 ohms ±.2% at 25°C   | .00427              |                   |                                 | 2               |                            |                      |                 |                 |               |  |  |  |  |  |
|                                                                                     | D10-S3238NAY36A | Nickel<br>120 ohms ±.3% at 0°C   | .00672              |                   |                                 |                 |                            |                      |                 |                 |               |  |  |  |  |  |

### Notes:

Model numbers with suffix A have no adhesive.

For pressure sensitive adhesive for self mounting change suffix A to B.

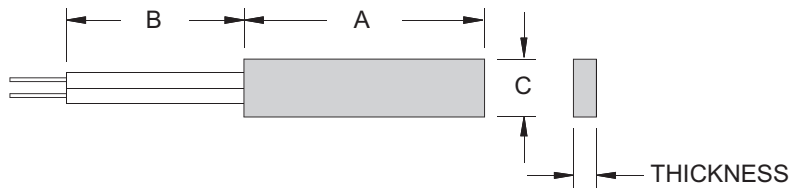
\*Maximum temperature for self-adhering B models is 177°C (350°F).

\*\* Add .005" (0.1mm) to thickness for B models.





# Stator Winding RTD's



## CLASS H

**.078" Thick** Body Material: Polyester glass. Leadwires: AWG 22

| Model       | Element                   |
|-------------|---------------------------|
| D11-S18CA   | 10 Ohm Copper             |
| D11-S15NA   | 120 Ohm Nickel            |
| D11-S13PA   | 100 Ohm Platinum (.00392) |
| D11-S8012PE | 100 Ohm Platinum (.00385) |

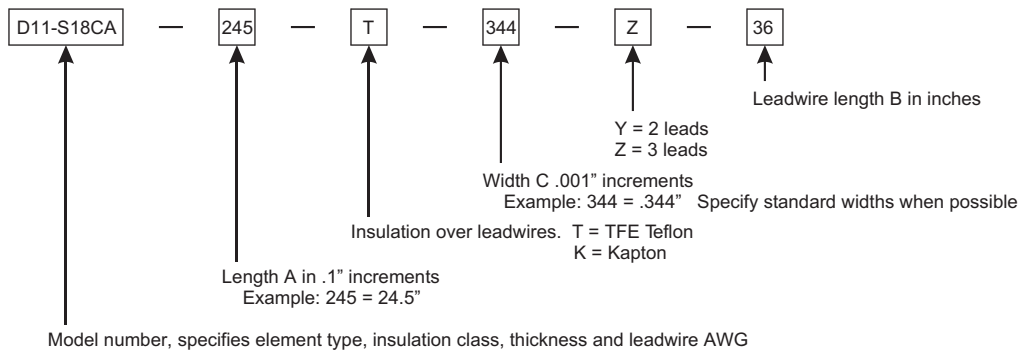
**.030" Thick** Body Material: Teflon glass. Leadwires: AWG 26

| Model       | Element                   |
|-------------|---------------------------|
| D11-S7401CA | 10 Ohm Copper             |
| D11-S7401NA | 120 Ohm Nickel            |
| D11-S7401PA | 100 Ohm Platinum (.00392) |
| D11-S7401PE | 100 Ohm Platinum (.00385) |

**.030" Thick** Note: These detectors are .045" thick over the leads attachment area. This area extends into the body a maximum of .62".  
Body Material: Teflon glass. Leadwires: AWG 22

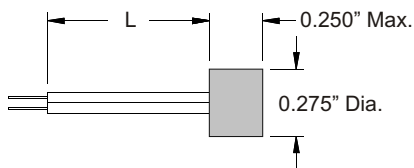
| Model       | Element                   |
|-------------|---------------------------|
| D11-S1220CA | 10 Ohm Copper             |
| D11-S1240NA | 120 Ohm Nickel            |
| D11-S1420PA | 100 Ohm Platinum (.00392) |
| D11-S8010PE | 100 Ohm Platinum (.00385) |

## HOW TO ORDER STATOR WINDING RTD'S



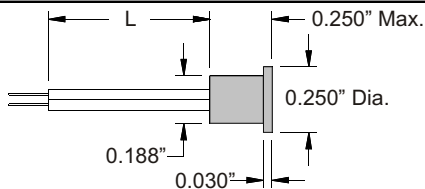
# Miniature RTD's

## CASE STYLE A



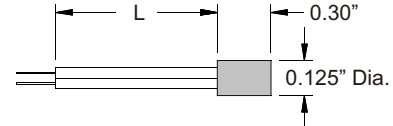
| Model        | Element                | No. & Type of Leads                               |
|--------------|------------------------|---------------------------------------------------|
| D12-S324CA*  | Copper                 | 3, AWG 28                                         |
| D12-S323FA*  | Nickel-Iron            | 2 or 3, AWG 28                                    |
| D12-S326NA*  | Nickel                 | 2 or 3, AWG 28                                    |
| D12-S325PA*  | Platinum (.00392)      | 2 or 3, AWG 28                                    |
| D12-S304PD*  | Platinum (.00385)      | 3, AWG 28                                         |
| D12-S730PE*  | Platinum (.00385)      | 2 or 3, AWG 28                                    |
| D12-S4026CA* | DUAL Copper            | 6, AWG 28                                         |
| D12-S4026NA* | DUAL Nickel            | 4 or 6, AWG 28                                    |
| D12-S4026PA* | DUAL Platinum (.00392) | 4 or 6, AWG 28                                    |
| D12-S309PD*  | DUAL Platinum (.00385) | 4 or 6, AWG 28                                    |
| D12-S305PE*  | DUAL Platinum (.00385) | 4 or 6, AWG 28                                    |
| D12-S327     | Nickel                 | 2, AWG 28, solid nickel, glass sleeving, 18" only |

## CASE STYLE B



| Model        | Element                | No. & Type of Leads |
|--------------|------------------------|---------------------|
| D12-S332CA*  | Copper                 | 3, AWG 24           |
| D12-S330NA*  | Nickel                 | 2 or 3, AWG 24      |
| D12-S331PA*  | Platinum (.00392)      | 2 or 3, AWG 24      |
| D12-S306PD*  | Platinum (.00385)      | 3, AWG 24           |
| D12-S7746PE* | Platinum (.00385)      | 2 or 3, AWG 24      |
| D12-S7792NA* | DUAL Nickel            | 4 or 6, AWG 28      |
| D12-S7792PA* | DUAL Platinum (.00392) | 4 or 6, AWG 28      |
| D12-S307PE*  | DUAL Platinum (.00385) | 4 or 6, AWG 28      |

## CASE STYLE C



| Model       | Element           | No. & Type of Leads    |
|-------------|-------------------|------------------------|
| D12-S324CA  | Copper            | 3, AWG 26              |
| D12-S340NA  | Nickel            | 3, AWG 24 or 3, AWG 26 |
| D12-S341PA  | Platinum (.00392) | 2, AWG 24 or 3, AWG 26 |
| D12-S308PD  | Platinum (.00385) | 3, AWG 26              |
| D12-S7908PE | Platinum (.00385) | 2 or 3, AWG 24         |

## Specifications: RTD's

**Temperature Range:** -80 to 260°C (-112 to 500°F). The upper limit reduces to 204° (400°F) with the nickel-iron elements.

## Elements:

| Code | Element                            | TCR    |
|------|------------------------------------|--------|
| CA   | Copper, 10 ± .02 Ohm at 25°C       | .00427 |
| FA   | Nickel-Iron, 604 ± 3.02 Ohm at 0°C | .00518 |
| NA   | Nickel, 120 ± .60 Ohm at 0°C       | .00672 |
| PA   | Platinum, 100 ± .36 Ohm at 0°C     | .00392 |
| PD   | Platinum, 100 ± .10 Ohm at 0°C     | .00385 |
| PE   | Platinum, 100 ± .36 Ohm at 0°C     | .00385 |

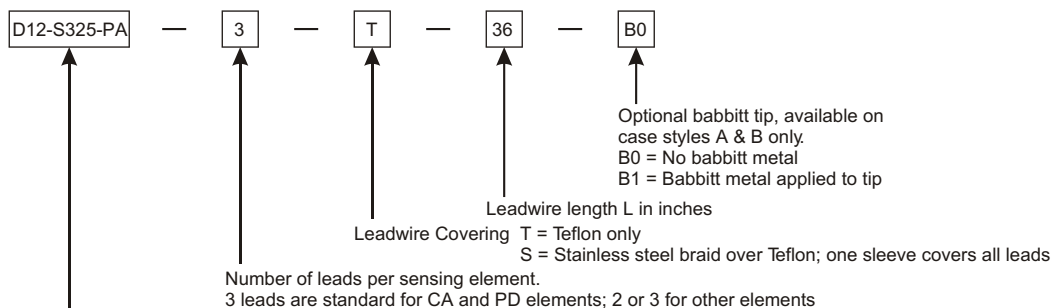
TCR is the Temperature Coefficient of Resistance in Ohm/Ohm/°C for the range 0 to 100°C. PD elements meet the "international standard" DIN EN 60751, Class B, PE elements have the same nominal TCR, but looser tolerance for lower cost.

Leads resistance is included in the calibration tolerance of 2-lead models for lead lengths up to 36". Add .05 ohm per foot to tolerance when longer leads (AWG 28) are used.

**Case:** Tin-plated copper alloy. No plating on babbitted sensors.

**Insulation resistance:** 10 megohms min. At 100 VDC.

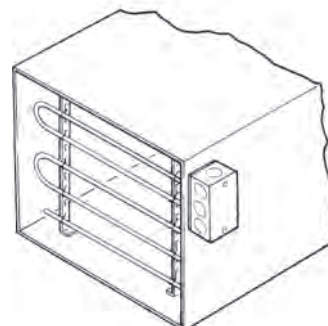
## HOW TO ORDER RTD'S



## Bending Area Averaging RTD's

These RTD's have a stainless steel casing which is bendable to a radius of 4". They can crisscross a duct or plenum to average out temperature stratification in both directions. Standard insertion lengths (L) are 6, 12, and 24 feet.

## Typical Installation



## HOW TO ORDER:

D13-S445FB — Y — 6 (Sample Part Number)

Insertion length (L) in feet

Y = 2 leads, 8" long

Z = 3 leads, optional on S447PB and S457PE

Model Number (specified element):

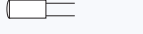
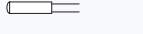
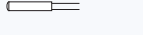
D13-S445FB: 1000 Ohms Nickel-Iron

D13-S446FC: 2000 Ohms Nickel-Iron

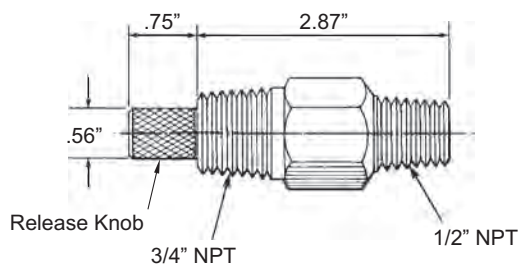
D13-S447PB: 100 Ohms Platinum Curve (.00391)

D13-S457PE: 100 Ohms Platinum Curve (.00385)

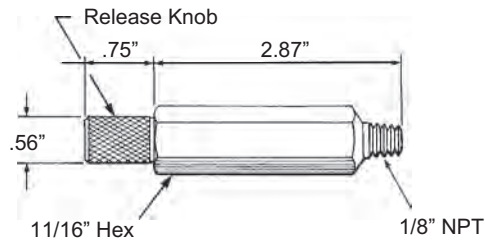
## RTD Elements

| Code       | Illustration                                                                        | Resistance @<br>0°C (Ohms) | Tolerance @<br>0°C (+ %) | Length<br>(mm) | Diameter<br>(mm) | Sensing<br>Length (mm) | Leads  |               | Recommended<br>Max. Current (mA) |
|------------|-------------------------------------------------------------------------------------|----------------------------|--------------------------|----------------|------------------|------------------------|--------|---------------|----------------------------------|
|            |                                                                                     |                            |                          |                |                  |                        | Number | Diameter (mm) |                                  |
| Pt100/30H  |  | 100                        | 0.1                      | 30 ± 1         | 4.5 ± 0.015      | 28 ± 1                 | 2      | 0.45          | 5                                |
| Pt2100/30H |  | 2 X 100                    | 0.1                      | 30 ± 1         | 4.5 ± 0.015      | 28 ± 1                 | 4      | 0.45          | 2 X 5                            |
| Pt100/1P   |  | 100                        | 0.1                      | 25 ± 1         | 3.175 ± 0.015    | 22 ± 1                 | 2      | 0.45          | 5                                |
| Pt2100/1P  |  | 2 X 100                    | 0.1                      | 25 ± 1         | 3.175 ± 0.015    | 22 ± 1                 | 4      | 0.45          | 2 X 5                            |
| Pt100/1A   |  | 100                        | 0.1                      | 25 ± 1         | 1.59 ± 0.015     | 22 ± 1                 | 2      | 0.275         | 3                                |
| Pt100/15H  |  | 100                        | 0.1                      | 15 ± 1         | 4.5 ± 0.015      | 13 ± 1                 | 2      | 0.45          | 5                                |
| Pt100/15P  |  | 100                        | 0.1                      | 15 ± 1         | 3.175 ± 0.015    | 13 ± 1                 | 2      | 0.45          | 5                                |
| Pt100/15A  |  | 100                        | 0.1                      | 15 ± 1         | 1.59 ± 0.015     | 13 ± 1                 | 2      | 0.275         | 3                                |
| Pt100/15B  |  | 100                        | 0.2                      | 15 ± 1         | 1.20 ± 5%        | 13 ± 1                 | 2      | 0.25          | 2                                |
| Pt100/15C  |  | 100                        | 0.2                      | 15 ± 1         | 0.90 ± 5%        | 13 ± 1                 | 2      | 0.15          | 1                                |
| Pt100/6D   |  | 100                        | 0.2                      | 6 ± 1          | 2.00 ± 3%        | 6 ± 1                  | 2      | 0.275         | 1                                |

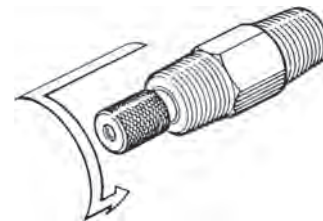
# Accessories Parts



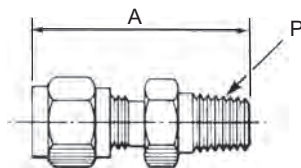
D14-FG110-1 = .215"  
D14-FG113-1 = .250"  
D14-FG114-1 = .188"



D14-FG111 = .215"  
D14-FG112 = .188"  
D14-FG117 = .250"



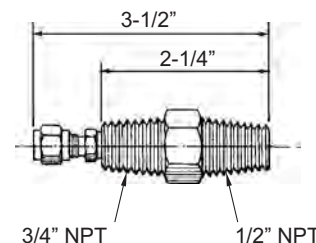
Material: Nickel plated cold rolled steel, silicone rubber o-ring  
Temperature Limit: 260°C (500°F)  
Pressure Limit: 50 PSI (345 Kpa)



## Compression Fittings

Material: 316 stainless steel.  
Temperature limit: 871°C (1600°F)

| Model       | Sensor Dia. | Pipe Thread P | A - Inches (mm) |
|-------------|-------------|---------------|-----------------|
| SS300-1-2BT | 3/16"       | 1/8"          | 1.23 (31.2)     |
| SS300-1-4BT | 3/16"       | 1/4"          | 1.43 (46.0)     |
| SS400-1-2BT | 1/4"        | 1/8"          | 1.29 (32.8)     |
| SS400-1-4BT | 1/4"        | 1/4"          | 1.49 (37.8)     |

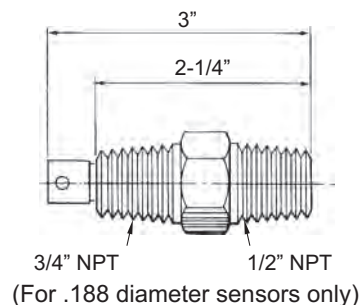


## Pressure Seal Transition Fitting

Material: 316 stainless steel.  
Temperature limit: 871°C (1600°F)

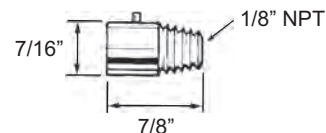
| Model | Sensor Dia. |
|-------|-------------|
| D14-1 | .188"       |
| D14-2 | .250"       |

## Bayonet Adapter #D14-3

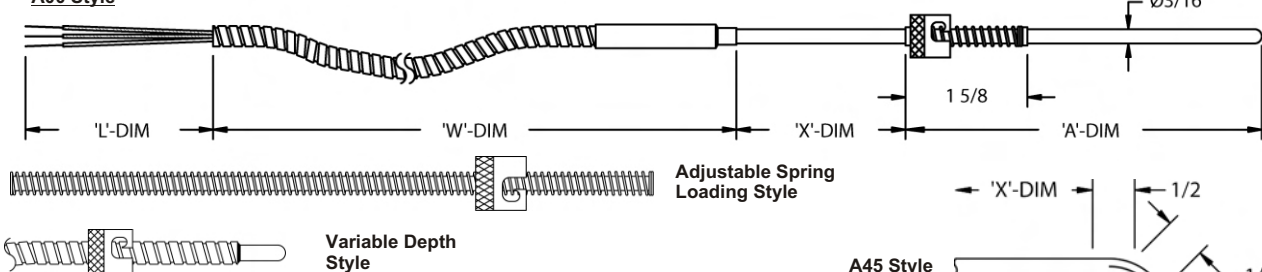


(For .188 diameter sensors only)

## Bayonet Adapter

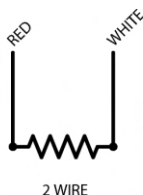


**A00 Style**



**Step 1:**

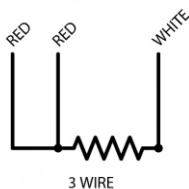
| Code | Bayonet Style                               |
|------|---------------------------------------------|
| A00- | Fixed Spring Loading (straight)             |
| A45- | Fixed Spring Loading (45 degree bend)       |
| A90- | Fixed Spring Loading (90 degree bend)       |
| B06- | Adjustable Spring Loading (6" spring)       |
| B12- | Adjustable Spring Loading (12" spring)      |
| C00- | Variable Depth (w/ nickel plated brass cap) |
| C01- | Variable Depth (w/ stainless steel cap)     |



2 WIRE

**Step 2:**

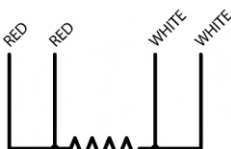
| Code | Lead Wire                               |
|------|-----------------------------------------|
| AF-  | Armoured Fiberglass leads               |
| AT-  | Armoured Teflon leads                   |
| FI-  | Individual Fiberglass Leads             |
| PT-  | PVC Armoured Teflon leads               |
| ST-  | Stainless Steel Braid over Teflon Leads |
| TI-  | Individual Teflon Leads                 |
| TJ-  | Teflon Jacketed leads                   |
| TT-  | Teflon Armour over Teflon               |



3 WIRE

**Step 3:**

| Code | Termination               |
|------|---------------------------|
| 01-  | Stripped Leads (standard) |
| 02-  | Spade Lugs                |
| CG-  | Cord Grip                 |



4 WIRE TYPE A

**Step 4:**

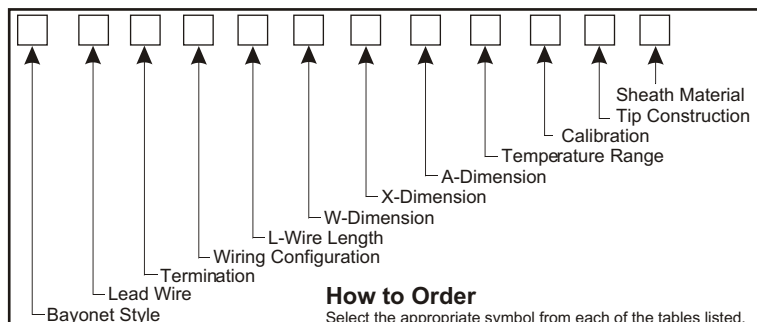
| Code | Wiring Configuration     |
|------|--------------------------|
| D2-  | Dual 2-wire              |
| D3-  | Dual 3-wire              |
| DA-  | Dual 4A-wire             |
| DB-  | Dual 4B-wire             |
| S2-  | Single 2-wire            |
| S3-  | Single 3-wire (standard) |
| SA-  | Single 4A-wire           |
| SB-  | Single 4B-wire           |



4 WIRE TYPE B

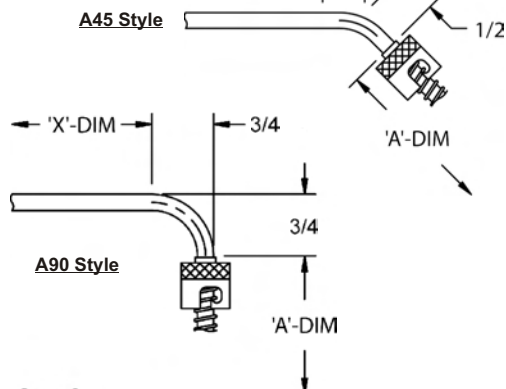
**Step 5:**

|                                     |
|-------------------------------------|
| L-Dimension in Inches - Wire Length |
|-------------------------------------|



**How to Order**

Select the appropriate symbol from each of the tables listed.



**Step 6:**

|                       |
|-----------------------|
| W-Dimension in Inches |
|-----------------------|

**Step 7:**

|                       |
|-----------------------|
| X-Dimension in Inches |
|-----------------------|

**Step 8:**

|                       |
|-----------------------|
| A-Dimension in Inches |
|-----------------------|

**Step 9:**

| Code | Temperature Range                      |
|------|----------------------------------------|
| LT-  | Low Temperature (-200 to 250°C)        |
| HT-  | High Temperature (-200 to 600°C)       |
| UT-  | Ultra High Temperature (-200 to 750°C) |

**Step 10:**

| Code | Calibration                             |
|------|-----------------------------------------|
| BC-  | 10 Ohm Copper                           |
| BN-  | 120 Ohm Nickel                          |
| PA-  | 100 Ohm Pt, Class A (±0.06%) (standard) |
| PB-  | 100 Ohm Pt, Class B (±0.12%)            |
| PI-  | 10 Ohm Platinum                         |
| PT-  | 100 Ohm 1/10 Din (±0.01%)               |
| TA-  | Class A, Thin Film (Tip Sensitive)      |
| TB-  | Class B, Thin Film (Tip Sensitive)      |

**Step 11:**

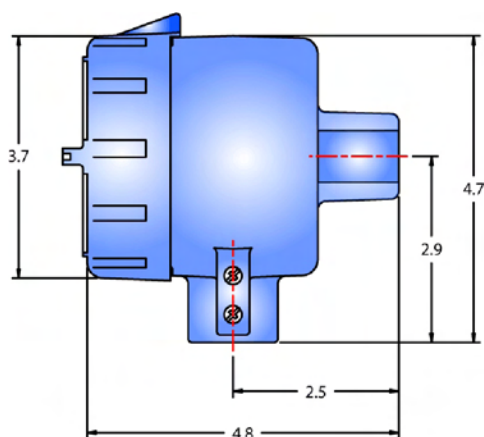
| Code | Tip Construction                    |
|------|-------------------------------------|
| C-   | Copper Tip (Fast Response, LT Only) |
| G-   | General Purpose (standard)          |

**Step 12:**

| Code | Sheath Material                      |
|------|--------------------------------------|
| J-   | Inconel 600 (Required for UT Sensor) |
| P-   | 304SS                                |
| R-   | 316SS (standard)                     |

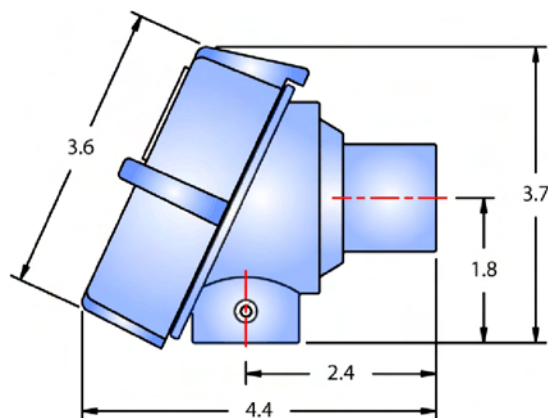


# Termination Heads



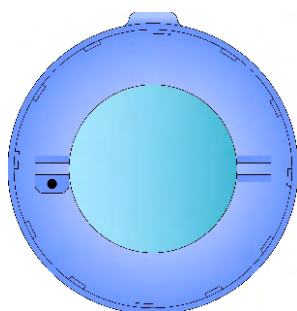
## 7000/8000 Series

CL.I Gr.BCD/CL.II Gr.EFG/CL.III (CSA, FM, UL)  
 EEx d IIC T6 CL.I Zone 1 (ATEX)  
 Ex d IIC T6 CL.I Zone 1 (IEC)  
 Type 4X / IP66  
 Cast Aluminum/Epoxy Coated or  
 Stainless Steel  
 Solid Cap or Glass Window Options

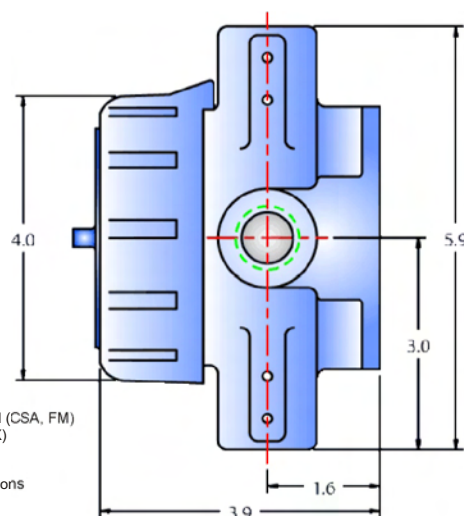


## 1000/4000 F Series

CL.I Div.1 Gr.BCD/CL.II Gr.EFG/CL.III (CSA, FM)  
 EEx d IIC T6 CL.I Zone 1 (ATEX)  
 Ex d IIC T6 CL.I Zone 1 (IEC)  
 Type 4X / IP66  
 Cast Aluminum/Epoxy Coated or  
 Stainless Steel

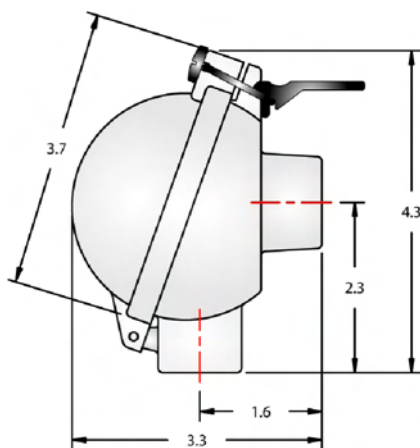


## GLASS WINDOW OPTION



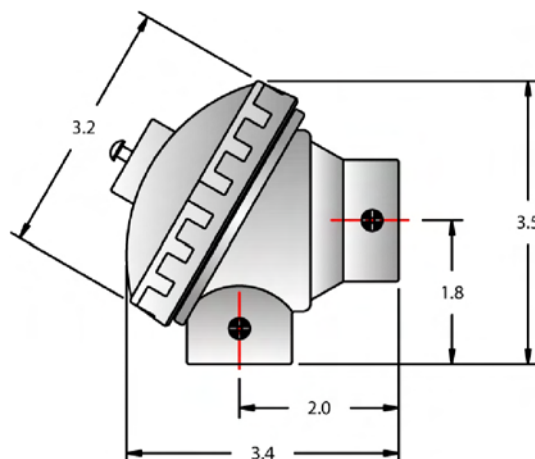
## 5000/6000 Series

CL.I Gr.BCD/CL.II Gr.EFG/CL.III (CSA, FM)  
 EEx d IIC T6 CL.I Zone 1 (ATEX)  
 Type 4X / IP66  
 Cast Aluminum/Epoxy Coated  
 Solid Cap or Glass Window Options



## Flip Top Transmitter Head

Model: DAN (IP65)  
 Cast Aluminum/Painted



## Low-Cost, General Purpose, Weatherproof

Models: KN4 (IP67), KH (IP67), KB2 (IP65)  
 Cast Aluminum Epoxy Coated/Stainless Steel/Bakelite

## Sanitary Head

Model: KPP (IP65)  
 Polypropylene

# RTD Assembly Terminal Block Options



Two to Six Terminal Configuration  
Material: Crastin  
For 7000 Series Head

Part Number

T02 = Two Terminals  
T03 = Three Terminals  
T04 = Four Terminals  
T06 = Six Terminals



Eight to Twelve Terminal Configuration  
Material: Crastin  
For 7000 Series Head

Part Number

T08 = Eight Terminals  
T09 = Nine Terminals  
T10 = Ten Terminals  
T12 = Twelve Terminals

Available for multi-point assemblies.  
Refer to catalogue page 1-58 for information on  
multi-points. Additional information available  
through local sales representative.



Two to Six Terminal Configuration  
Material: Crastin  
For 4000 Series & General Purpose Heads

Part Number

2B = Two Terminals  
3B = Three Terminals  
4B = Four Terminals  
6B = Six Terminals



Two to Six Terminal Configuration  
Material: Ceramic  
For 4000 Series & General Purpose Heads

Part Number

2C = Two Terminals  
3C = Three Terminals  
4C = Four Terminals  
6C = Six Terminals



Two to Eight Terminal Configuration  
Material: Ceramic  
For 4000 & 7000 Series Head  
Din Style Sensors

Part Number

C02 = Two Terminals  
C03 = Three Terminals  
C04 = Four Terminals  
C06 = Six Terminals  
C08 = Eight Terminals

# Hazardous Locations General Information



| Protection Methods for Potentially Explosive Gas/Vapour Atmospheres |                       |                      |               |      |            |                           |                                       |                    |                   |
|---------------------------------------------------------------------|-----------------------|----------------------|---------------|------|------------|---------------------------|---------------------------------------|--------------------|-------------------|
| Protection Method                                                   | North America Class I |                      |               |      |            |                           | Europe (CENELEC), International (IEC) |                    |                   |
|                                                                     | Div.                  | Standard             |               | Zone | Standard   |                           | Zone                                  | Standard           |                   |
|                                                                     |                       | Canada CSA           | US            |      | Canada CSA | US                        |                                       | European Norm (EN) | International IEC |
| Intrinsic Safety - ia (2 faults)                                    | 1                     | C22.2 No. 157        | FM3610/UL913  | 0    | E60079-11  | ISA 12.02.01/UL2279       | 0                                     | 50020              | 60079-11          |
| Intrinsic Safety - ib (1 fault)                                     |                       |                      |               | 1    | E60079-11  | ISA 12.02.01/UL2279       | 1                                     | 50020              | 60079-11          |
| Explosionproof Flameproof - d                                       | 1                     | C22.2 No. 30         | FM3615/UL1203 | 1    | E60079-1   | ISA S12.22.01/UL2279      | 1                                     | 50018              | 60079-1           |
| Purged Pressurized - p                                              | 1/2                   | CSA TIL 13A/NFPA 496 | NFPA 496      | 1/2  | E60079-2   |                           | 1                                     | 50016              | 60079-2           |
| Increased Safety - e                                                |                       |                      |               | 1    | E79-7      | ANSI/ISA S12.16.01/UL2279 | 1                                     | 50019              | 60079-7           |
| Encapsulation - m                                                   |                       |                      |               | 1    | E79-18     | ISA S12.23.01/UL2279      | 1                                     | 50028              | 60079-18          |
| Oil immersion - o                                                   |                       |                      |               | 1    | E79-6      | ANSI/ISA S12.26.01/UL2279 | 1                                     | 50015              | 60079-6           |
| Powder filled - q                                                   |                       |                      |               | 1    | E60079-5   | ANSI/ISA S12.25.01/UL2279 | 1                                     | 50017              | 60079-5           |
| Non-incendive/non-sparking                                          | 2                     | C22.2 No. 213        | FM3611/UL1604 |      |            |                           |                                       |                    |                   |
| Protection - n                                                      |                       |                      |               | 2    | E60079-15  | UL2279                    | 2                                     | 50021              | 60079-15          |
| Special requirements (2 protection methods)                         |                       |                      |               |      |            |                           | 0                                     | 50284              |                   |

| Protection Methods for Combustible/Ignitable Dust Atmospheres |                             |                            |               |                                       |                |                   |
|---------------------------------------------------------------|-----------------------------|----------------------------|---------------|---------------------------------------|----------------|-------------------|
| Protection Method                                             | North America Class II, III |                            |               | Europe (CENELEC), International (IEC) |                |                   |
|                                                               | Division                    | Standard                   |               | Zone                                  | Standard       |                   |
|                                                               |                             | Canada CSA                 | US            |                                       | Europe CENELEC | International IEC |
| Intrinsic Safety - ia                                         | 1                           | C22.2 No. 157              | FM3610/UL913  |                                       |                |                   |
| Dust ignition protection                                      | 1                           | C22.2 No. 25 or E61241-1-1 | UL 1203       | 20 / 21 / 22                          | EN50281-1-1    | 61241-1-1         |
| Purged                                                        | 1/2                         |                            | NFPA 496      |                                       |                | 61241-4           |
| Dust tight                                                    | 2                           | C22.2 No. 25 or E61241-1-1 | FM3611/UL1604 |                                       |                |                   |
| Non-incendive                                                 | 2                           |                            | FM3611/UL1604 |                                       |                |                   |

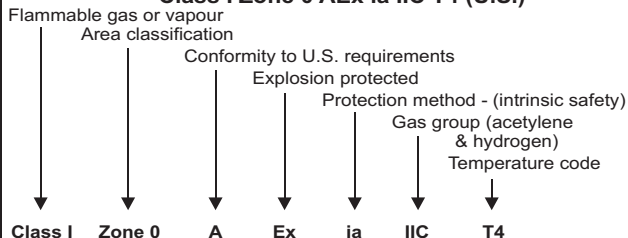
## Hazardous Locations Equipment Marking

### Markings for North America

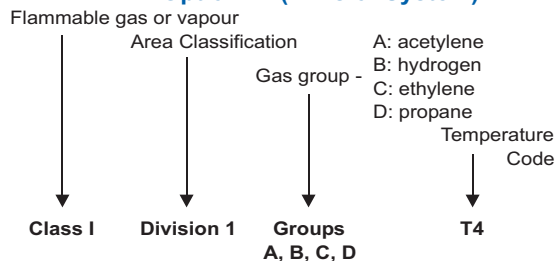
#### Option A: (ZoneSystem)

Ex ia IIC T4 (Canada)

Class I Zone 0 AEx ia IIC T4 (U.S.)

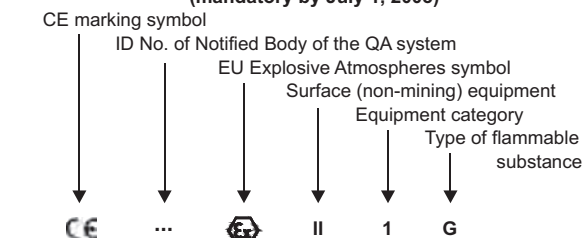


#### Option B: (DivisionSystem)

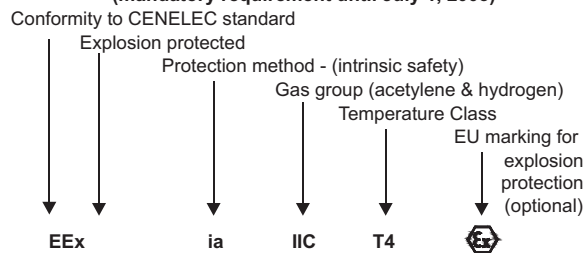


### Markings for Europe

**ATEX Directive (94/9/EC) on Potentially Explosive Atmospheres**  
(mandatory by July 1, 2003)



**CENELEC (European) Directive (76/117/EEC)**  
(mandatory requirement until July 1, 2003)





| ATEX Directive 94/9/EC |                                            |                                  |                             |                                     |
|------------------------|--------------------------------------------|----------------------------------|-----------------------------|-------------------------------------|
| Equipment Group        | Equipment Category and Level of Protection | Presence of Explosive Atmosphere | Flammable Substances        | Correlation with Hazardous Areas    |
| I - Mines              | M1 - very high level of protection         | Presence                         | Methane, Dust               | —                                   |
|                        | M2 - high level of protection              | Risk of Presence                 |                             | —                                   |
| II - Surface           | 1 - very high level of protection          | Continuous Presence              | G-Gas, Vapours Mist; D-Dust | Zone 0 (Gas etc.)<br>Zone 20 (Dust) |
|                        | 2 - high level of protection               | Likely to Occur                  |                             | Zone 1 (Gas etc.)<br>Zone 21 (Dust) |
|                        | 3 - normal level of protection             | Unlikely to Occur                |                             | Zone 2 (Gas etc.)<br>Zone 22 (Dust) |

| Ingress Protection (IP) Codes                    |                              |                                            |                              |
|--------------------------------------------------|------------------------------|--------------------------------------------|------------------------------|
| First NUMERAL<br>Protection Against Solid Bodies |                              | SECOND NUMERAL<br>Protection Against Water |                              |
| 0                                                | No Protection                | 0                                          | No Protection                |
| 1                                                | Objects Greater Than 50 mm   | 1                                          | Vertically Dripping          |
| 2                                                | Objects Greater Than 12.5 mm | 2                                          | Angled Dripping (15° tilted) |
| 3                                                | Objects Greater Than 2.5 mm  | 3                                          | Spraying                     |
| 4                                                | Objects Greater Than 1.0 mm  | 4                                          | Splashing                    |
| 5                                                | Dust-Protected               | 5                                          | Jetting                      |
| 6                                                | Dust-Tight                   | 6                                          | Powerful Jetting             |
|                                                  |                              | 7                                          | Temporary Immersion          |
|                                                  |                              | 8                                          | Continuous Immersion         |

| Temperature Codes & Classes      |                       |                                    |
|----------------------------------|-----------------------|------------------------------------|
| Maximum Surface Temperature (°C) | US (NEC) Canada (CEC) | US (NEC) Canada (CEC) IEC, CENELEC |
| 450                              | T1                    | T1                                 |
| 300                              | T2                    | T2                                 |
| 280                              | T2A                   |                                    |
| 260                              | T2B                   |                                    |
| 230                              | T2C                   |                                    |
| 215                              | T2D                   |                                    |
| 200                              | T3                    | T3                                 |
| 180                              | T3A                   |                                    |
| 165                              | T3B                   |                                    |
| 160                              | T3C                   |                                    |
| 135                              | T4                    | T4                                 |
| 120                              | T4A                   |                                    |
| 100                              | T5                    | T5                                 |
| 85                               | T6                    | T6                                 |

| Apparatus Grouping                                                      |                          |                                                       |
|-------------------------------------------------------------------------|--------------------------|-------------------------------------------------------|
| Typical Gas/Dust/<br>Fibres/Flyings                                     | US (NEC)<br>Canada (CEC) | US (NEC)<br>Canada (CEC)<br>IEC, CENELEC              |
| Acetylene                                                               | Class I, Group A         | Group IIC                                             |
| Hydrogen                                                                | Class I, Group B         |                                                       |
| Ethylene                                                                | Class I, Group C         | Group IIB                                             |
| Propane                                                                 | Class I, Group D         | Group IIA                                             |
| Methane                                                                 | Gaseous Mines*           | Group I*                                              |
| Magnesium                                                               | Class II, Group E        | IEC, CENELEC<br>do not subdivide<br>by material types |
| Coal                                                                    | Class II, Group F        |                                                       |
| Grain                                                                   | Class II, Group G        |                                                       |
| Cotton                                                                  | Class III                |                                                       |
| *not within scope of NEC or CEC                                         |                          |                                                       |
| Class I - gas/vapour/mist, Class II - dust, Class III - fibres, flyings |                          |                                                       |

| Area Classifications Division vs. Zone |                             |              |
|----------------------------------------|-----------------------------|--------------|
| Type of Area                           | NEC and CEC (North America) | ATEX and IEC |
| Continuous Hazard                      | Division 1 or Zone 0        | Zone 0       |
| Intermittent Hazard                    | Division 1 or Zone 1        | Zone 1       |
| Hazard Under Abnormal Conditions       | Division 2 or Zone 2        | Zone 2       |

| NEMA/CSA/UL Enclosure Types                                                         |                |                                                                 |
|-------------------------------------------------------------------------------------|----------------|-----------------------------------------------------------------|
| Type                                                                                | Application    | Abbreviated Definition*                                         |
| 1                                                                                   | Indoor         | General Purpose                                                 |
| 2                                                                                   | Indoor         | Protection against angled dripping water                        |
| 3, 3R, 3S                                                                           | Indoor/Outdoor | Protection against rain, snow                                   |
| 4, 4X                                                                               | Indoor/Outdoor | Protection against rain, snow, hose directed water              |
| 5                                                                                   | Indoor/Outdoor | Protection against angled dripping water, dust, fibres, flyings |
| 6                                                                                   | Indoor/Outdoor | Protection against temporary submersion                         |
| 6P                                                                                  | Indoor/Outdoor | Protection against prolonged submersion                         |
| 12, 12K                                                                             | Indoor         | Protection against circulating dust, fibres, flyings            |
| 13                                                                                  | Indoor         | Protection against circulating dust, fibres, flyings, seepage   |
| *refer to the enclosure standard for detailed definitions - CSA C22.2 No. 94, UL 50 |                |                                                                 |