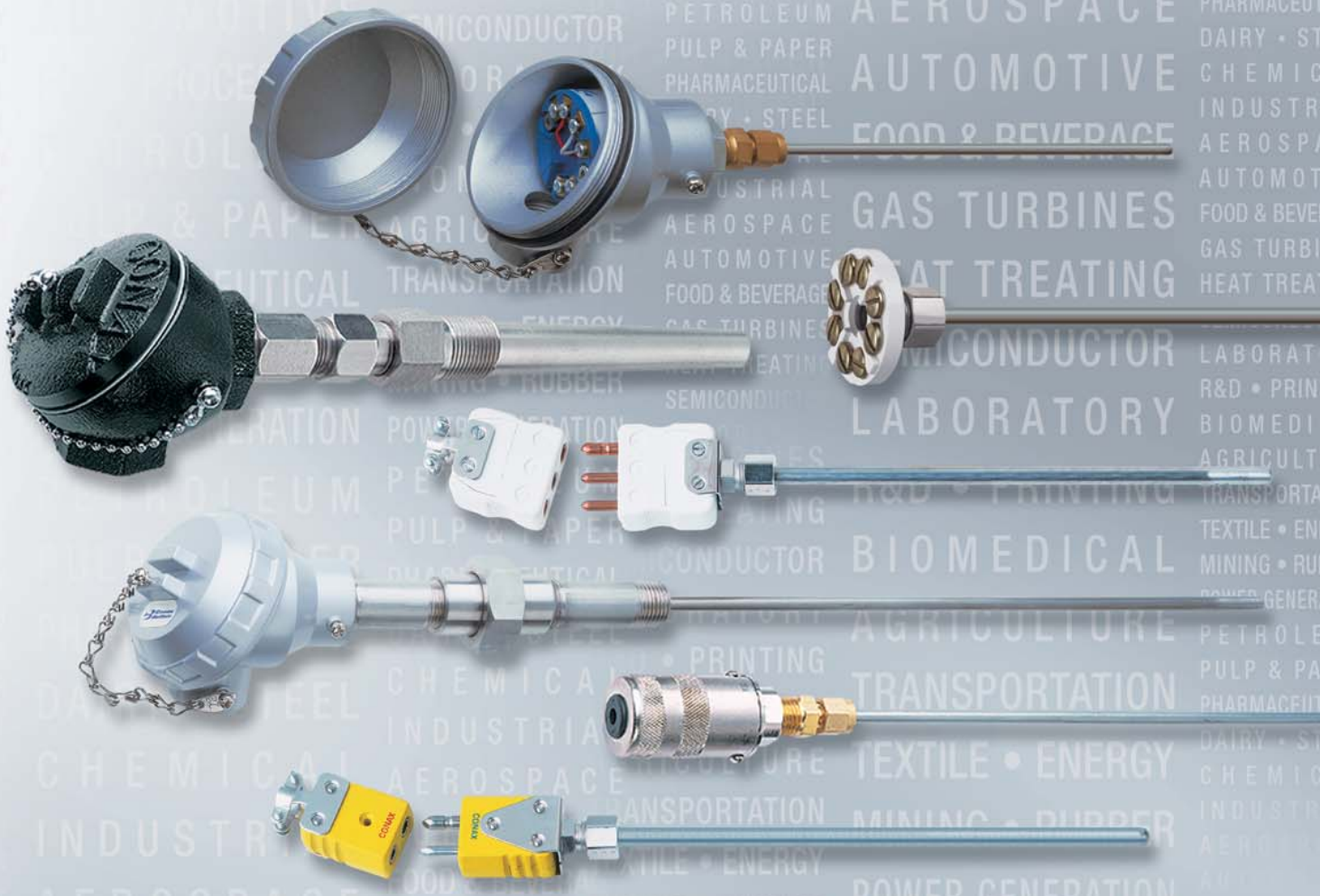
RTD and Thermocouple Assemblies Handbook



Conax Buffalo Technologies

CATALOG 5005

Proven Performers

Conax Buffalo is the industry leader in the design and fabrication of temperature sensor assemblies for a wide variety of industries and uses. We are committed to providing the finest quality temperature sensors, at an affordable price, with an easy ordering system to speed delivery. This catalog outlines our key products for temperature sensor assemblies, but by no means exhausts our capabilities. If you don't see what you need, contact us – we welcome the opportunity to discuss your application and recommend solutions.

In the past 50 years, Conax Buffalo has developed a reputation as the company to turn to for quality solutions to application needs. Many of our custom designs become industry standards. Today, we manufacture more than 100,000 standard assemblies in our state-of-the art production facilities, while our knowledgeable engineering staff continues to break new ground with its custom designs and problem-solving abilities.

From the simplest assembly to the most complicated design challenge, turn to Conax Buffalo Technologies for quality, innovation, on-time delivery and commitment to customer satisfaction. We look forward to serving you.

Engineering, Test &

Conax built its reputation on exceptional engineering capabilities and dedication to a thorough understanding of all aspects of temperature measurement. That tradition continues today, with a full complement of engineering, test, quality assurance and calibration services available in our state-of-the-art manufacturing facility.

Conax engineers welcome the opportunity to discuss and develop solutions to challenging applications. In addition, we offer the latest technology in test equipment for prototyping and design to assist in development of new solutions to customer problems.

This dedication to excellence is also a foundation of our quality assurance program. Raw materials for critical components are thoroughly tested prior to assembly, and all RTDs and thermocouples undergo rigorous electrical inspection before shipment. Conax Quality Assurance programs conform to ISO 9001/ANSI/ASQC Q9001:2000, MIL-I-45208A and MIL-I-45662 standards. Specific tests may be ordered by a customer to meet application standards.

Our in-house capabilities include:

- Temperature Sensor Calibration
- Time Response Testing in accordance with ASTM E644 methods and procedures
- X-Ray and Liquid Dye Penetrant Non-Destructive Testing
- Thermowell Analysis to ASME Performance Test Code 19.3
- Vibration Testing
- Hydrostatic & Pneumatic Pressure Testing
- Helium Mass Spectrometer Leak Testing
- Temperature/Humidity Chambers
- Dimensional & Optical Gauging Systems

Calibration Services

While all Conax sensors are designed to perform accurately, calibration can often be useful in ensuring that your system will provide the most accurate output possible at a given temperature point. Calibration services report the actual deviation of a specific sensor at a given temperature within the allowable limits of error. This improves the overall system accuracy by providing the data to subtract out the sensor error. As sensor characteristics change over time due to aging, mechanical working and effects of environment, periodic recalibration is essential to re-establish the known deviation and ensure that your sensor system continues to provide accurate data.

Conax can precision calibrate your thermocouples, RTDs and thermistors, alone or in assemblies, using industry accepted comparison techniques in a modern, environmentally controlled calibration lab to the following specifications:

- Calibration to NIST traceable standards
- Calibration methods and procedures complying with ASTM E220 and E644
- Calibration ranges:
  - -30˚ F to +3000˚ F (-34˚ C to +1650˚ C) (For lower temperatures, consult factory)
  - -320˚ F (-195.8˚ C) (Boiling Point of Liquid Nitrogen)
  - For 900˚ F or higher, the minimum probe length is 18 inches.
- Temperature control methods include highly stable liquid baths, fluidized powder baths or electrically heated tube furnaces.

Reports

Detailed calibration reports are provided for each test temperature, indicating the temperature of the unit under test, the temperature of the calibration standard, and the allowable deviation vs. the actual deviation.

For RTDs, a resistance vs. temperature report based on the Callendar Van Dusen equation can be provided. This report specifies the temperature vs. resistance characteristics specific to the RTD under test when the sensor is calibrated at a minimum of three points.

Each report is certified by highly trained quality personnel and is maintained on file for future reference.

Calibration Guidelines

Sheath Material	Maximum Recommended* Calibration Temperature
Stainless Steel	1650˚ F (899˚ C)
Inconel	2100˚ F (1149˚ C)
Noble Metal (Platinum)	3000˚ F (1650˚ C)
Ceramic (Alumina)	3000˚ F (1650˚ C)
Refractory Metal (Molybdenum)	800˚ F (427˚ C) in air 3000˚ F (1650˚ C) in inert atmospheres

**Recommended temperatures are a guide and can be exceeded pending Thermocouple and RTD element type.*

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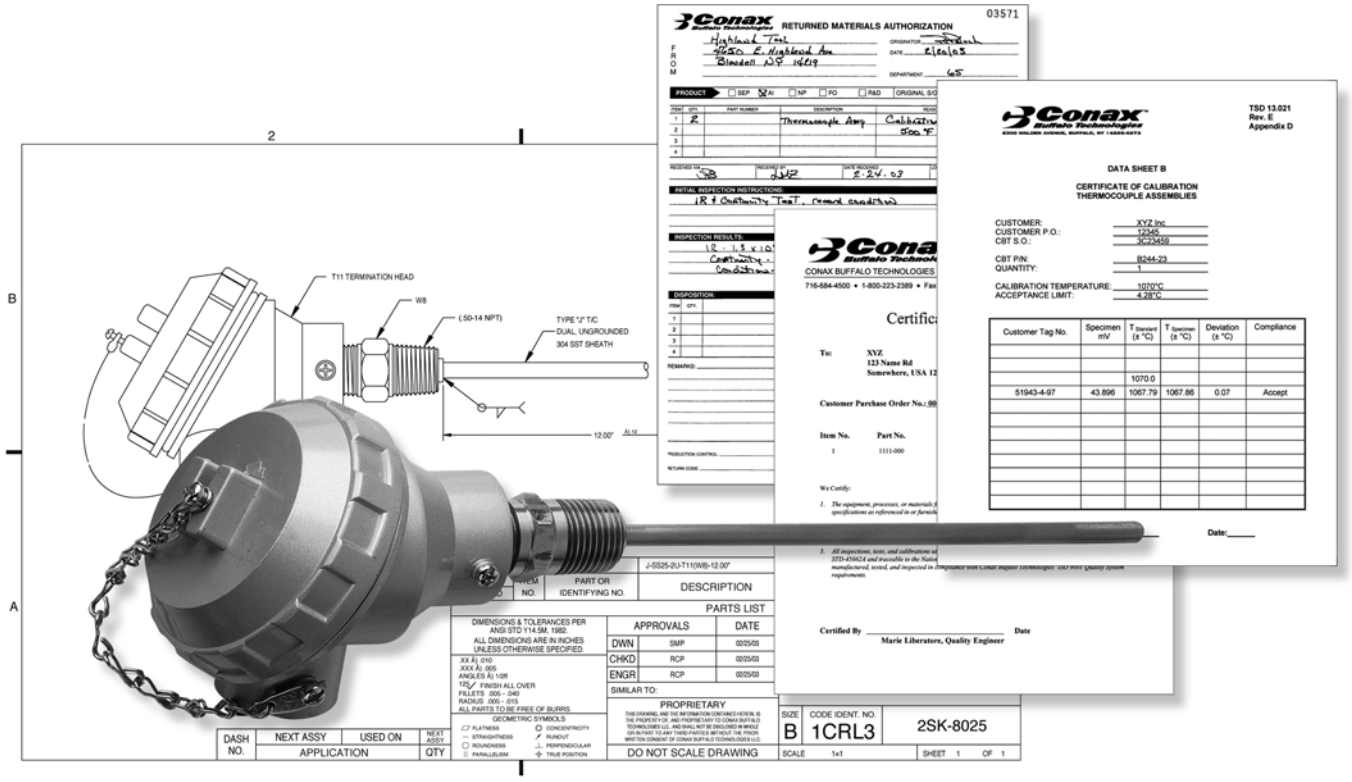
Calibration Services



Pressure/Vacuum Sealing of Wires and Probes

Conax Buffalo developed the "soft sealant" method of pressure/vacuum sealing and is still the leading manufacturer of this type of sealing device. Based on the compression of a sealant material within a fixed housing, the practical application of this technology relies on a thorough understanding of the behavior of sealant materials. Conax offers a complete range of pressure/vacuum compression sealing gland options for wires and probes, including packing glands, transducer glands, electrode glands, power lead glands, split glands, multi-hole metal, multi-hole ceramic and metal ferrule glands.

We also offer a line of accessories, including torque wrenches, crow's feet, socket adaptors and lubrication kits. For information, request the Conax Pressure and Vacuum Sealing Catalog or contact a Conax sales engineer at 800-223-2389.

Conax Buffalo Technologies

RTD Assemblies – Comp

Conax Buffalo's **wirewound platinum RTD assemblies** feature a wirewound element encased in either a stainless steel or Inconel 600 sheath. The RTD's nickel leadwires are supported and insulated throughout the sheath with densely compacted high-purity magnesium oxide. This allows the sensor to be bent like a thermocouple except in the tip portion that contains the element.

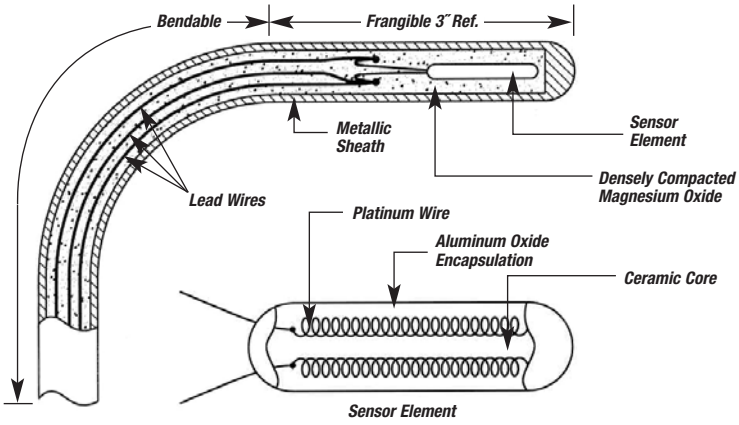
Thin film platinum element assemblies (M-style) use a powder-filled tubewell construction with bare leadwire strung through pre-formed MgO insulators and attached directly to the element. This assembly is inserted into a closed-end tubewell, which is then filled with Al_2O_3 powder and capped with potting compound. **Copper and nickel element assemblies (E-style)** feature a similar tubewell construction, with Teflon®-insulated leadwires brazed to the element. The tubewell is then filled with Al_2O_3 powder and capped with potting compound. In both cases, the minimum active length is 3" and the assemblies should not be bent.

RTD assemblies can be provided with a wide variety of termination styles and mounting fittings to meet the needs of your application. Conax Buffalo also offers numerous sensor tolerances, sheath diameters and sheath materials. This section outlines the key choices needed to specify the correct Conax Buffalo part description for your needs. In each case, you will be asked to select the:

- sensor element to meet your operating conditions and specifications
- sensor tolerance
- lead configuration corresponding to the number of leads your application requires
- sheath material and size
- termination style
- optional mounting configuration
- sheath length

If at any time you require assistance, call 1-800-223-2389 or your local Conax sales representative.

Wirewound Platinum Element Assembly



Sensor Element Descriptions

Catalog Code	Description	Operating Range	
ERTD41	Wirewound Copper, 10Ω (9.05Ω actual) @ 0˚ C, 0.00426 Ω/Ω/˚C	-70˚ C to +150˚ C	-94˚ F to +300˚ F
ERTD42	Wirewound Nickel, 120Ω @ 0˚ C, 0.00672 Ω/Ω/˚C	-40˚ C to +180˚ C	-40˚ F to +350˚ F
RTD43	Wirewound Platinum, 100Ω @ 0˚ C, 0.00385 Ω/Ω/˚C	-250˚ C to +600˚ C	-418˚ F to +1112˚ F
MRTDF43	Thin Film Platinum, 100Ω @ 0˚ C, 0.00385 Ω/Ω/˚C	-50˚ C to +550˚ C	-58˚ F to +1022˚ F
RTD44	Wirewound Platinum, 100Ω @ 0˚ C, 0.00385 Ω/Ω/˚C	-250˚ C to +800˚ C	-418˚ F to +1472˚ F
ARTD44	Wirewound Platinum, 100Ω @ 0˚ C, 0.00385 Ω/Ω/˚C	-196˚ C to +600˚ C	-321˚ F to +1112˚ F
RTD45	Wirewound Platinum, 100Ω @ 0˚ C, 0.003916 Ω/Ω/˚C	-250˚ C to +600˚ C	-418˚ F to +1112˚ F
RTD86	Wirewound Platinum, 200Ω @ 0˚ C, 0.00385 Ω/Ω/˚C	-250˚ C to +600˚ C	-418˚ F to +1112˚ F
MRTDF430	Thin Film Platinum, 1000Ω @ 0˚ C, 0.00385 Ω/Ω/˚C	-50˚ C to +550˚ C	-58˚ F to +1022˚ F

Note: Operating temperatures apply to element only. Assembly operating temperature depends on materials and construction.
When the RTD must fit into an existing network, the ice point resistance and temperature coefficient should match that of the readout equipment – usually found on the equipment nameplate.
Wirewound platinum elements consist of a filament encapsulated within longitudinal holes in a ceramic body. Thin-film elements (designated by "F") consist of a platinum film deposited onto a ceramic substrate and are available only in powder-filled construction.
ASTM E1137 specifications are met by ARTD44.
These sensor types are also available: RTD48, Wirewound Platinum, 10 Ω @ 0˚ C, 0.00385 Ω/Ω/˚C; MRTDF215, Thin Film Platinum, 500 Ω @ 0˚ C, 0.00385 Ω/Ω/˚C. Consult factory.
Wirewound platinum element assemblies are also available in E-style and M-style construction, W tolerance, for certain applications. Consult factory.

Conax Buffalo Technologies

Sensor Tolerances

Class (Catalog Code)	Tolerance at 0˚C (˚C)									
	ERTD41	ERTD42		MRTDF43	RTD43 & RTD44		RTD45		RTD86	MRTDF430
	Single	Single	Dual	Single	Single	Dual	Single	Dual	Single	Single
Class B (W)*	–	–	–	±0.3	±0.3	±0.3	±0.3	±0.3	±0.3	±0.3
1/3 Class B (V)	–	–	–	–	±0.1	–	±0.1	–	–	–
X	±0.4	±0.8	±1.4	–	–	–	–	–	–	–
Class A (S)**	–	–	–	–	±0.15	–	±0.15	–	–	–

Notes:
- *This table represents tolerance values for 3-wire and 4-wire RTDs. Caution must be exercised with 2-wire RTDs and 3-wire RTDs with longer than standard termination leads because possible error can be introduced by leadwire resistance.*
- *Class A and Class B tolerances are based on EN 60751:1996 for platinum elements.*
- *For ASTM E1137 assemblies, ARTD44, W tolerance applies, 4-wire lead configuration.*

** Type W tolerance sensors are the most widely used in the industry.*

*** Type S is only available with Type 4 four-wire lead configuration.*

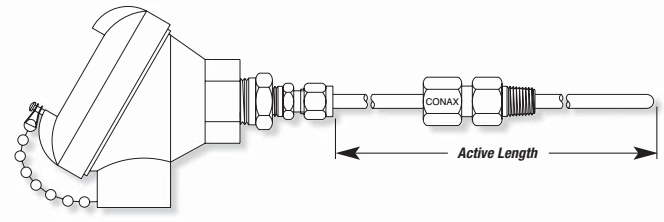
Sheath Diameter and Material Availabilities

Catalog Code			Sheath OD (inches)	Wall Thickness (nominal)	Sensor Element	Single				Dual	
304 Stainless Steel	316 Stainless Steel	INCONEL 600				W	V	X	S	W	X
SS12	316SS12	INC12	0.125	0.020	RTD43	•	•		•	•	
					MRTDF43	•					
					RTD44	•	•		•		
					RTD45	•	•		•		
SS18	316SS18	INC18	0.187	0.028	RTD43	•	•		•	•	
					MRTDF43	•					
					RTD44	•	•		•	•	
					RTD45	•	•		•	•	
SS25	316SS25	INC25	0.250	0.033	ERTD41			•			
					ERTD42			•			•
					RTD43	•	•		•	•	
					MRTDF43	•					
					RTD44	•	•		•	•	
					ARTD44	•					
					RTD45	•	•		•	•	
					RTD86	•					
					MRTDF430	•					

Notes:
- *Per ASTM E1137, stainless steel is recommended for service temperatures not exceeding 900˚F (480˚C). Inconel 600 is recommended for service temperatures not exceeding 1202˚F (650˚C). Conax endorses these recommendations. Above 1202˚F (650˚C), high purity alumina sheathing is suggested.*
- *All 0.125" and 0.187" sheath diameters can be supplied containing up to four wires. All 0.250" sheath diameters can be supplied containing up to eight wires.*
- *ASTM E1137 assemblies, ARTD44W, available in 0.250" sheath diameter only.*
- *Maximum continuous standard probe length is 20 feet. For longer lengths, please consult the factory.*
- *Information on optional sheath materials can be found on pages 23-24 or consult the factory.*

Active Length

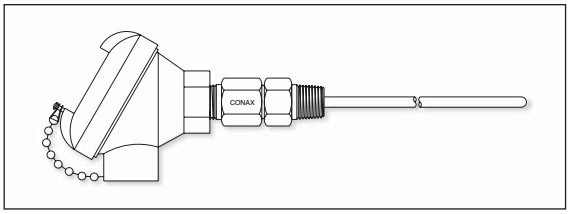
The active length must be specified as the last portion of the catalog description. The active length is the distance in inches from the termination to the sensor tip, as shown in the drawing. Note that you must order the active length, not the immersion. The active length is available in 1/16" increments. For information on immersion length, see pages 25 and 44.



Conax Buffalo Technologies

RTD Assemblies with Termi

Conax Buffalo RTD assemblies offer a wide variety of terminal head styles to meet application needs. In direct mount models, the sheath is attached to the terminal head using either a W8 fitting or a Conax Buffalo manufactured "soft seal" sealing gland. Gland models are provided in different sizes and with various sealant materials to ensure proper function in a wide range of environments. All provided direct mount fittings serve as mounting devices and environmental seals.



Assembly with Conax packing gland.
Example: ***RTD43W3-316SS25-T5AL(PG4BL)-12.00"***

Specify Sensor Element

RTD43 Platinum
- 100Ω @ 0˚ C
- α = 0.00385 Ω/Ω/˚C
- -250˚ C to +600˚ C
- -418˚ F to +1112˚ F

MRTDF43 Platinum
- 100Ω @ 0˚ C
- α = 0.00385 Ω/Ω/˚C
- -50˚ C to +550˚ C
- -58˚ F to +1022˚ F

RTD44 Platinum
- 100Ω @ 0˚ C
- α = 0.00385 Ω/Ω/˚C
- -250˚ C to +800˚ C
- -418˚ F to +1472˚ F
- Inconel 600 sheath standard

RTD45 Platinum
- 100Ω @ 0˚ C
- α = 0.003916 Ω/Ω/˚C
- -250˚ C to +600˚ C
- -418˚ F to +1112˚ F

RTD86 Platinum
- 200Ω @ 0˚ C
- α = 0.00385 Ω/Ω/˚C
- -250˚ C to +600˚ C
- -418˚ F to +1112˚ F

MRTDF430 Platinum
- 1000Ω @ 0˚ C
- α = 0.00385 Ω/Ω/˚C
- -50˚ C to +550˚ C
- -58˚ F to +1022˚ F
- Available with 0.250" sheath diameter or larger

Note: For ASTM E1137 assemblies, use ordering prefix ARTD44W4-SS25 or ARTD44W4-INC25.

Specify Sensor Tolerance

W (Class B)
- Available for RTD43, 44 and 45, single and dual; and RTD86, MRTDF43 and MRTDF430, single only
- Tolerance at 0˚ C is ±0.3˚ C

V (1/3 Class B)
- Available for RTD43, 44 and 45 single only
- Tolerance at 0˚ C is ±0.1˚ C

S (Class A)
- Available for RTD43, 44 and 45 single only
- Tolerance at 0˚ C is ±0.15˚ C

X
- Available for ERTD41, single only; tolerance at 0˚ C is ±0.4˚ C
- Available for ERTD42, single; tolerance at 0˚ C is ±0.8˚ C
- Available for ERTD42, dual; tolerance at 0˚ C is ±1.4˚ C

ERTD41 Copper
- 10Ω (9.05Ω actual) @ 0˚ C
- α = 0.00426 Ω/Ω/˚C
- -70˚ C to +150˚ C
- -94˚ F to +300˚ F
- Available with 0.250" sheath diameter or larger

ERTD42 Nickel
- 120Ω @ 0˚ C
- α = 0.00672 Ω/Ω/˚C
- -40˚ C to +180˚ C
- -40˚ F to +350˚ F
- Available with 0.250" sheath diameter or larger

Specify Sensor Lead Configuration

2 — RED, WHITE — 2-WIRE SINGLE

3 — RED, RED, WHITE — 3-WIRE SINGLE

4 — RED, RED, WHITE, WHITE — 4-WIRE SINGLE

6 — RED, RED, WHITE, WHITE — 2-WIRE DUAL

7 — RED, RED, RED, RED, WHITE, WHITE — 3-WIRE DUAL

8 — RED, RED, RED, RED, WHITE, WHITE, WHITE, WHITE — 4-WIRE DUAL

Note: 0.125" and 0.187" diameter sheaths can contain up to 4 wires; 0.250" diameter sheaths can contain up to 8 wires.

Specify Sheath Material & Size

304 Stainless Steel

SS12
- 0.125" diameter

SS18
- 0.187" diameter

SS25
- 0.250" diameter

316 Stainless Steel

316SS12
- 0.125" diameter

316SS18
- 0.187" diameter

316SS25
- 0.250" diameter

Inconel 600

INC12
- 0.125" diameter
- Standard sheath material for RTD44

INC18
- 0.187" diameter
- Standard sheath material for RTD44

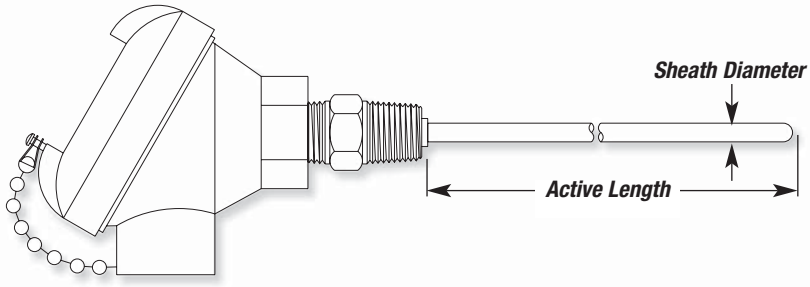
INC25
- 0.250" diameter
- Standard sheath material for RTD44

Note: For additional diameters and other sheath materials, see pages 23-24.

Conax Buffalo Technologies

For more information call: ***1-800-223-2389*** *• e-mail:* ***conaxbuf@conaxbuffalo.com*** *• visit our website:* ***www.conaxbuffalo.com***

nal Head and Direct Mount



Sensor Element | 'W' Sensor Tolerance | '3' Sensor Lead Configuration | 0.250" 316 Stainless Steel Sheath | T5 Aluminum Termination | Mounting Style | Length

Progressive Description Example: ***RTD43W3-316SS25-T5AL(W8)-12.00"***

[ ] ( ) .00"

Specify Termination Style | *Specify Mounting Style* | *Specify Length in Inches (required)*

T5AL - Aluminum
T5CI - Cast Iron

- NEMA 4 rated
- Conduit port 3/4 NPT

T5SS

- NEMA 4X rated
- 316 stainless steel construction
- Conduit port 3/4 NPT

T7

- Weather proof
- Aluminum conduit box accommodates up to 8 terminals
- Conduit port 3/4 NPT

T8

- Weather proof
- Cast iron construction
- Black epoxy coated (E-coat)
- Conduit port 3/4 NPT

T8E

- Explosion proof rating
  Class I, Group B, C & D
  Class II, Group E, F & G
  Class III
- Gray iron body with aluminum screw cover
- NEMA 4 rated
- Conduit port 1/2 NPT

T11

- Weather proof
- Aluminum construction
- Conduit port 1/2 NPT

T11PL

- Weather proof
- Plastic construction
- Conduit port 1/2 NPSM

T12

- Weather proof
- Aluminum construction
- Flip-top head
- Conduit port 1/2 NPT

T13

- FDA compliant, NEMA 4 rated
- White, unpigmented polypropylene construction
- Conduit port 3/4 NPT

T13F

- FDA compliant, NEMA 4X rated
- White, unpigmented polypropylene construction
- Flip-top head
- Conduit port 3/4 NPT

T13T

- FDA compliant, NEMA 4X rated
- White, unpigmented polypropylene construction
- 4 terminal posts
- Conduit port 3/4 NPT

T15EAL - Aluminum
T15ESS - Stainless Steel

- Explosion Proof rating Class 1, Division 1, Groups B, C and D and Dust Proof/Ignition Proof rating for Class II, Division 1, Group E, F & G
- Ratings: T15EAL – NEMA 4, T15ESS – NEMA 4X
- Conduit port 3/4 NPT

Note: For additional terminal head types and detailed descriptions, see page 46-51.

PG2

- For 0.125", 0.187" and 0.250" diameter sheath
- Stainless steel construction
- Mounting thread 1/4 NPT

PG2BL – Lava sealant
PG2BT – Teflon sealant
PG2BN – Neoprene sealant
PG2BV – Viton sealant
PG2BG – Grafoil sealant

PG4

- For 0.250" diameter sheath
- Stainless steel construction
- Mounting thread 1/2 NPT

PG4BL – Lava sealant
PG4BT – Teflon sealant
PG4BN – Neoprene sealant
PG4BV – Viton sealant
PG4BG – Grafoil sealant

W4

- For 0.125", 0.187" and 0.250" diameter sheath
- 316 stainless steel construction
- Mounting thread 1/4 NPT
- Sheath welded to fitting

W8

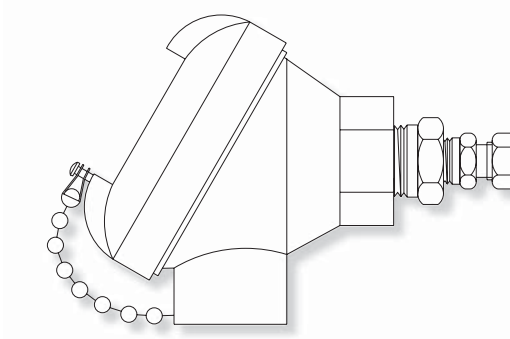
- For 0.125", 0.187" and 0.250" diameter sheath
- 316 stainless steel construction
- Mounting thread 1/2 NPT
- Sheath welded to fitting

Note: For sealant material details, see page 41.

Conax Buffalo Technologies

RTD Assemblies with Terminal Head

RTD assemblies can be supplied with a wide variety of terminal head styles to meet application needs. Adjustable mounting fittings using Conax Buffalo "soft seal" packing glands allow the immersion depth of the sheath to be easily adjusted in the field and provide pressure or vacuum sealing against gases or liquids. (Glands are shipped untorqued.) Gland models are offered in different sizes and with various sealant materials to ensure proper function in a wide range of environments. Additional information on sealing options, as well as sealant temperature and pressure ratings, can be found in Conax Pressure & Vacuum Sealing Assemblies catalog or at www.conaxbuffalo.com.



Specify Sensor Element

RTD43 Platinum
- 100Ω @ 0˚ C
- α = 0.00385 Ω/Ω/˚C
- -250˚ C to +600˚ C
- -418˚ F to +1112˚ F

MRTDF43 Platinum
- 100Ω @ 0˚ C
- α = 0.00385 Ω/Ω/˚C
- -50˚ C to +550˚ C
- -58˚ F to +1022˚ F

RTD44 Platinum
- 100Ω @ 0˚ C
- α = 0.00385 Ω/Ω/˚C
- -250˚ C to +800˚ C
- -418˚ F to +1472˚ F
- Inconel 600 sheath standard

RTD45 Platinum
- 100Ω @ 0˚ C
- α = 0.003916 Ω/Ω/˚C
- -250˚ C to +600˚ C
- -418˚ F to +1112˚ F

RTD86 Platinum
- 200Ω @ 0˚ C
- α = 0.00385 Ω/Ω/˚C
- -250˚ C to +600˚ C
- -418˚ F to +1112˚ F

MRTDF430 Platinum
- 1000Ω @ 0˚ C
- α = 0.00385 Ω/Ω/˚C
- -50˚ C to +550˚ C
- -58˚ F to +1022˚ F
- Available with 0.250" sheath diameter or larger

Note: For ASTM E1137 assemblies, use ordering prefix ARTD44W4-SS25 or ARTD44W4-INC25.

Specify Sensor Tolerance

W (Class B)
- Available for RTD43, 44 and 45, single and dual; and RTD86, MRTDF43 and MRTDF430, single only
- Tolerance at 0˚ C is ±0.3˚ C

V (1/3 Class B)
- Available for RTD43, 44 and 45 single only
- Tolerance at 0˚ C is ±0.1˚ C

S (Class A)
- Available for RTD43, 44 and 45 single only
- Tolerance at 0˚ C is ±0.15˚ C

X
- Available for ERTD41, single only; tolerance at 0˚ C is ±0.4˚ C
- Available for ERTD42, single; tolerance at 0˚ C is ±0.8˚ C
- Available for ERTD42, dual; tolerance at 0˚ C is ±1.4˚ C

ERTD41 Copper
- 10Ω (9.05Ω actual) @ 0˚ C
- α = 0.00426 Ω/Ω/˚C
- -70˚ C to +150˚ C
- -94˚ F to +300˚ F
- Available with 0.250" sheath diameter or larger

ERTD42 Nickel
- 120Ω @ 0˚ C
- α = 0.00672 Ω/Ω/˚C
- -40˚ C to +180˚ C
- -40˚ F to +350˚ F
- Available with 0.250" sheath diameter or larger

Specify Sensor Lead Configuration

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3 — RED, RED, WHITE — 3-WIRE SINGLE

4 — RED, RED, WHITE, WHITE — 4-WIRE SINGLE

6 — RED, RED, WHITE, WHITE — 2-WIRE DUAL

7 — RED, RED, RED, RED, WHITE, WHITE — 3-WIRE DUAL

8 — RED, RED, RED, RED, WHITE, WHITE, WHITE, WHITE — 4-WIRE DUAL

Note: 0.125" and 0.187" diameter sheaths can contain up to 4 wires; 0.250" diameter sheaths can contain up to 8 wires.

Specify Sheath Material & Size

304 Stainless Steel

SS12
- 0.125" diameter

SS18
- 0.187" diameter

SS25
- 0.250" diameter

316 Stainless Steel

316SS12
- 0.125" diameter

316SS18
- 0.187" diameter

316SS25
- 0.250" diameter

Inconel 600

INC12
- 0.125" diameter
- Standard sheath material for RTD44

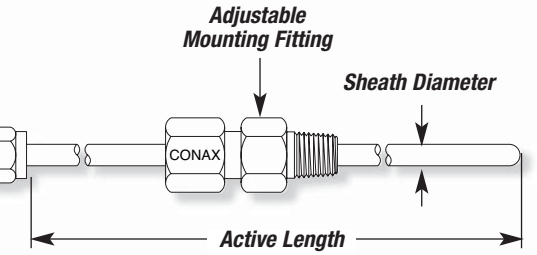
INC18
- 0.187" diameter
- Standard sheath material for RTD44

INC25
- 0.250" diameter
- Standard sheath material for RTD44

Note: For additional diameters and other sheath materials, see pages 23-24.

Conax Buffalo Technologies

s and Adjustable Mounting Fittings



Sensor Element | 'W' Sensor Tolerance | '3' Sensor Lead Configuration | 0.250" 316 Stainless Steel Sheath | T5 Aluminum Termination | Mounting Style | Length

Progressive Description Example: ***RTD43W3-316SS25-T5AL-PG4AL-12.00"***

Specify Termination Style

T5AL - Aluminum
T5CI - Cast Iron

- NEMA 4 rated
- Conduit port 3/4 NPT

T5SS

- NEMA 4X rated
- 316 stainless steel construction
- Conduit port 3/4 NPT

T7

- Weather proof
- Aluminum conduit box accommodates up to 8 terminals
- Conduit port 3/4 NPT

T8

- Weather proof
- Cast iron construction
- Black epoxy coated (E-coat)
- Conduit port 3/4 NPT

T8E

- Explosion proof rating Class I, Group B, C & D Class II, Group E, F & G Class III
- Gray iron body with aluminum screw cover
- NEMA 4 rated
- Conduit port 1/2 NPT

T11

- Weather proof
- Aluminum construction
- Conduit port 1/2 NPT

T11PL

- Weather proof
- Plastic construction
- Conduit port 1/2 NPSM

T12

- Weather proof
- Aluminum construction
- Flip-top head
- Conduit port 1/2 NPT

T13T

- FDA compliant, NEMA 4X rated
- White, unpigmented polypropylene construction
- 4 terminal posts
- Conduit port 3/4 NPT

T15EAL - Aluminum
T15ESS - Stainless Steel

- Explosion Proof rating Class 1, Division 1, Groups B, C and D and Dust Proof/Ignition Proof rating for Class II, Division 1, Group E, F & G
- Ratings: T15EAL – NEMA 4, T15ESS – NEMA 4X
- Conduit port 3/4 NPT

Note: For additional terminal head types and detailed descriptions, see page 46-51.

Specify Mounting Style

Packing Gland

MPG

- For 0.125" and 0.187" diameter sheath
- Stainless steel construction
- Mounting thread 1/8 NPT

MPGAL – Lava sealant
MPGAT – Teflon sealant
MPGAN – Neoprene sealant
MPGAV – Viton sealant
MPGAG – Grafoil sealant

PG2

- For 0.125", 0.187" and 0.250" diameter sheath
- Stainless steel construction
- Mounting thread 1/4 NPT

PG2AL – Lava sealant
PG2AT – Teflon sealant
PG2AN – Neoprene sealant
PG2AV – Viton sealant
PG2AG – Grafoil sealant

PG4

- For 0.250" diameter sheath
- Stainless steel construction
- Mounting thread 1/2 NPT

PG4AL – Lava sealant
PG4AT – Teflon sealant
PG4AN – Neoprene sealant
PG4AV – Viton sealant
PG4AG – Grafoil sealant

Midlock Gland

MK125A

- For 0.125" diameter sheath
- Stainless steel construction
- Stainless steel ferrule
- Mounting thread 1/8 NPT

MK187A

- For 0.187" diameter sheath
- Stainless steel construction
- Stainless steel ferrule
- Mounting thread 1/8 NPT

MK250A

- For 0.250" diameter sheath
- Stainless steel construction
- Stainless steel ferrule
- Mounting thread 1/4 NPT

Note: For sealant material details, see page 41.

This assembly may be purchased without the mounting fitting. Omit the mounting style from the description. The catalog description in this case would be RTD43W3-316SS25-T5AL-12.00".

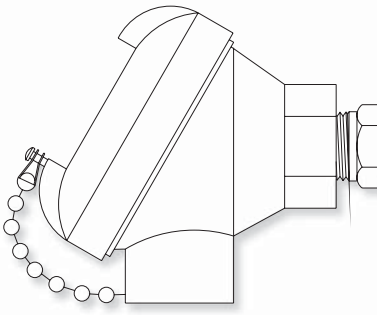
.00"

Specify Length in Inches (required)

Conax Buffalo Technologies

RTD Assemblies with Terminal He

Spring-loaded assemblies are used to maintain positive contact between the sensor tip and the surface to be monitored, typically used with thermowell assemblies. Conax Buffalo supplies a number of styles of spring-loaded assemblies to meet application needs. Spring-loaded assemblies can be provided with all terminal heads. In addition, the T11SL model provides a spring-loaded assembly built into the T11 aluminum terminal head. This allows complete disassembly and removal of the sensor probe without dismantling the terminal head from the conduit or the vessel. For detailed information on these mounting styles, see pages 44-45.



Specify Sensor Element

RTD43 Platinum
- 100Ω @ 0˚ C
- α = 0.00385 Ω/Ω/˚C
- -250˚ C to +600˚ C
- -418˚ F to +1112˚ F

MRTDF43 Platinum
- 100Ω @ 0˚ C
- α = 0.00385 Ω/Ω/˚C
- -50˚ C to +550˚ C
- -58˚ F to +1022˚ F

RTD44 Platinum
- 100Ω @ 0˚ C
- α = 0.00385 Ω/Ω/˚C
- -250˚ C to +800˚ C
- -418˚ F to +1472˚ F
- Inconel 600 sheath standard

RTD45 Platinum
- 100Ω @ 0˚ C
- α = 0.003916 Ω/Ω/˚C
- -250˚ C to +600˚ C
- -418˚ F to +1112˚ F

RTD86 Platinum
- 200Ω @ 0˚ C
- α = 0.00385 Ω/Ω/˚C
- -250˚ C to +600˚ C
- -418˚ F to +1112˚ F

MRTDF430 Platinum
- 1000Ω @ 0˚ C
- α = 0.00385 Ω/Ω/˚C
- -50˚ C to +550˚ C
- -58˚ F to +1022˚ F
- Available with 0.250" sheath diameter or larger

Note: For ASTM E1137 assemblies, use ordering prefix ARTD44W4-SS25 or ARTD44W4-INC25.

Specify Sensor Tolerance

W (Class B)
- Available for RTD43, 44 and 45, single and dual; and RTD86, MRTDF43 and MRTDF430, single only
- Tolerance at 0˚ C is ±0.3˚ C

V (1/3 Class B)
- Available for RTD43, 44 and 45 single only
- Tolerance at 0˚ C is ±0.1˚ C

S (Class A)
- Available for RTD43, 44 and 45 single only
- Tolerance at 0˚ C is ±0.15˚ C

X
- Available for ERTD41, single only; tolerance at 0˚ C is ±0.4˚ C
- Available for ERTD42, single; tolerance at 0˚ C is ±0.8˚ C
- Available for ERTD42, dual; tolerance at 0˚ C is ±1.4˚ C

ERTD41 Copper
- 10Ω (9.05Ω actual) @ 0˚ C
- α = 0.00426 Ω/Ω/˚C
- -70˚ C to +150˚ C
- -94˚ F to +300˚ F
- Available with 0.250" sheath diameter or larger

ERTD42 Nickel
- 120Ω @ 0˚ C
- α = 0.00672 Ω/Ω/˚C
- -40˚ C to +180˚ C
- -40˚ F to +350˚ F
- Available with 0.250" sheath diameter or larger

Specify Sensor Lead Configuration

2 — RED, WHITE — 2-WIRE SINGLE

3 — RED, RED, WHITE — 3-WIRE SINGLE

4 — RED, RED, WHITE, WHITE — 4-WIRE SINGLE

6 — RED, RED, WHITE, WHITE — 2-WIRE DUAL

7 — RED, RED, RED, RED, WHITE, WHITE — 3-WIRE DUAL

8 — RED, RED, RED, RED, WHITE, WHITE, WHITE, WHITE — 4-WIRE DUAL

Note: 0.125" and 0.187" diameter sheaths can contain up to 4 wires; 0.250" diameter sheaths can contain up to 8 wires.

Specify Sheath Material & Size

304 Stainless Steel

SS12
- 0.125" diameter

SS18
- 0.187" diameter

SS25
- 0.250" diameter

316 Stainless Steel

316SS12
- 0.125" diameter

316SS18
- 0.187" diameter

316SS25
- 0.250" diameter

Inconel 600

INC12
- 0.125" diameter
- Standard sheath material for RTD44

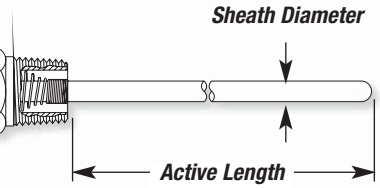
INC18
- 0.187" diameter
- Standard sheath material for RTD44

INC25
- 0.250" diameter
- Standard sheath material for RTD44

Note: For additional diameters and other sheath materials, see pages 23-24.

Conax Buffalo Technologies

ads and Spring-Loaded Mounting



Progressive Description Example: **RTD43W3-316SS25-T5AL(CSLW)-12.00"**

Sensor Element · 'W' Sensor Tolerance · '3' Sensor Lead Configuration · 0.250" 316 Stainless Steel Sheath · T5 Aluminum Termination · Mounting Style · Length

[ ] — *Specify Termination Style*

( ) — *Specify Mounting Style*

.00" — *Specify Length in Inches (required)*

T11SL
- Weather proof
- Aluminum construction
- Built-in spring loaded assembly
- Conduit port 1/2 NPT

T5AL - Aluminum
T5CI - Cast Iron
- NEMA 4 rated
- Conduit port 3/4 NPT

T5SS
- NEMA 4X rated
- 316 stainless steel construction
- Conduit port 3/4 NPT

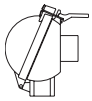
T7
- Weather proof
- Aluminum conduit box accommodates up to 8 terminals
- Conduit port 3/4 NPT

T8
- Weather proof
- Cast iron construction
- Black epoxy coated (E-coat)
- Conduit port 3/4 NPT

T8E
- Explosion proof rating Class I, Group B, C & D Class II, Group E, F & G Class III
- Gray iron body with aluminum screw cover
- NEMA 4 rated
- Conduit port 1/2 NPT

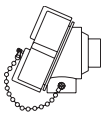
T11
- Weather proof
- Aluminum construction
- Conduit port 1/2 NPT

T11PL
- Weather proof
- Plastic construction
- Conduit port 1/2 NPSM



T12
- Weather proof
- Aluminum construction
- Flip-top head
- Conduit port 1/2 NPT

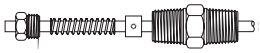
T13T
- FDA compliant, NEMA 4X rated
- White, unpigmented polypropylene construction
- 4 terminal posts
- Conduit port 3/4 NPT



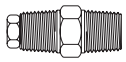
T15EAL - Aluminum
T15ESS - Stainless Steel
- Explosion Proof rating Class 1, Division 1, Groups B, C and D and Dust Proof/Ignition Proof rating for Class II, Division 1, Group E, F & G
- Ratings: T15EAL – NEMA 4, T15ESS – NEMA 4X
- Conduit port 3/4 NPT

Note: For additional terminal head types and detailed descriptions, see page 46-51.

CSLW
- For 0.125", 0.187" and 0.250" diameter sheaths
- Stainless steel construction
- Mounting thread 1/2 NPT

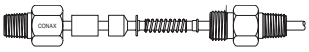


SLAN
- For 0.125", 0.187" and 0.250" diameter sheaths
- Stainless steel construction
- Mounting thread 1/2 NPT
- Probe position can be adjusted in the field



SLANS
- For 0.250" diameter sheath
- Includes Viton O-ring
- Stainless steel construction
- Mounting thread 1/2 NPT
- Probe position can be adjusted in the field

SLN
- For 0.125", 0.187" and 0.250" diameter sheath
- Mounting thread 1/2 NPT
- Most durable



SL
- Spring-loaded packing gland
- Spring travel: 1/4" to 3/8"
- 2-8 pounds spring pressure
- Stainless steel construction, Teflon sealant
- Available with B cap for direct mount
- *Additional dimensional data required, see page 44.*

SL12
- For 0.125" diameter sheath
- Mounting thread 1/8 NPT

SL18
- For 0.187" diameter sheath
- Mounting thread 1/4 NPT

SL25
- For 0.250" diameter sheath
- Mounting thread 1/2 NPT
- Optional 1/4 NPT mounting thread is available. Consult factory.

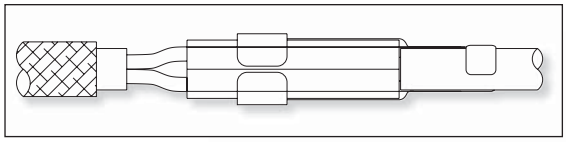
For additional information on spring-loaded mounting styles, see pages 44-45.

Conax Buffalo Technologies

RTD Assemblies with T3/

This exclusive Conax Buffalo design provides a practically unbreakable connection between the leadwire and the probe lead. The T3 epoxy-filled transition is supplied with 24 AWG stranded silver-plated copper Teflon-insulated wire with Teflon overall as standard. Silicone impregnated fiberglass insulation is also available.

T4 termination provides a stainless steel overbraid for maximum flexibility and abrasion resistance. The overbraid is embedded in the epoxy-filled material to ensure mechanical strength. Standard extension leads are 2 ft. long. Longer leads are available on request.



Exclusive Conax strain harness design is used for added support on 0.187˝ diameters and smaller, single element only.

Specify Sensor Element

RTD43 Platinum
- 100Ω @ 0˚ C
- α = 0.00385 Ω/Ω/˚C
- -250˚ C to +600˚ C
- -418˚ F to +1112˚ F

MRTDF43 Platinum
- 100Ω @ 0˚ C
- α = 0.00385 Ω/Ω/˚C
- -50˚ C to +550˚ C
- -58˚ F to +1022˚ F

RTD44 Platinum
- 100Ω @ 0˚ C
- α = 0.00385 Ω/Ω/˚C
- -250˚ C to +800˚ C
- -418˚ F to +1472˚ F
- Inconel 600 sheath standard

RTD45 Platinum
- 100Ω @ 0˚ C
- α = 0.003916 Ω/Ω/˚C
- -250˚ C to +600˚ C
- -418˚ F to +1112˚ F

RTD86 Platinum
- 200Ω @ 0˚ C
- α = 0.00385 Ω/Ω/˚C
- -250˚ C to +600˚ C
- -418˚ F to +1112˚ F

MRTDF430 Platinum
- 1000Ω @ 0˚ C
- α = 0.00385 Ω/Ω/˚C
- -50˚ C to +550˚ C
- -58˚ F to +1022˚ F
- Available with 0.250" sheath diameter or larger

Note: For ASTM E1137 assemblies, use ordering prefix ARTD44W4-SS25 or ARTD44W4-INC25.

Specify Sensor Tolerance

W (Class B)
- Available for RTD43, 44 and 45, single and dual; and RTD86, MRTDF43 and MRTDF430, single only
- Tolerance at 0˚ C is ±0.3˚ C

V (1/3 Class B)
- Available for RTD43, 44 and 45 single only
- Tolerance at 0˚ C is ±0.1˚ C

S (Class A)
- Available for RTD43, 44 and 45 single only
- Tolerance at 0˚ C is ±0.15˚ C

X
- Available for ERTD41, single only; tolerance at 0˚ C is ±0.4˚ C
- Available for ERTD42, single; tolerance at 0˚ C is ±0.8˚ C
- Available for ERTD42, dual; tolerance at 0˚ C is ±1.4˚ C

ERTD41 Copper
- 10Ω (9.05Ω actual) @ 0˚ C
- α = 0.00426 Ω/Ω/˚C
- -70˚ C to +150˚ C
- -94˚ F to +300˚ F
- Available with 0.250" sheath diameter or larger

ERTD42 Nickel
- 120Ω @ 0˚ C
- α = 0.00672 Ω/Ω/˚C
- -40˚ C to +180˚ C
- -40˚ F to +350˚ F
- Available with 0.250" sheath diameter or larger

Specify Sensor Lead Configuration

2 — RED, WHITE — 2-WIRE SINGLE

3 — RED, RED, WHITE — 3-WIRE SINGLE

4 — RED, RED, WHITE, WHITE — 4-WIRE SINGLE

6 — RED, RED, WHITE, WHITE — 2-WIRE DUAL

7 — RED, RED, RED, RED, WHITE, WHITE — 3-WIRE DUAL

8 — RED, RED, RED, RED, WHITE, WHITE, WHITE, WHITE — 4-WIRE DUAL

Note: 0.125" and 0.187" diameter sheaths can contain up to 4 wires; 0.250" diameter sheaths can contain up to 8 wires.

Specify Sheath Material & Size

304 Stainless Steel

SS12
- 0.125" diameter

SS18
- 0.187" diameter

SS25
- 0.250" diameter

316 Stainless Steel

316SS12
- 0.125" diameter

316SS18
- 0.187" diameter

316SS25
- 0.250" diameter

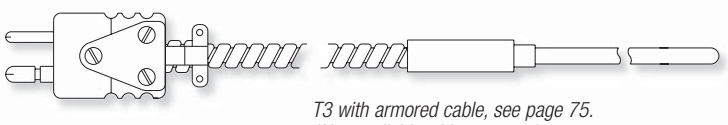
Inconel 600

INC12
- 0.125" diameter
- Standard sheath material for RTD44

INC18
- 0.187" diameter
- Standard sheath material for RTD44

INC25
- 0.250" diameter
- Standard sheath material for RTD44

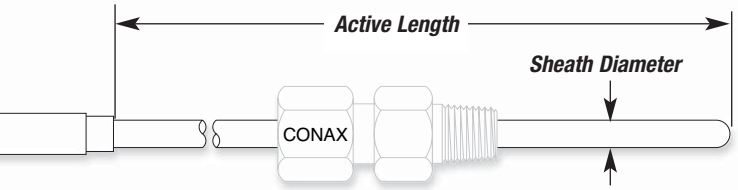
Note: For additional diameters and other sheath materials, see pages 23-24.

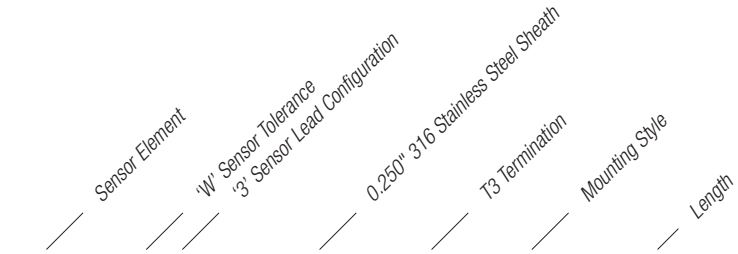


T3 with armored cable, see page 75. (Also available without armor.)

Conax Buffalo Technologies

T4 Leadwire Termination





Specify Termination Style

T3
- Teflon insulated leadwire
- Service temperature: 300˚ F (150˚ C)

T4
- Teflon insulated leadwire
- Stainless steel overbraid
- Service temperature: 300˚ F (150˚ C)

T4F
- Fiberglass/silicone impregnated leadwire insulation
- Stainless steel overbraid
- Service temperature: 300˚ F (150˚ C)

T4(HT)
- Fiberglass/silicone impregnated
- Stainless steel overbraid
- High temperature encapsulant
- Service temperature: 900˚ F (482˚ C)

For longer lead length, specify in feet, rounded up to the nearest foot. Example: T3(3 FT)

Optional leadwire insulation types are available. Example: PVC requested – T3(3 FT-PVC). Consult factory for availability.

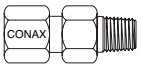
For detailed descriptions of termination styles, see pages 46-47.

Specify Mounting Style (optional)

Packing Gland

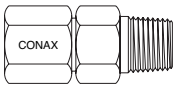
MPG
- For 0.125" and 0.187" diameter sheath
- Stainless steel construction
- Mounting thread 1/8 NPT

MPGAL – Lava sealant
MPGAT – Teflon sealant
MPGAN – Neoprene sealant
MPGAV – Viton sealant
MPGAG – Grafoil sealant



PG2
- For 0.125", 0.187" and 0.250" diameter sheath
- Stainless steel construction
- Mounting thread 1/4 NPT

PG2AL – Lava sealant
PG2AT – Teflon sealant
PG2AN – Neoprene sealant
PG2AV – Viton sealant
PG2AG – Grafoil sealant



PG4
- For 0.250" diameter sheath
- Stainless steel construction
- Mounting thread 1/2 NPT

PG4AL – Lava sealant
PG4AT – Teflon sealant
PG4AN – Neoprene sealant
PG4AV – Viton sealant
PG4AG – Grafoil sealant

Specify Length in Inches (required)

.00"

Midlock Gland

MK125A
- For 0.125" diameter sheath
- Stainless steel construction
- Stainless steel ferrule
- Mounting thread 1/8 NPT

MK187A
- For 0.187" diameter sheath
- Stainless steel construction
- Stainless steel ferrule
- Mounting thread 1/8 NPT

MK250A
- For 0.250" diameter sheath
- Stainless steel construction
- Stainless steel ferrule
- Mounting thread 1/4 NPT

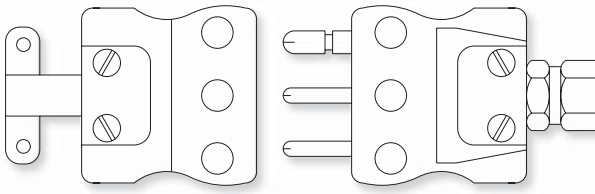
Spring-Load

CSLP
- For 0.125", 0.187" and 0.250" diameter sheaths
- Stainless steel construction
- Mounting thread 1/2 NPT
- *Additional dimensional data required, see page 44.*

Note: For sealant material details, see page 41.

RTD Assemblies with PJF

Polarized plug and jack assembly bodies are made from molded glass-filled thermoset compounds, with copper pin material. The connector is color-coded white. A metal ferrule tube adapter secures the probe in place, and a wire clamp is used to hold the wire. Standard assemblies are designed to operate in temperatures up to 300˚ F (150˚ C). High temperature assemblies operate up to 800˚ F (427˚ C) and are color-coded red. Polarity marks are molded in the bodies for installation assistance. Individual plugs, jacks, tube adapters and wire clamps are also available.



Specify Sensor Element

RTD43 Platinum
- 100Ω @ 0˚ C
- α = 0.00385 Ω/Ω/˚C
- -250˚ C to +600˚ C
- -418˚ F to +1112˚ F

MRTDF43 Platinum
- 100Ω @ 0˚ C
- α = 0.00385 Ω/Ω/˚C
- -50˚ C to +550˚ C
- -58˚ F to +1022˚ F

RTD44 Platinum
- 100Ω @ 0˚ C
- α = 0.00385 Ω/Ω/˚C
- -250˚ C to +800˚ C
- -418˚ F to +1472˚ F
- Inconel 600 sheath standard

RTD45 Platinum
- 100Ω @ 0˚ C
- α = 0.003916 Ω/Ω/˚C
- -250˚ C to +600˚ C
- -418˚ F to +1112˚ F

RTD86 Platinum
- 200Ω @ 0˚ C
- α = 0.00385 Ω/Ω/˚C
- -250˚ C to +600˚ C
- -418˚ F to +1112˚ F

MRTDF430 Platinum
- 1000Ω @ 0˚ C
- α = 0.00385 Ω/Ω/˚C
- -50˚ C to +550˚ C
- -58˚ F to +1022˚ F
- Available with 0.250" sheath diameter or larger

Note: For ASTM E1137 assemblies, use ordering prefix ARTD44W4-SS25 or ARTD44W4-INC25.

Specify Sensor Tolerance

W (Class B)
- Available for RTD43, 44 and 45, single and dual; and RTD86, MRTDF43 and MRTDF430, single only
- Tolerance at 0˚ C is ±0.3˚ C

V (1/3 Class B)
- Available for RTD43, 44 and 45 single only
- Tolerance at 0˚ C is ±0.1˚ C

S (Class A)
- Available for RTD43, 44 and 45 single only
- Tolerance at 0˚ C is ±0.15˚ C

X
- Available for ERTD41, single only; tolerance at 0˚ C is ±0.4˚ C
- Available for ERTD42, single; tolerance at 0˚ C is ±0.8˚ C
- Available for ERTD42, dual; tolerance at 0˚ C is ±1.4˚ C

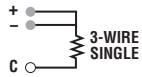
ERTD41 Copper
- 10Ω (9.05Ω actual) @ 0˚ C
- α = 0.00426 Ω/Ω/˚C
- -70˚ C to +150˚ C
- -94˚ F to +300˚ F
- Available with 0.250" sheath diameter or larger

ERTD42 Nickel
- 120Ω @ 0˚ C
- α = 0.00672 Ω/Ω/˚C
- -40˚ C to +180˚ C
- -40˚ F to +350˚ F
- Available with 0.250" sheath diameter or larger

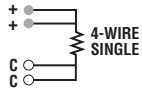
Specify Sensor Lead Configuration

2 — 2-WIRE SINGLE

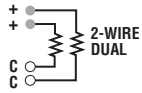
3 — 3-WIRE SINGLE



4 — 4-WIRE SINGLE



6 — 2-WIRE DUAL



Note: 0.125" and 0.187" diameter sheaths can contain up to 4 wires; 0.250" diameter sheaths can contain up to 6 wires.

Specify Sheath Material & Size

304 Stainless Steel

SS12
- 0.125" diameter

SS18
- 0.187" diameter

SS25
- 0.250" diameter

316 Stainless Steel

316SS12
- 0.125" diameter

316SS18
- 0.187" diameter

316SS25
- 0.250" diameter

Inconel 600

INC12
- 0.125" diameter
- Standard sheath material for RTD44

INC18
- 0.187" diameter
- Standard sheath material for RTD44

INC25
- 0.250" diameter
- Standard sheath material for RTD44

Note: For additional diameters and other sheath materials, see pages 23-24.

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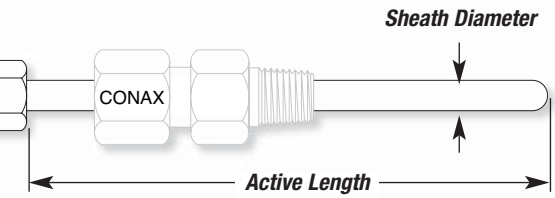
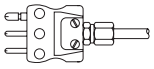
C-Plug/Jack Termination



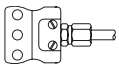
Progressive Description Example: **RTD43W3-316SS25-PJFC-PG4AL-12.00"**

Sensor Element | 'W' Sensor Tolerance | '3' Sensor Lead Configuration | 0.250" 316 Stainless Steel Sheath | PJFC Termination | Mounting Style | Length

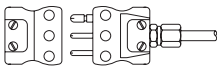
Specify Termination Style



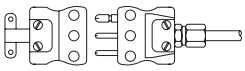
PJ – Male plug only
PJHT – Male plug only, high temperature



PF – Female jack only
PFHT – Female jack only, high temperature



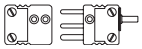
PJF – Male plug & female jack
PJFHT – Male plug & female jack, high temperature



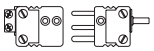
PJFC – Plug, jack & wire clamp
PJFCHT – Plug, jack & wire clamp, high temperature

MPJ – Miniature male plug only
MPJHT – Miniature male plug only, high temperature

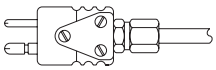
MPF – Miniature female jack only
MPFHT – Miniature female jack only, high temperature



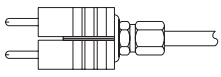
MPJF – Miniature male plug & female jack
MPJFHT – Miniature male plug & female jack, high temperature



MPJFC – Miniature plug, jack & wire clamp
MPJFCHT – Miniature plug, jack & wire clamp, high temperature



Two-pin model



Four-pin model

Miniatures not available in four-pin style.

For detailed descriptions of termination styles, see page 50.

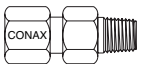
Specify Mounting Style (optional)

Packing Gland

MPG

- For 0.125" and 0.187" diameter sheath
- Stainless steel construction
- Mounting thread 1/8 NPT

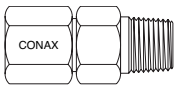
MPGAL – Lava sealant
MPGAT – Teflon sealant
MPGAN – Neoprene sealant
MPGAV – Viton sealant
MPGAG – Grafoil sealant



PG2

- For 0.125", 0.187" and 0.250" diameter sheath
- Stainless steel construction
- Mounting thread 1/4 NPT

PG2AL – Lava sealant
PG2AT – Teflon sealant
PG2AN – Neoprene sealant
PG2AV – Viton sealant
PG2AG – Grafoil sealant



PG4

- For 0.250" diameter sheath
- Stainless steel construction
- Mounting thread 1/2 NPT

PG4AL – Lava sealant
PG4AT – Teflon sealant
PG4AN – Neoprene sealant
PG4AV – Viton sealant
PG4AG – Grafoil sealant

Midlock Gland

MK125A

- For 0.125" diameter sheath
- Stainless steel construction
- Stainless steel ferrule
- Mounting thread 1/8 NPT

MK187A

- For 0.187" diameter sheath
- Stainless steel construction
- Stainless steel ferrule
- Mounting thread 1/8 NPT

MK250A

- For 0.250" diameter sheath
- Stainless steel construction
- Stainless steel ferrule
- Mounting thread 1/4 NPT

Spring-Load

CSLP

- For 0.125", 0.187" and 0.250" diameter sheaths
- Stainless steel construction
- Mounting thread 1/2 NPT
- *Additional dimensional data required, see page 44.*

Note: For sealant material details, see page 41.

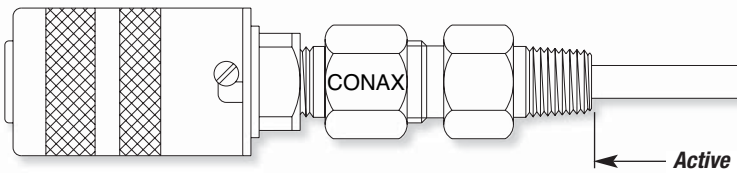
.00"

Specify Length in Inches (required)

Conax Buffalo Technologies

RTD Assemblies with B

Conax Buffalo B-Series heads are compact, lightweight terminal heads that provide convenient hook-up of customer extension wire. The cap and body are nickel-plated to resist corrosion. The ceramic terminal block contains zinc-plated brass terminal posts that accept up to 14 AWG wire. Bayonet-style cover allows easy access to the terminal posts. B-Series heads are provided in direct or adjustable mounting styles.



Direct Mount
Progressive Description Example: ***RTD43W3-316SS25-B***

Sensor Element | 'W' Sensor Tolerance | '3' Sensor Lead Configuration | 0.250" 316 Stainless Steel Sheath

Specify Sensor Element

RTD43 Platinum
- 100Ω @ 0˚ C
- α = 0.00385 Ω/Ω/˚C
- -250˚ C to +600˚ C
- -418˚ F to +1112˚ F

MRTDF43 Platinum
- 100Ω @ 0˚ C
- α = 0.00385 Ω/Ω/˚C
- -50˚ C to +550˚ C
- -58˚ F to +1022˚ F

RTD44 Platinum
- 100Ω @ 0˚ C
- α = 0.00385 Ω/Ω/˚C
- -250˚ C to +800˚ C
- -418˚ F to +1472˚ F
- Inconel 600 sheath standard

RTD45 Platinum
- 100Ω @ 0˚ C
- α = 0.003916 Ω/Ω/˚C
- -250˚ C to +600˚ C
- -418˚ F to +1112˚ F

RTD86 Platinum
- 200Ω @ 0˚ C
- α = 0.00385 Ω/Ω/˚C
- -250˚ C to +600˚ C
- -418˚ F to +1112˚ F

MRTDF430 Platinum
- 1000Ω @ 0˚ C
- α = 0.00385 Ω/Ω/˚C
- -50˚ C to +550˚ C
- -58˚ F to +1022˚ F
- Available with 0.250" sheath diameter or larger

Note: For ASTM E1137 assemblies, use ordering prefix ARTD44W4-SS25 or ARTD44W4-INC25.

Specify Sensor Tolerance

W (Class B)
- Available for RTD43, 44 and 45, single and dual; and RTD86, MRTDF43 and MRTDF430, single only
- Tolerance at 0˚ C is ±0.3˚ C

V (1/3 Class B)
- Available for RTD43, 44 and 45 single only
- Tolerance at 0˚ C is ±0.1˚ C

S (Class A)
- Available for RTD43, 44 and 45 single only
- Tolerance at 0˚ C is ±0.15˚ C

X
- Available for ERTD41, single only; tolerance at 0˚ C is ±0.4˚ C
- Available for ERTD42, single; tolerance at 0˚ C is ±0.8˚ C
- Available for ERTD42, dual; tolerance at 0˚ C is ±1.4˚ C

ERTD41 Copper
- 10Ω (9.05Ω actual) @ 0˚ C
- α = 0.00426 Ω/Ω/˚C
- -70˚ C to +150˚ C
- -94˚ F to +300˚ F
- Available with 0.250" sheath diameter or larger

ERTD42 Nickel
- 120Ω @ 0˚ C
- α = 0.00672 Ω/Ω/˚C
- -40˚ C to +180˚ C
- -40˚ F to +350˚ F
- Available with 0.250" sheath diameter or larger

Specify Sensor Lead Configuration

2 — RED, WHITE — 2-WIRE SINGLE

3 — RED, RED, WHITE — 3-WIRE SINGLE

4 — RED, RED, WHITE, WHITE — 4-WIRE SINGLE

6 — RED, RED, WHITE, WHITE — 2-WIRE DUAL

Specify Sheath Material & Size

304 Stainless Steel

SS12
- 0.125" diameter

SS18
- 0.187" diameter

SS25
- 0.250" diameter

316 Stainless Steel

316SS12
- 0.125" diameter

316SS18
- 0.187" diameter

316SS25
- 0.250" diameter

Inconel 600

INC12
- 0.125" diameter
- Standard sheath material for RTD44

INC18
- 0.187" diameter
- Standard sheath material for RTD44

INC25
- 0.250" diameter
- Standard sheath material for RTD44

Note: For additional diameters and other sheath materials, see pages 23-24.

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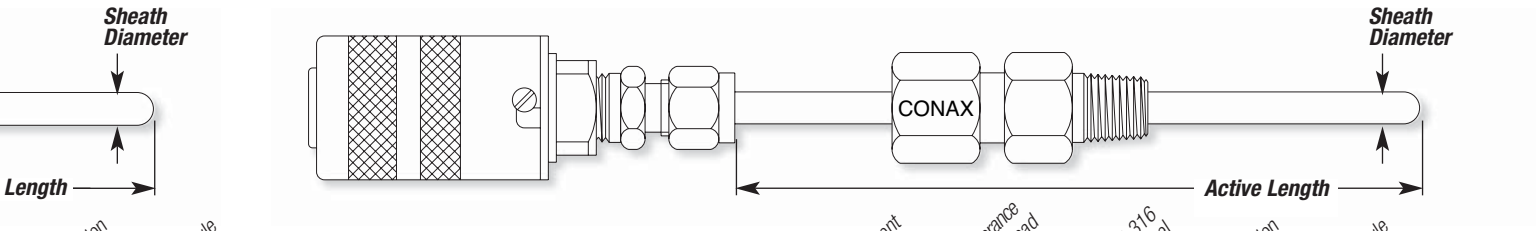
-Series Terminal Head



B3 Termination — Mounting Style — Length

3(PG2BN)-12.00"

Adjustable Mount

Progressive Description Example: **RTD43W3-316SS25-B3-PG2AL-12.00"**

Sensor Element — 'W' Sensor Tolerance — '3' Sensor Lead Configuration — 0.250" 316 Stainless Steel Sheath — B3 Termination — Mounting Style — Length

Specify Termination Style

Specify Mounting Style

.00"

Specify Length in Inches (required)

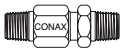
B2
- Standard 2-wire
- Maximum service temperature is 200˚ F (93.3˚ C) with grommet and O-ring; 750˚ F (400˚ C) with grommet and O-ring removed.

B3
- Standard 3-wire
- Maximum service temperature is 200˚ F (93.3˚ C) with grommet and O-ring; 750˚ F (400˚ C) with grommet and O-ring removed

B4
- Standard 4-wire
- Maximum service temperature is 200˚ F (93.3˚ C) with grommet and O-ring; 750˚ F (400˚ C) with grommet and O-ring removed

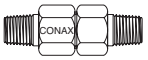
For detailed descriptions of termination styles, see page 50.

DIRECT MOUNT
Packing Gland



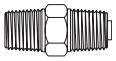
MPG
- For 0.125" and 0.187" diameter sheath
- Stainless steel construction
- Mounting thread 1/8 NPT

MPGBL – Lava sealant
MPGBT – Teflon sealant
MPGBN – Neoprene sealant
MPGBV – Viton sealant
MPGBG – Grafoil sealant



PG2
- For 0.125", 0.187" and 0.250" diameter sheath
- Stainless steel construction
- Mounting thread 1/4 NPT

PG2BL – Lava sealant
PG2BT – Teflon sealant
PG2BN – Neoprene sealant
PG2BV – Viton sealant
PG2BG – Grafoil sealant

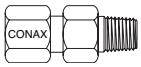


W4
- For 0.125", 0.187" & 0.250" diameter sheath
- 316 stainless steel construction
- Mounting thread 1/4 NPT
- Sheath welded to fitting

ADJUSTABLE MOUNT *(optional)*
Packing Gland

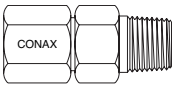
MPG
- For 0.125" and 0.187" diameter sheath
- Stainless steel construction
- Mounting thread 1/8 NPT

MPGAL – Lava sealant
MPGAT – Teflon sealant
MPGAN – Neoprene sealant
MPGAV – Viton sealant
MPGAG – Grafoil sealant



PG2
- For 0.125", 0.187" and 0.250" diameter sheath
- Stainless steel construction
- Mounting thread 1/4 NPT

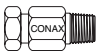
PG2AL – Lava sealant
PG2AT – Teflon sealant
PG2AN – Neoprene sealant
PG2AV – Viton sealant
PG2AG – Grafoil sealant



PG4
- For 0.250" diameter sheath
- Stainless steel construction
- Mounting thread 1/2 NPT

PG4AL – Lava sealant
PG4AT – Teflon sealant
PG4AN – Neoprene sealant
PG4AV – Viton sealant
PG4AG – Grafoil sealant

Midlock Gland



MK125A
- For 0.125" diameter sheath
- Stainless steel construction
- Stainless steel ferrule
- Mounting thread 1/8 NPT

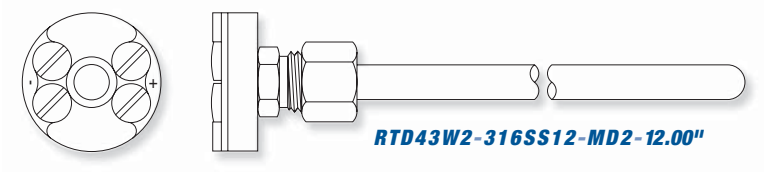
MK187A
- For 0.187" diameter sheath
- Stainless steel construction
- Stainless steel ferrule
- Mounting thread 1/8 NPT

MK250A
- For 0.250" diameter sheath
- Stainless steel construction
- Stainless steel ferrule
- Mounting thread 1/4 NPT

Note: For sealant material details, see page 41.

RTD Assemblies with

The MD disc-style termination is small, compact, lightweight and provides easy access and convenient wire termination. It is excellent for use in clean areas and confined spaces. The disc is molded from high-performance thermoset compounds, color-coded white (high-temperature models are red). The discs are mounted directly to the sheath using a brass metal-to-metal compression fitting.



Specify Sensor Element

RTD43 Platinum
- 100Ω @ 0˚ C
- α = 0.00385 Ω/Ω/˚C
- -250˚ C to +600˚ C
- -418˚ F to +1112˚ F

MRTDF43 Platinum
- 100Ω @ 0˚ C
- α = 0.00385 Ω/Ω/˚C
- -50˚ C to +550˚ C
- -58˚ F to +1022˚ F

RTD44 Platinum
- 100Ω @ 0˚ C
- α = 0.00385 Ω/Ω/˚C
- -250˚ C to +800˚ C
- -418˚ F to +1472˚ F
- Inconel 600 sheath standard

RTD45 Platinum
- 100Ω @ 0˚ C
- α = 0.003916 Ω/Ω/˚C
- -250˚ C to +600˚ C
- -418˚ F to +1112˚ F

RTD86 Platinum
- 200Ω @ 0˚ C
- α = 0.00385 Ω/Ω/˚C
- -250˚ C to +600˚ C
- -418˚ F to +1112˚ F

MRTDF430 Platinum
- 1000Ω @ 0˚ C
- α = 0.00385 Ω/Ω/˚C
- -50˚ C to +550˚ C
- -58˚ F to +1022˚ F
- Available with 0.250" sheath diameter or larger

Note: For ASTM E1137 assemblies, use ordering prefix ARTD44W4-SS25 or ARTD44W4-INC25.

Specify Sensor Tolerance

W (Class B)
- Available for RTD43, 44 and 45, single and dual; and RTD86, MRTDF43 and MRTDF430, single only
- Tolerance at 0˚ C is ±0.3˚ C

V (1/3 Class B)
- Available for RTD43, 44 and 45 single only
- Tolerance at 0˚ C is ±0.1˚ C

S (Class A)
- Available for RTD43, 44 and 45 single only
- Tolerance at 0˚ C is ±0.15˚ C

X
- Available for ERTD41, single only; tolerance at 0˚ C is ±0.4˚ C
- Available for ERTD42, single; tolerance at 0˚ C is ±0.8˚ C
- Available for ERTD42, dual; tolerance at 0˚ C is ±1.4˚ C

ERTD41 Copper
- 10Ω (9.05Ω actual) @ 0˚ C
- α = 0.00426 Ω/Ω/˚C
- -70˚ C to +150˚ C
- -94˚ F to +300˚ F
- Available with 0.250" sheath diameter or larger

ERTD42 Nickel
- 120Ω @ 0˚ C
- α = 0.00672 Ω/Ω/˚C
- -40˚ C to +180˚ C
- -40˚ F to +350˚ F
- Available with 0.250" sheath diameter or larger

Specify Sensor Lead Configuration

2 — RED, WHITE — 2-WIRE SINGLE

3 — RED, RED, WHITE — 3-WIRE SINGLE

4 — RED, RED, WHITE, WHITE — 4-WIRE SINGLE

6 — RED, RED, WHITE, WHITE — 2-WIRE DUAL

Specify Sheath Material & Size

304 Stainless Steel

SS12
- 0.125" diameter

SS18
- 0.187" diameter

SS25
- 0.250" diameter

316 Stainless Steel

316SS12
- 0.125" diameter

316SS18
- 0.187" diameter

316SS25
- 0.250" diameter

Inconel 600

INC12
- 0.125" diameter
- Standard sheath material for RTD44

INC18
- 0.187" diameter
- Standard sheath material for RTD44

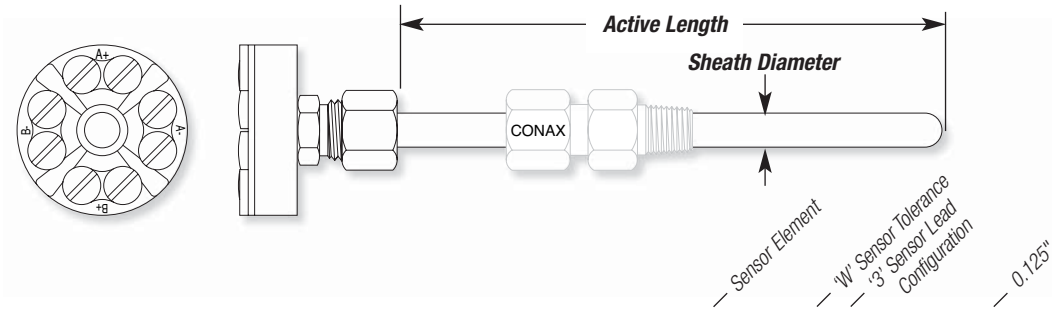
INC25
- 0.250" diameter
- Standard sheath material for RTD44

Note: For additional diameters and other sheath materials, see pages 23-24.

Conax Buffalo Technologies

For more information call: ***1-800-223-2389*** *• e-mail:* ***conaxbuf@conaxbuffalo.com*** *• visit our website:* ***www.conaxbuffalo.com***

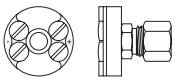
MD Disc Termination



Sensor Element — 'W' Sensor Tolerance — '3' Sensor Lead Configuration — 0.125" 316 Stainless Steel Sheath — MD3 Termination — Mounting Style — Length

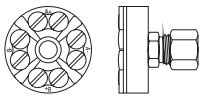
Progressive Description Example: ***RTD43W3-316SS12-MD3-PG2AL-12.00"***

_____	_____	.00"
Specify Termination Style	*Specify Mounting Style (optional)*	*Specify Length in Inches (required)*



MD2
- Standard 2-wire
- Maximum service temperature: 400˚ F (205˚ C) continuous, 500˚ F (260˚ C) intermittent
- Available with 0.125", 0.187" or 0.250" diameter sheath
- 1" OD x 1.1" overall

MD2HT
- Standard 2-wire
- Maximum service temperature: 800˚ F (425˚ C) continuous, 1000˚ F (538˚ C) intermittent
- Available with 0.125", 0.187" or 0.250" diameter sheath
- 1" OD x 1.1" overall



MD3
- Standard 3-wire
- Maximum service temperature: 400˚ F (205˚ C) continuous, 500˚ F (260˚ C) intermittent
- Available with 0.125", 0.187" or 0.250" diameter sheath
- 1-1/4" OD x 1.1" overall

MD3HT
- Standard 3-wire
- Maximum service temperature: 800˚ F (425˚ C) continuous, 1000˚ F (538˚ C) intermittent
- Available with 0.125", 0.187" or 0.250" diameter sheath
- 1-1/4" OD x 1.1" overall

MD4
- Standard 4-wire
- Maximum service temperature: 400˚ F (205˚ C) continuous, 500˚ F (260˚ C) intermittent
- Available with 0.125", 0.187" or 0.250" diameter sheath
- 1-1/4" OD x 1.1" overall

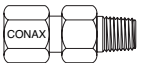
MD4HT
- Standard 4-wire
- Maximum service temperature: 800˚ F (425˚ C) continuous, 1000˚ F (538˚ C) intermittent
- Available with 0.125", 0.187" or 0.250" diameter sheath
- 1-1/4" OD x 1.1" overall

For detailed descriptions of termination styles, see page 50.

Packing Gland

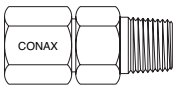
MPG
- For 0.125" and 0.187" diameter sheath
- Stainless steel construction
- Mounting thread 1/8 NPT

MPGAL – Lava sealant
MPGAT – Teflon sealant
MPGAN – Neoprene sealant
MPGAV – Viton sealant
MPGAG – Grafoil sealant



PG2
- For 0.125", 0.187" and 0.250" diameter sheath
- Stainless steel construction
- Mounting thread 1/4 NPT

PG2AL – Lava sealant
PG2AT – Teflon sealant
PG2AN – Neoprene sealant
PG2AV – Viton sealant
PG2AG – Grafoil sealant



PG4
- For 0.250" diameter sheath
- Stainless steel construction
- Mounting thread 1/2 NPT

PG4AL – Lava sealant
PG4AT – Teflon sealant
PG4AN – Neoprene sealant
PG4AV – Viton sealant
PG4AG – Grafoil sealant

Midlock Gland

MK125A
- For 0.125" diameter sheath
- Stainless steel construction
- Stainless steel ferrule
- Mounting thread 1/8 NPT

MK187A
- For 0.187" diameter sheath
- Stainless steel construction
- Stainless steel ferrule
- Mounting thread 1/8 NPT

MK250A
- For 0.250" diameter sheath
- Stainless steel construction
- Stainless steel ferrule
- Mounting thread 1/4 NPT

Note: For sealant material details, see page 41.

Conax Buffalo Technologies

Thermocouple Assemblies –

Conax Buffalo thermocouple assemblies represent the culmination of 50 years experience in the design and manufacture of temperature sensors. Conax Buffalo thermocouple designs have proven their durability and reliability in applications ranging from large industrial processing plants to highly specialized laboratory testing and validation. Our extensive knowledge of the science of temperature measurement and the physical properties of materials used for sheathing and insulation enables our sales engineers to recommend the most effective solutions to your application needs.

Conax Buffalo thermocouple assemblies offer a wide variety of termination styles and mounting fittings, as well as extensive choices in sensor calibration, sheath diameter and sheath material. This section outlines the key choices needed to specify the correct Conax Buffalo part description for your needs. In each case, you will be asked to select the:

- sensor calibration
- sheath material and size
- tip configuration
- termination style
- optional mounting configuration
- sheath length

If at any time you require assistance, call 1-800-223-2389 or your local Conax sales representative.

Thermocouple Types

Choose the thermocouple type from the temperature range table below. Minimum requirements for all Conax Buffalo thermocouples are standard limits of error, denoted by a single letter (eg. J). Special limits of error are also available above 32˚ F (0˚ C) and are designated by a double calibration letter (eg. JJ).

ANSI/ASME Designation	Calibration	Service Temperatures (Bare/Exposed Wire*)	Remarks
J	Iron vs. Constantan	32˚ F to 1400˚ F (0˚ C to 760˚ C)	For use in reducing atmospheres. Iron may oxidize if unprotected in oxidizing atmospheres. Limited use possible in oxidizing atmospheres at high temperatures; not recommended at low temperatures.
K	Chromel® vs. Alumel®	-328˚ F to 2300˚ F (-200˚ C to 1260˚ C)	For use in oxidizing atmospheres. Not recommended for reducing atmospheres.
E	Chromel vs. Constantan	-328˚ F to 1600˚ F (-200˚ C to 870˚ C)	Good for use in oxidizing atmospheres. Highest EMF output of the common thermocouples.
T	Copper vs. Constantan	-328˚ F to 700˚ F (-200˚ C to 370˚ C)	For use in oxidizing, reducing and inert atmospheres. Capable of cryogenic temperature service. Good where moisture is present.
N	Nicrosil vs. Nisil	32˚ F to 2300˚ F (0˚ C to 1260˚ C)	Less affected by the order/disorder transformation that causes calibration shifts in Type K. For use in oxidizing atmospheres.
S	Platinum-10% Rhodium vs. Platinum	32˚ F to 2700˚ F (0˚ C to 1480˚ C)	For use in oxidizing atmospheres. Alumina protection tubes are recommended to resist contamination at elevated temperatures.
R	Platinum-13% Rhodium vs. Platinum	32˚ F to 2700˚ F (0˚ C to 1480˚ C)	For use in oxidizing atmospheres. Alumina protection tubes are recommended to resist contamination at elevated temperatures.
B	Platinum-30% Rhodium vs. Platinum-6% Rhodium	1600˚ F to 3100˚ F (870˚ C to 1700˚ C)	For use in oxidizing, inert or vacuum atmospheres. Alumina protection tubes are recommended to resist contamination at elevated temperatures.
C	Tungsten-5% Rhenium vs. Tungsten-26% Rhenium	32˚ F to 4200˚ F (0˚ C to 2315˚ C)	For use in hydrogen, inert or vacuum atmospheres.

- Supplied environment data for bare or exposed wire, less protective sheath.
- For more technical and ordering information on Type S, R, B & C assemblies, request Conax High Temperature Thermocouples Bulletin 6008.
- Type C not available in special limits of error.

Conax Buffalo Technologies

Sheath Materials and Sizes

Catalog Code	Sheath Diameter	Sheath Wall Thickness	Wire Gauge	Sheath Material	Upper Service Temperature	Melting Point	Remarks
SS4	0.040	0.004 to 0.005	34-35	304 SST (standard stocked probe sheath material available in all sizes)	1650˚ F (900˚ C)	2600˚ F (1430˚ C)	Standard, most economical sheath material. Resists oxidation to 1650˚ F (900˚ C).
SS6	0.062	0.006 to 0.008	30-31				
SS12	0.125	0.012 to 0.015	24-25				
SS18	0.187	0.019 to 0.023	20-21				
SS25	0.250	0.025 to 0.030	18-19				
SS37	0.375	0.037 to 0.045	14-15				
310SS		Consult Factory		310 SST	2000˚ F (1090˚ C)	2600˚ F (1430˚ C)	Excellent resistance to oxidizing and carburizing atmospheres.
316SS4	0.040	0.004 to 0.005	34-35	316 SST (stocked probe sheath material available in all sizes)	1650˚ F (900˚ C)	2600˚ F (1430˚ C)	Good weldability. Resistant to carbide precipitation.
316SS6	0.062	0.006 to 0.008	30-31				
316SS12	0.125	0.012 to 0.015	24-25				
316SS18	0.187	0.019 to 0.023	20-21				
316SS25	0.250	0.025 to 0.030	18-19				
316SS37	0.375	0.037 to 0.045	14-15				
321SS		Consult Factory		321 SST	1650˚ F (900˚ C)	2570˚ F (1410˚ C)	Excellent resistance to intergranular corrosion. Immune to organic chemical attack.
INC4	0.040	0.004 to 0.005	34-35	INCONEL 600 (standard stocked probe sheath material available in all sizes)	2100˚ F (1150˚ C)	2525˚ F (1390˚ C)	Excellent resistance to stress corrosion cracking. Used in chemical and aircraft industries.
INC6	0.062	0.006 to 0.008	30-31				
INC12	0.125	0.012 to 0.015	24-25				
INC18	0.187	0.019 to 0.023	20-21				
INC25	0.250	0.025 to 0.030	18-19				
INC37	0.375	0.037 to 0.045	14-15				
188HN		Consult Factory		HAYNES 188	2100˚ F (1150˚ C)	2400˚ F (1315˚ C)	Excellent high temperature strength and oxidation resistance to 2100˚ F (1150˚ C).
214HN		Consult Factory		HAYNES 214	2200˚ F (1200˚ C)	2475˚ F (1360˚ C)	Excellent oxidation, carbonization and chlorination resistance.
230HN		Consult Factory		HAYNES 230	2100˚ F (1150˚ C)	2440˚ F (1340˚ C)	Excellent high temperature strength and oxidation resistance to 2100˚ F (1150˚ C). Excellent resistance to nitriding environments.
HC		Consult Factory		HASTELLOY C	2000˚ F (1090˚ C)	2380˚ F (1300˚ C)	Excellent corrosion resistance to 2000˚ F (1090˚ C). Good chlorine resistance.
HX		Consult Factory		HASTELLOY X	2200˚ F (1200˚ C)	2380˚ F (1300˚ C)	Good strength to 2200˚ F (1200˚ C). Used as sheath material in aircraft industries.
TI12	0.125	0.017 to 0.023	22-24	TITANIUM	2000˚ F (1090˚ C)	3035˚ F (1670˚ C)	Resistant to acid and chemical attack. Primary uses in aircraft applications.
TA6	0.062	0.008 to 0.012	29-30	TANTALUM	4500˚ F (2480˚ C)	5425˚ F (3000˚ C)	Resistant to acids and liquid metals, except for fluming sulphuric and hydrochloric. Subject to hydrogen and nitrogen embrittlement. Limited to 500˚ F (260˚ C) in air or oxidizing atmospheres.
TA12	0.125	0.017 to 0.023	22-24				
TA18	0.187	0.025 to 0.031	19-20				
TA25	0.250	0.035 to 0.041	17-18				
PLT4	0.040	0.004 to 0.005	34-35	PLATINUM-10% RHODIUM	3200˚ F (1760˚ C)	3360˚ F (1850˚ C)	Stronger than pure platinum. Excellent in oxidizing atmospheres.
PLT6	0.062	0.006 to 0.008	30-31				
PLT12	0.125	0.012 to 0.015	24-25				

Note: Information provided is for 2-wire material only. For 4-wire and 6-wire material, consult factory.

Thermocouple Assemblies –

High-Temperature Tubewell Materials and Sizes

Catalog Type	Sheath Diameter	Sheath Material	Upper Service Temperature	Melting Point	Remarks
SA SiC	0.375 0.625 0.750	ALPHA-SINTERED SILICON CARBIDE	3000˚ F (1650˚ C)	—	No free silicon, higher density than SiC, low porosity, excellent thermal shock resistance, high chemical, corrosion and abrasion resistance. Excellent thermal conductivity. Not recommended for molten steel.
AL_2O_3	0.125 0.187 0.250 0.375	ALUMINA	3450˚ F (1900˚ C)	3686˚ F (2030˚ C)	High-purity aluminum oxide offers high thermal conductivity, high electrical resistivity and good resistance to thermal shock. It also offers excellent resistance to chemical attack. Aluminum oxide functions well in oxidizing, reducing or high vacuum applications, but is not recommended for high vacuum environments in the presence of graphite at temperatures exceeding 2372˚ F (1300˚ C).
QUARTZ	CONSULT FACTORY	FUSED QUARTZ	3050˚ F (1677˚ C)	—	Excellent thermal shock resistance, non-reactive to most acids and metals, performs well in oxidizing, inert or neutral atmospheres.
MO	0.125 0.187 0.250	MOLYBDENUM	3400˚ F (1870˚ C)	4730˚ F (2610˚ C)	Molybdenum offers excellent mechanical properties at elevated temperatures and is exceptional for use in reducing or neutral atmospheres. Molybdenum offers superb thermal shock resistance and has potentially unlimited life at high temperatures in a vacuum. Pure hydrogen, argon and helium atmospheres are completely inert to molybdenum. Performance is poor in oxidizing atmospheres. Above 800˚ F (427˚ C), molybdenum will react with oxygen.

For additional technical and ordering information, request Conax High Temperature Thermocouples Bulletin 6008.

Application Atmospheres

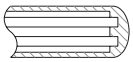
	Oxidizing	Reducing	Inert	Vacuum
Catalog Type				
J	G	VG	VG	VG
K	VG	NR	VG	VG
E	VG	G	VG	G
T	VG	G	VG	VG
N	VG	VG	VG	VG
S	VG	NR	G	G
R	VG	NR	G	G
B	VG	NR	VG	VG
C	NR	VG	VG	VG
Sheath Type				
304SST	VG	G	VG	VG
310SST	VG	G	VG	VG
316SST	VG	G	VG	VG
321SST	VG	G	VG	VG

	Oxidizing	Reducing	Inert	Vacuum
Sheath Type				
INCONEL 600	VG	G	VG	VG
HAYNES 188	VG	G	VG	VG
HAYNES 214	VG	G	VG	VG
HAYNES 230	VG	G	VG	VG
HASTELLOY C	VG	VG	VG	F
HASTELLOY X	VG	G	VG	F
TITANIUM	G to 800˚ F	NR	G	G
TANTALUM	G to 500˚ F	NR	VG	VG
PLATINUM-10% RHODIUM	VG	NR	VG	G
Tubewell Materials				
ALPHA-SINTERED SILICON CARBIDE	VG	VG	VG	VG
ALUMINA	VG	VG	VG	VG
FUSED QUARTZ	VG	VG	VG	VG
MOLYBDENUM	G to 800˚ F	VG	VG	VG

G – Good
VG – Very good
NR – Not recommended
F – Fair

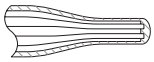
Conax Buffalo Technologies

Tip Configurations



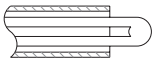
G – Grounded

- Most commonly used, not recommended for high temperature or highly corrosive environments.
- Not available for S, R, B or C thermocouples with base metal sheathing (stainless steel or Inconel).
- Measuring junction welded to sheath tip.
- Faster response and slightly lower cost than ungrounded.



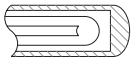
GR – Grounded, Reduced

- Same specifications as grounded, but the sheath outer diameter is reduced to obtain faster response time without loss of structural strength. The tip configuration provides for larger termination conductors, resulting in less corrosion and breakage. The length of the reduced sheath is approximately one inch.
- Not recommended for S, R, B or C thermocouples with stainless steel or Inconel sheathing.
- 0.040" OD sheath reduced to 0.032" OD (not available for Type T configuration).
- 0.062" OD sheath reduced to 0.040" OD
- 0.125" OD sheath reduced to 0.093" OD
- 0.187" OD sheath reduced to 0.125" OD
- 0.250" OD sheath reduced to 0.187" OD



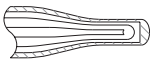
B – Bare Wire

- For the fastest response time, the thermocouple hot junction extends beyond the insulation and sheath for direct contact with the process.
- Welded, bare wire hot junction provides minimum mass.
- Exposed mineral insulation is encapsulated with alumina ceramic cement and is not completely moisture sealed. Therefore, pre-heat to 250˚ F (121˚ C) prior to operational use.



U – Ungrounded

- Provides longer life under maximum vibration, shock and corrosive conditions. Recommended for electrical applications where stray RFI/EMI could affect output. Additional insulation resistance tests can be easily made to verify thermocouple electrical integrity.
- Mineral insulation is densely compacted to eliminate voids.
- Completely homogenous welded closure at tip provides maximum corrosion resistance.
- Note on multiple elements: for dual elements with diameters 0.187" through 0.375" and triple elements with 0.250" diameter, the probes are isolated ungrounded. For all other diameters, probes are common ungrounded.



UR – Ungrounded, Reduced

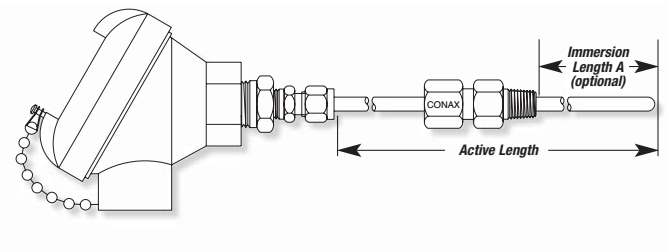
- Same specifications as ungrounded, but the sheath outer diameter is reduced to obtain faster response time without loss of structural strength. The tip configuration provides for larger termination conductors, resulting in less corrosion, breakage and high sheath-to-wire and wire-to-wire insulation resistance. The length of the reduced sheath is approximately one inch.
- 0.062" OD sheath reduced to 0.040" OD
- 0.125" OD sheath reduced to 0.093" OD
- 0.187" OD sheath reduced to 0.125" OD
- 0.250" OD sheath reduced to 0.187" OD

Multiple Element Junctions: ***For T Series and MD terminations, dual element assemblies (4-wire) require the prefix number "2"; for example: J-SS12-2U-T5. Triple element assemblies (6-wire) require the prefix number "3"; for example: J-SS12-3U-T5. Series B, C, P and PJF terminations do not require an additional prefix number, as the terminal head type specifies the terminal wire quantity.***

See page 71 for specialty tip configurations.

Active Length

The active length must be specified as the last portion of the catalog description. The active length is the distance in inches from the termination to the sensor tip, as shown in the drawing. Note that you must order the active length, not the immersion. The active length is available in 1/16" increments.

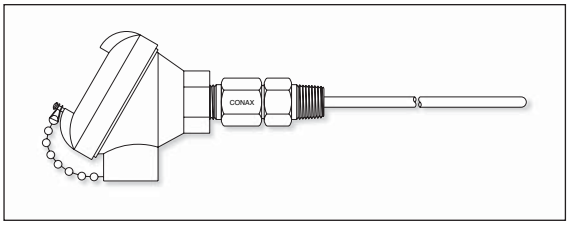


With adjustable fittings and spring-load assemblies, the immersion length is measured from the end of the fitting to the tip of the probe. In cases where this length must be called out in the catalog description, it is added at the end of the catalog number as follows:

Example: ***J-SS12-U-B2-SL-12.50", A=3.50"***
(A indicates the immersion length)

Thermocouple Assemblies with

Conax Buffalo thermocouple assemblies offer a wide variety of terminal head styles to meet application needs. In direct mount models, the sheath is attached to the terminal head using either a W8 fitting or a Conax Buffalo manufactured "soft seal" sealing gland. Gland models are provided in different sizes and with various sealant materials to ensure proper function in a wide range of environments. All provided direct mount fittings serve as mounting devices and environmental seals.



Assembly with Conax packing gland.
Example: ***J-SS12-U-T5AL(PG4BL)-12.00"***

Specify Sensor Element

J – Iron/Constantan
- 32˚ F to +1400˚ F
- 0˚ C to +760˚ C

K – Chromel/Alumel
- -328˚ F to +2300˚ F
- -200˚ C to +1260˚ C

E – Chromel/Constantan
- -328˚ F to +1600˚ F
- -200˚ C to +870˚ C

T – Copper/Constantan
- -328˚ F to +700˚ F
- -200˚ C to +370˚ C

N – Nicrosil/Nisil
- 32˚ F to +2300˚ F
- 0˚ C to +1260˚ C

S – Platinum-10% Rhodium/Platinum
- 32˚ F to +2700˚ F
- 0˚ C to +1480˚ C

R – Platinum-13% Rhodium/Platinum
- 32˚ F to +2700˚ F
- 0˚ C to +1480˚ C

B – Platinum-30% Rhodium/Platinum-6% Rhodium
- 1600˚ F to +3100˚ F
- 870˚ C to +1700˚ C

C – Tungsten-5% Rhenium/Tungsten-26% Rhenium
- 32˚ F to +4200˚ F
- 0˚ C to +2315˚ C

Special limits of error are designated by a double catalog letter, e.g. JJ.

Specify Sheath Material

SS – 304 Stainless Steel
- Maximum service temperature: +1650˚ F (900˚ C)

316SS – 316 Stainless Steel
- Maximum service temperature: +1650˚ F (900˚ C)

INC – Inconel 600
- Maximum service temperature: +2100˚ F (1150˚ C)

Alternate Materials

310SS – 310 Stainless Steel
188HN – Haynes 188
214HN – Haynes 214
230HN – Haynes 230
HC – Hastelloy C
HX – Hastelloy X
TI – Titanium
TA – Tantalum
PLT – Platinum

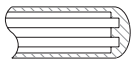
Certain calibrations and wire configurations (dual and triple) may not be available in all sheath materials and diameters. Consult factory for details.

Specify Sheath Diameter

12 = 0.125" diameter
18 = 0.187" diameter
25 = 0.250" diameter
37 = 0.375" diameter

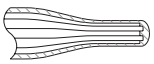
Sheath diameters < 0.125" are available for direct mount application, review with factory.

Specify Tip Configuration

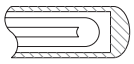


G – Grounded

G – Single, Grounded
2G – Dual, Grounded
3G – Triple, Grounded

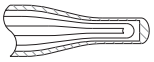


GR – Grounded, Reduced

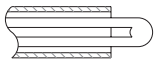


U – Ungrounded

U – Single, Ungrounded
2U – Dual, Ungrounded
3U – Triple, Ungrounded



UR – Ungrounded, Reduced

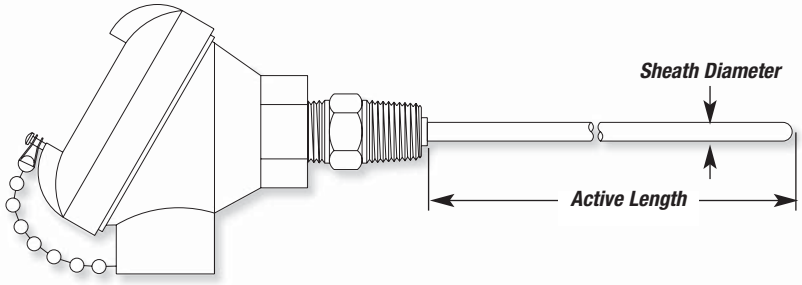


B – Bare Wire

Note: For more information on tip configurations, see page 25. For specialty tips, see page 71.

Conax Buffalo Technologies

Terminal Head and Direct Mount



Sensor Element | 0.125" Stainless Steel Sheath | Ungrounded Tip Configuration | T5 Aluminum Termination | Mounting Style | Length

Progressive Description Example: ***J-SS12-U-T5AL(W8)-12.00"***

[ ] ( ) .00"

Specify Termination Style | *Specify Mounting Style* | *Specify Length in Inches (required)*

T5AL - Aluminum
T5CI - Cast Iron

- NEMA 4 rated
- Conduit port 3/4 NPT

T5SS

- NEMA 4X rated
- 316 stainless steel construction
- Conduit port 3/4 NPT

T7

- Weather proof
- Aluminum conduit box accommodates up to 8 terminals
- Conduit port 3/4 NPT

T8

- Weather proof
- Cast iron construction
- Black epoxy coated (E-coat)
- Conduit port 3/4 NPT

T8E

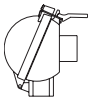
- Explosion proof rating
  Class I, Group B, C & D
  Class II, Group E, F & G
  Class III
- Gray iron body with aluminum screw cover
- NEMA 4 rated
- Conduit port 1/2 NPT

T11

- Weather proof
- Aluminum construction
- Conduit port 1/2 NPT

T11PL

- Weather proof
- Plastic construction
- Conduit port 1/2 NPSM



T12

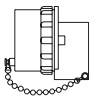
- Weather proof
- Aluminum construction
- Flip-top head
- Conduit port 1/2 NPT

T13

- FDA compliant, NEMA 4 rated
- White, unpigmented polypropylene construction
- Conduit port 3/4 NPT

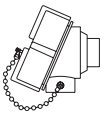
T13F

- FDA compliant, NEMA 4X rated
- White, unpigmented polypropylene construction
- Flip-top head
- Conduit port 3/4 NPT



T13T

- FDA compliant, NEMA 4X rated
- White, unpigmented polypropylene construction
- 4 terminal posts
- Conduit port 3/4 NPT



T15EAL - Aluminum
T15ESS - Stainless Steel

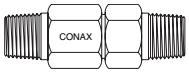
- Explosion Proof rating Class 1, Division 1, Groups B, C and D and Dust Proof/Ignition Proof rating for Class II, Division 1, Group E, F & G
- Ratings: T15EAL – NEMA 4, T15ESS – NEMA 4X
- Conduit port 3/4 NPT

Note: For additional terminal head types and detailed descriptions, see pages 46-51.

PG2

- For 0.125", 0.187" and 0.250" diameter sheath
- Stainless steel construction
- Mounting thread 1/4 NPT

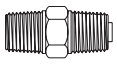
PG2BL – Lava sealant
PG2BT – Teflon sealant
PG2BN – Neoprene sealant
PG2BV – Viton sealant
PG2BG – Grafoil sealant



PG4

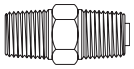
- For 0.250" and 0.375" diameter sheath
- Stainless steel construction
- Mounting thread 1/2 NPT

PG4BL – Lava sealant
PG4BT – Teflon sealant
PG4BN – Neoprene sealant
PG4BV – Viton sealant
PG4BG – Grafoil sealant



W4

- For 0.125", 0.187" and 0.250" diameter sheath
- 316 stainless steel construction
- Mounting thread 1/4 NPT
- Sheath welded to fitting



W8

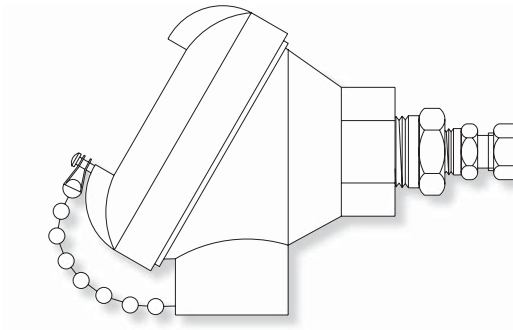
- For 0.125", 0.187" and 0.250" diameter sheath
- 316 stainless steel construction
- Mounting thread 1/2 NPT
- Sheath welded to fitting

Note: For sealant material details, see page 41.

Conax Buffalo Technologies

Thermocouple Assemblies with Terminal

Thermocouple assemblies can be supplied with a wide variety of terminal head styles to meet application needs. Adjustable mounting fittings using Conax Buffalo "soft seal" packing glands allow the immersion depth of the sheath to be easily adjusted in the field and provide pressure or vacuum sealing against gases or liquids. (Glands are shipped untorqued.) Gland models are offered in different sizes and with various sealant materials to ensure proper function in a wide range of environments. Additional information on sealing options, as well as sealant temperature and pressure ratings, can be found in Conax Pressure & Vacuum Sealing Assemblies catalog or at www.conaxbuffalo.com.



Specify Sensor Element

J – Iron/Constantan
- 32˚ F to +1400˚ F
- 0˚ C to +760˚ C

K – Chromel/Alumel
- -328˚ F to +2300˚ F
- -200˚ C to +1260˚ C

E – Chromel/Constantan
- -328˚ F to +1600˚ F
- -200˚ C to +870˚ C

T – Copper/Constantan
- -328˚ F to +700˚ F
- -200˚ C to +370˚ C

N – Nicrosil/Nisil
- 32˚ F to +2300˚ F
- 0˚ C to +1260˚ C

S – Platinum-10% Rhodium/Platinum
- 32˚ F to +2700˚ F
- 0˚ C to +1480˚ C

R – Platinum-13% Rhodium/Platinum
- 32˚ F to +2700˚ F
- 0˚ C to +1480˚ C

B – Platinum-30% Rhodium/Platinum-6% Rhodium
- 1600˚ F to +3100˚ F
- 870˚ C to +1700˚ C

C – Tungsten-5% Rhenium/Tungsten-26% Rhenium
- 32˚ F to +4200˚ F
- 0˚ C to +2315˚ C

Special limits of error are designated by a double catalog letter, e.g. JJ.

Specify Sheath Material

SS – 304 Stainless Steel
- Maximum service temperature: +1650˚ F (900˚ C)

316SS – 316 Stainless Steel
- Maximum service temperature: +1650˚ F (900˚ C)

INC – Inconel 600
- Maximum service temperature: +2100˚ F (1150˚ C)

Alternate Materials

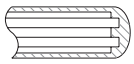
310SS – 310 Stainless Steel
188HN – Haynes 188
214HN – Haynes 214
230HN – Haynes 230
HC – Hastelloy C
HX – Hastelloy X
TI – Titanium
TA – Tantalum
PLT – Platinum

Certain calibrations and wire configurations (dual and triple) may not be available in all sheath materials and diameters. Consult factory for details.

Specify Sheath Diameter

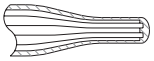
12 = 0.125" diameter
18 = 0.187" diameter
25 = 0.250" diameter
37 = 0.375" diameter

Specify Tip Configuration

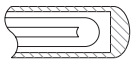


G – Grounded

G – Single, Grounded
2G – Dual, Grounded
3G – Triple, Grounded

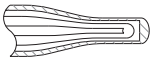


GR – Grounded, Reduced

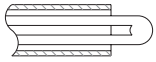


U – Ungrounded

U – Single, Ungrounded
2U – Dual, Ungrounded
3U – Triple, Ungrounded



UR – Ungrounded, Reduced

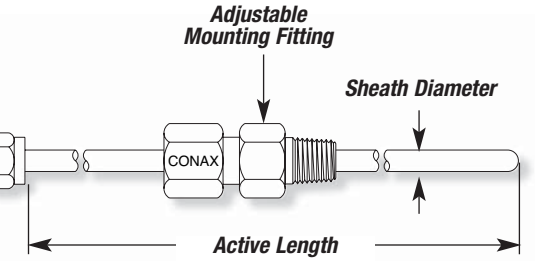


B – Bare Wire

Note: For more information on tip configurations, see page 25. For specialty tips, see page 71.

Conax Buffalo Technologies

Heads and Adjustable Mounting Fittings



Progressive Description Example: **J-SS12-U-T5AL-PG2AL-12.00"**

Sensor Element | 0.125" Stainless Steel Sheath | Ungrounded Tip Configuration | T5 Aluminum Termination | Mounting Style | Length

Specify Termination Style

T5AL - Aluminum
T5CI - Cast Iron
- NEMA 4 rated
- Conduit port 3/4 NPT

T5SS
- NEMA 4X rated
- 316 stainless steel construction
- Conduit port 3/4 NPT

T7
- Weather proof
- Aluminum conduit box accommodates up to 8 terminals
- Conduit port 3/4 NPT

T8
- Weather proof
- Cast iron construction
- Black epoxy coated (E-coat)
- Conduit port 3/4 NPT

T8E
- Explosion proof rating Class I, Group B, C & D Class II, Group E, F & G Class III
- Gray iron body with aluminum screw cover
- NEMA 4 rated
- Conduit port 1/2 NPT

T11
- Weather proof
- Aluminum construction
- Conduit port 1/2 NPT

T11PL
- Weather proof
- Plastic construction
- Conduit port 1/2 NPSM

T12
- Weather proof
- Aluminum construction
- Flip-top head
- Conduit port 1/2 NPT

T13T
- FDA compliant, NEMA 4X rated
- White, unpigmented polypropylene construction
- 4 terminal posts
- Conduit port 3/4 NPT

T15EAL - Aluminum
T15ESS - Stainless Steel
- Explosion Proof rating Class 1, Division 1, Groups B, C and D and Dust Proof/Ignition Proof rating for Class II, Division 1, Group E, F & G
- Ratings: T15EAL – NEMA 4, T15ESS – NEMA 4X
- Conduit port 3/4 NPT

Note: For additional terminal head types and detailed descriptions, see pages 46-51.

Specify Mounting Style

Packing Gland

MPG
- For 0.125" and 0.187" diameter sheath
- Stainless steel construction
- Mounting thread 1/8 NPT

MPGAL – Lava sealant
MPGAT – Teflon sealant
MPGAN – Neoprene sealant
MPGAV – Viton sealant
MPGAG – Grafoil sealant

PG2
- For 0.125", 0.187" and 0.250" diameter sheath
- Stainless steel construction
- Mounting thread 1/4 NPT

PG2AL – Lava sealant
PG2AT – Teflon sealant
PG2AN – Neoprene sealant
PG2AV – Viton sealant
PG2AG – Grafoil sealant

PG4
- For 0.250" and 0.375" diameter sheath
- Stainless steel construction
- Mounting thread 1/2 NPT

PG4AL – Lava sealant
PG4AT – Teflon sealant
PG4AN – Neoprene sealant
PG4AV – Viton sealant
PG4AG – Grafoil sealant

Midlock Gland

MK125A
- For 0.125" diameter sheath
- Stainless steel construction
- Stainless steel ferrule
- Mounting thread 1/8 NPT

MK187A
- For 0.187" diameter sheath
- Stainless steel construction
- Stainless steel ferrule
- Mounting thread 1/8 NPT

MK250A
- For 0.250" diameter sheath
- Stainless steel construction
- Stainless steel ferrule
- Mounting thread 1/4 NPT

MK375A
- For 0.375" diameter sheath
- Stainless steel construction
- Stainless steel ferrule
- Mounting thread 1/2 NPT

Note: For sealant material details, see page 41.

This assembly may be purchased without the mounting fitting. Omit the mounting style from the description. The catalog description in this case would be J-SS12-U-T5AL-12.00".

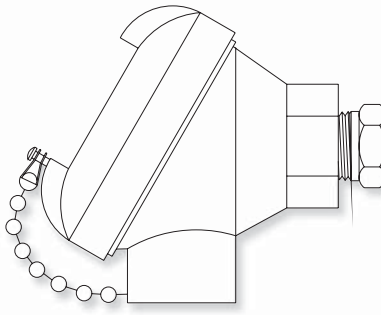
Specify Length in Inches (required)

.00"

Conax Buffalo Technologies

Thermocouple Assemblies with Termin

Spring-loaded assemblies are used to maintain positive contact between the sensor tip and the surface to be monitored. Conax Buffalo supplies a number of styles of spring-loaded assemblies to meet application needs. Spring-loaded assemblies can be provided with all terminal heads. In addition, the T11SL model provides a spring-loaded assembly built into the T11 aluminum terminal head. This allows complete disassembly and removal of the sensor probe without dismantling the terminal head from the conduit or the vessel. For detailed information on these mounting styles, see pages 44-45.



Specify Sensor Element

J – Iron/Constantan
- 32˚ F to +1400˚ F
- 0˚ C to +760˚ C

K – Chromel/Alumel
- -328˚ F to +2300˚ F
- -200˚ C to +1260˚ C

E – Chromel/Constantan
- -328˚ F to +1600˚ F
- -200˚ C to +870˚ C

T – Copper/Constantan
- -328˚ F to +700˚ F
- -200˚ C to +370˚ C

N – Nicrosil/Nisil
- 32˚ F to +2300˚ F
- 0˚ C to +1260˚ C

S – Platinum-10% Rhodium/Platinum
- 32˚ F to +2700˚ F
- 0˚ C to +1480˚ C

R – Platinum-13% Rhodium/Platinum
- 32˚ F to +2700˚ F
- 0˚ C to +1480˚ C

B – Platinum-30% Rhodium/Platinum-6% Rhodium
- 1600˚ F to +3100˚ F
- 870˚ C to +1700˚ C

C – Tungsten-5% Rhenium/Tungsten-26% Rhenium
- 32˚ F to +4200˚ F
- 0˚ C to +2315˚ C

Special limits of error are designated by a double catalog letter, e.g. JJ.

Specify Sheath Material

SS – 304 Stainless Steel
- Maximum service temperature: +1650˚ F (900˚ C)

316SS – 316 Stainless Steel
- Maximum service temperature: +1650˚ F (900˚ C)

INC – Inconel 600
- Maximum service temperature: +2100˚ F (1150˚ C)

Alternate Materials

310SS – 310 Stainless Steel
188HN – Haynes 188
214HN – Haynes 214
230HN – Haynes 230
HC – Hastelloy C
HX – Hastelloy X
TI – Titanium
TA – Tantalum
PLT – Platinum

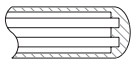
Certain calibrations and wire configurations (dual and triple) may not be available in all sheath materials and diameters. Consult factory for details.

Specify Sheath Diameter

6 = 0.062" diameter
12 = 0.125" diameter
18 = 0.187" diameter
25 = 0.250" diameter

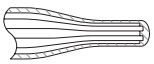
Note: The SL6 is the only spring load mounting style available for the 0.062" diameter.

Specify Tip Configuration

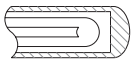


G – Grounded

G – Single, Grounded
2G – Dual, Grounded
3G – Triple, Grounded

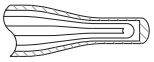


GR – Grounded, Reduced

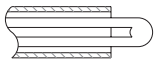


U – Ungrounded

U – Single, Ungrounded
2U – Dual, Ungrounded
3U – Triple, Ungrounded



UR – Ungrounded, Reduced

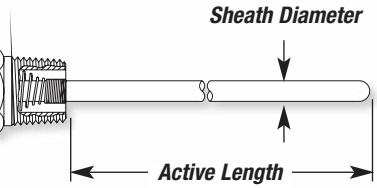


B – Bare Wire

Note: For more information on tip configurations, see page 25. For specialty tips, see page 71.

Conax Buffalo Technologies

al Heads and Spring-Loaded Mounting



Sensor Element | 0.125" Stainless Steel Sheath | Ungrounded Tip Configuration | T5 Aluminum Termination | Mounting Style | Length

Progressive Description Example: ***J-SS12-U-T5AL(CSLW)-12.00"***

[ ] *Specify Termination Style*

( ) *Specify Mounting Style*

.00" *Specify Length in Inches (required)*

T5AL - Aluminum
T5CI - Cast Iron
- NEMA 4 rated
- Conduit port 3/4 NPT

T5SS
- NEMA 4X rated
- 316 stainless steel construction
- Conduit port 3/4 NPT

T7
- Weather proof
- Aluminum conduit box accommodates up to 8 terminals
- Conduit port 3/4 NPT

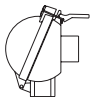
T8
- Weather proof
- Cast iron construction
- Black epoxy coated (E-coat)
- Conduit port 3/4 NPT

T8E
- Explosion proof rating Class I, Group B, C & D Class II, Group E, F & G Class III
- Gray iron body with aluminum screw cover
- NEMA 4 rated
- Conduit port 1/2 NPT

T11SL
- Weather proof
- Aluminum construction
- Built-in spring loaded assembly
- Conduit port 1/2 NPT

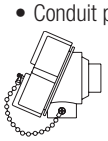
T11
- Weather proof
- Aluminum construction
- Conduit port 1/2 NPT

T11PL
- Weather proof
- Plastic construction
- Conduit port 1/2 NPSM



T12
- Weather proof
- Aluminum construction
- Flip-top head
- Conduit port 1/2 NPT

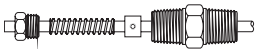
T13T
- FDA compliant, NEMA 4X rated
- White, unpigmented polypropylene construction
- 4 terminal posts
- Conduit port 3/4 NPT



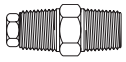
T15EAL - Aluminum
T15ESS - Stainless Steel
- Explosion Proof rating Class 1, Division 1, Groups B, C and D and Dust Proof/Ignition Proof rating for Class II, Division 1, Group E, F & G
- Ratings: T15EAL – NEMA 4, T15ESS – NEMA 4X
- Conduit port 3/4 NPT

Note: For additional terminal head types and detailed descriptions, see pages 46-51.

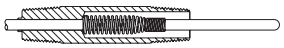
CSLW
- For 0.125", 0.187" and 0.250" diameter sheaths
- Stainless steel construction
- Mounting thread 1/2 NPT



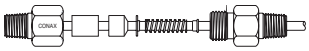
SLAN
- For 0.125", 0.187" and 0.250" diameter sheaths
- Stainless steel construction
- Mounting thread 1/2 NPT
- Probe position can be adjusted in the field



SLANS
- For 0.250" diameter sheath
- Includes Viton O-ring
- Stainless steel construction
- Mounting thread 1/2 NPT
- Probe position can be adjusted in the field



SLN
- For 0.125", 0.187" and 0.250" diameter sheath
- Mounting thread 1/2 NPT
- Most durable



SL
- Spring-loaded packing gland
- Spring travel: 1/4" to 3/8"
- 2-8 pounds spring pressure
- Stainless steel construction, Teflon sealant
- Available with B cap for direct mount
- *Additional dimensional data required, see page 44.*

SL6
- For 0.062" diameter sheath
- Mounting thread 1/8 NPT

SL12
- For 0.125" diameter sheath
- Mounting thread 1/8 NPT

SL18
- For 0.187" diameter sheath
- Mounting thread 1/4 NPT

SL25
- For 0.250" diameter sheath
- Mounting thread 1/2 NPT
- Optional 1/4 NPT mounting thread is available. Consult factory.

For additional information on spring-loaded mounting styles, see page 44-45.

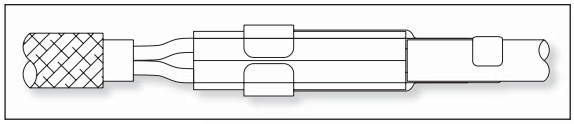
Conax Buffalo Technologies

For more information call: ***1-800-223-2389*** *•* *e-mail:* ***conaxbuf@conaxbuffalo.com*** *•* *visit our website:* ***www.conaxbuffalo.com***

Thermocouple Assemblies wit

This exclusive Conax Buffalo design provides a practically unbreakable connection between the leadwire and the probe lead. The T3 epoxy-filled transition is supplied with silicone-impregnated fiberglass insulation thermocouple wire as standard. AWG 20 wire is provided for sheath diameters of 0.125" to 0.375"; AWG 24 wire is provided for sheath diameters of 0.040" and 0.062".

T4 termination provides a stainless steel overbraid for maximum flexibility and abrasion resistance. The overbraid is embedded in the epoxy to ensure mechanical strength. Standard extension leads are 2 ft. long. Longer leads are available on request.



Exclusive Conax strain harness design is used for added support on 0.187˝ diameters and smaller, two wires only.

Specify Sensor Element

- **J – Iron/Constantan**
  - 32˚ F to +1400˚ F
  - 0˚ C to +760˚ C
- **K – Chromel/Alumel**
  - -328˚ F to +2300˚ F
  - -200˚ C to +1260˚ C
- **E – Chromel/Constantan**
  - -328˚ F to +1600˚ F
  - -200˚ C to +870˚ C
- **T – Copper/Constantan**
  - -328˚ F to +700˚ F
  - -200˚ C to +370˚ C
- **N – Nicrosil/Nisil**
  - 32˚ F to +2300˚ F
  - 0˚ C to +1260˚ C
- **S – Platinum-10% Rhodium/Platinum**
  - 32˚ F to +2700˚ F
  - 0˚ C to +1480˚ C
- **R – Platinum-13% Rhodium/Platinum**
  - 32˚ F to +2700˚ F
  - 0˚ C to +1480˚ C
- **B – Platinum-30% Rhodium/Platinum-6% Rhodium**
  - 1600˚ F to +3100˚ F
  - 870˚ C to +1700˚ C
- **C – Tungsten-5% Rhenium/Tungsten-26% Rhenium**
  - 32˚ F to +4200˚ F
  - 0˚ C to +2315˚ C

Special limits of error are designated by a double catalog letter, e.g. JJ.

Specify Sheath Material

- **SS – 304 Stainless Steel**
  - Maximum service temperature: +1650˚ F (900˚ C)
- **316SS – 316 Stainless Steel**
  - Maximum service temperature: +1650˚ F (900˚ C)
- **INC – Inconel 600**
  - Maximum service temperature: +2100˚ F (1150˚ C)

Alternate Materials

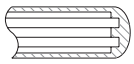
- **310SS – 310 Stainless Steel**
- **188HN – Haynes 188**
- **214HN – Haynes 214**
- **230HN – Haynes 230**
- **HC – Hastelloy C**
- **HX – Hastelloy X**
- **TI – Titanium**
- **TA – Tantalum**
- **PLT – Platinum**

Certain calibrations and wire configurations (dual and triple) may not be available in all sheath materials and diameters. Consult factory for details.

Specify Sheath Diameter

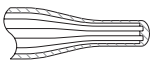
- **4 = 0.040" diameter**
- **6 = 0.062" diameter**
- **12 = 0.125" diameter**
- **18 = 0.187" diameter**
- **25 = 0.250" diameter**
- **37 = 0.375" diameter**

Specify Tip Configuration

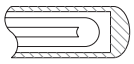


G – Grounded

G – Single, Grounded
2G – Dual, Grounded
3G – Triple, Grounded

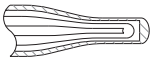


GR – Grounded, Reduced

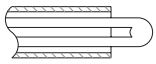


U – Ungrounded

U – Single, Ungrounded
2U – Dual, Ungrounded
3U – Triple, Ungrounded

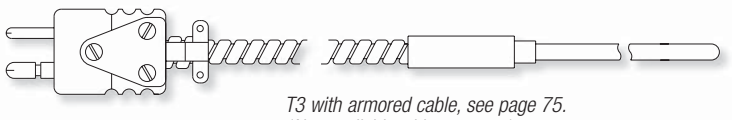


UR – Ungrounded, Reduced



B – Bare Wire

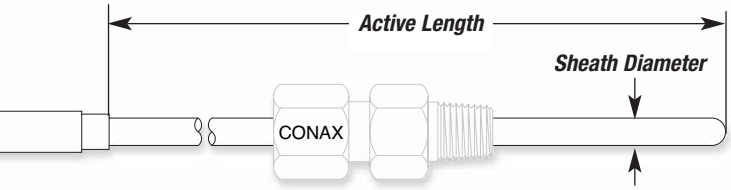
Note: For more information on tip configurations, see page 25. For specialty tips, see page 71.



T3 with armored cable, see page 75. (Also available without armor.)

Conax Buffalo Technologies

h T3/T4 Leadwire Termination



Sensor Element | 0.125" Stainless Steel Sheath | Ungrounded Tip Configuration | T3 Termination | Mounting Style | Length

Progressive Description Example: ***J-SS12-U-T3-PG2AL-12.00"***

Specify Termination Style

T3
- Fiberglass/silicone impregnated leadwire insulation
- Service temperature: 300˚ F (150˚ C)

T4
- Fiberglass/silicone impregnated leadwire insulation
- Stainless steel overbraid
- Service temperature: 300˚ F (150˚ C)

T3(HT)
- Fiberglass/silicone impregnated leadwire insulation
- High-temperature encapsulant
- Service temperature: 900˚ F (482˚ C)

T4(HT)
- Fiberglass/silicone impregnated leadwire insulation
- Stainless steel overbraid
- High-temperature encapsulant
- Service temperature: 900˚ F (482˚ C)

For longer lead length, specify in feet, rounded up to the nearest foot. Example: T3(3 FT)

Optional leadwire insulation types are available. Example: PVC requested – T3(3 FT-PVC). Consult factory for availability.

For detailed descriptions of termination styles, see pages 46-47.

Specify Mounting Style (optional)

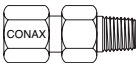
Packing Gland

MIC
- For 0.040" and 0.062" diameter sheath
- Stainless steel construction
- Mounting thread 1/16 NPT

MICAL – Lava sealant
MICAT – Teflon sealant
MICAG – Grafoil sealant
(not available for 0.040" diameter)

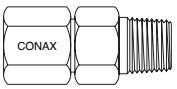
MPG
- For 0.040", 0.062", 0.125" and 0.187" diameter sheath
- Stainless steel construction
- Mounting thread 1/8 NPT

MPGAL – Lava sealant
MPGAT – Teflon sealant
MPGAN – Neoprene sealant
MPGAV – Viton sealant
MPGAG – Grafoil sealant
(not available for 0.040" diameter)



PG2
- For 0.125", 0.187" and 0.250" diameter sheath
- Stainless steel construction
- Mounting thread 1/4 NPT

PG2AL – Lava sealant
PG2AT – Teflon sealant
PG2AN – Neoprene sealant
PG2AV – Viton sealant
PG2AG – Grafoil sealant



PG4
- For 0.250" and 0.375" diameter sheath
- Stainless steel construction
- Mounting thread 1/2 NPT

PG4AL – Lava sealant
PG4AT – Teflon sealant
PG4AN – Neoprene sealant
PG4AV – Viton sealant
PG4AG – Grafoil sealant

Midlock Gland

MK062A
- For 0.062" diameter sheath
- Stainless steel construction
- Stainless steel ferrule
- Mounting thread 1/8 NPT

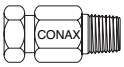
MK125A
- For 0.125" diameter sheath
- Stainless steel construction
- Stainless steel ferrule
- Mounting thread 1/8 NPT

MK187A
- For 0.187" diameter sheath
- Stainless steel construction
- Stainless steel ferrule
- Mounting thread 1/8 NPT

.00"

Specify Length in Inches (required)

MK250A
- For 0.250" diameter sheath
- Stainless steel construction
- Stainless steel ferrule
- Mounting thread 1/4 NPT



MK375A
- For 0.375" diameter sheath
- Stainless steel construction
- Stainless steel ferrule
- Mounting thread 1/2 NPT

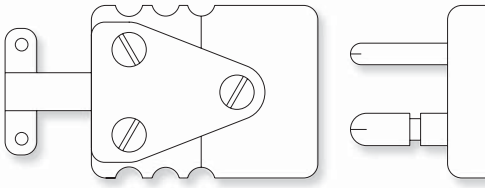
Spring-Load

CSLP
- For 0.125", 0.187" and 0.250" diameter sheaths
- Stainless steel construction
- Mounting thread 1/2 NPT
- *Additional dimensional data required, see page 44.*

Note: For sealant material details, see page 41.

Thermocouple Assemblies wit

Polarized plug and jack assembly bodies are made from molded glass-filled thermoset compounds, with contacts constructed of thermocouple alloy materials. Polarity marks are molded in the bodies for installation assistance, and male and female assemblies are color coded with ISA calibration coding. A metal ferrule tube adapter secures the probe in place, and a wire clamp is used to hold the wire. Standard assemblies are designed to operate in temperatures up to 300˚ F (150˚ C). High temperature assemblies operate up to 800˚ F (427˚ C) and are color-coded red. Individual plugs, jacks, tube adapters and wire clamps are also available.



Specify Sensor Element

- **J – Iron/Constantan**
  - 32˚ F to +1400˚ F
  - 0˚ C to +760˚ C
- **K – Chromel/Alumel**
  - -328˚ F to +2300˚ F
  - -200˚ C to +1260˚ C
- **E – Chromel/Constantan**
  - -328˚ F to +1600˚ F
  - -200˚ C to +870˚ C
- **T – Copper/Constantan**
  - -328˚ F to +700˚ F
  - -200˚ C to +370˚ C
- **N – Nicrosil/Nisil**
  - 32˚ F to +2300˚ F
  - 0˚ C to +1260˚ C
- **S – Platinum-10% Rhodium/Platinum**
  - 32˚ F to +2700˚ F
  - 0˚ C to +1480˚ C
- **R – Platinum-13% Rhodium/Platinum**
  - 32˚ F to +2700˚ F
  - 0˚ C to +1480˚ C
- **B – Platinum-30% Rhodium/Platinum-6% Rhodium**
  - 1600˚ F to +3100˚ F
  - 870˚ C to +1700˚ C
- **C – Tungsten-5% Rhenium/Tungsten-26% Rhenium**
  - 32˚ F to +4200˚ F
  - 0˚ C to +2315˚ C

Special limits of error are designated by a double catalog letter, e.g. JJ.

Specify Sheath Material

- **SS – 304 Stainless Steel**
  - Maximum service temperature: +1650˚ F (900˚ C)
- **316SS – 316 Stainless Steel**
  - Maximum service temperature: +1650˚ F (900˚ C)
- **INC – Inconel 600**
  - Maximum service temperature: +2100˚ F (1150˚ C)

Alternate Materials

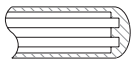
- **310SS – 310 Stainless Steel**
- **188HN – Haynes 188**
- **214HN – Haynes 214**
- **230HN – Haynes 230**
- **HC – Hastelloy C**
- **HX – Hastelloy X**
- **TI – Titanium**
- **TA – Tantalum**
- **PLT – Platinum**

Certain calibrations and wire configurations (dual and triple) may not be available in all sheath materials and diameters. Consult factory for details.

Specify Sheath Diameter

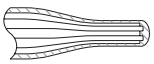
- **4 = 0.040" diameter**
- **6 = 0.062" diameter**
- **12 = 0.125" diameter**
- **18 = 0.187" diameter**
- **25 = 0.250" diameter**
- **37 = 0.375" diameter**

Specify Tip Configuration

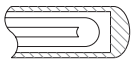


G – Grounded

G – Single, Grounded
2G – Dual, Grounded
3G – Triple, Grounded

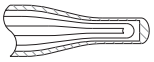


GR – Grounded, Reduced

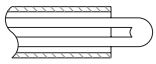


U – Ungrounded

U – Single, Ungrounded
2U – Dual, Ungrounded
3U – Triple, Ungrounded

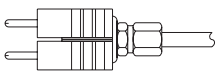


UR – Ungrounded, Reduced



B – Bare Wire

Note: For more information on tip configurations, see page 25. For specialty tips, see page 71.

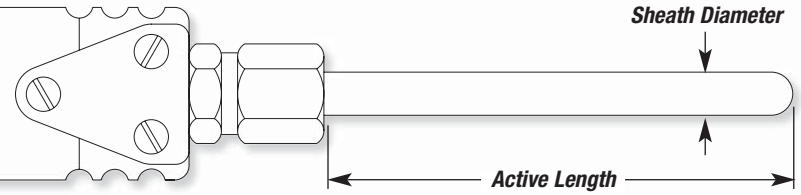


Dual styles available

Miniatures are not available in dual construction.

Conax Buffalo Technologies

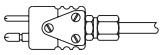
h PJFC-Plug/Jack Termination



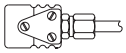
Sensor Element | 0.125" Stainless Steel Sheath | Ungrounded Tip Configuration | PJFC Termination | Mounting Style | Length

Progressive Description Example: ***J-SS12-U-PJFC-PG2AL-12.00"***

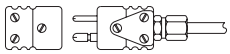
		.00"
Specify Termination Style	*Specify Mounting Style (optional)*	*Specify Length in Inches (required)*



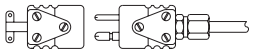
PJ – Male plug only
PJHT – Male plug only, high temperature



PF – Female jack only
PFHT – Female jack only, high temperature



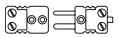
PJF – Male plug & female jack
PJFHT – Male plug & female jack, high temperature



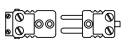
PJFC – Plug, jack & wire clamp
PJFCHT – Plug, jack & wire clamp, high temperature

MPJ – Miniature male plug only
MPJHT – Miniature male plug only, high temperature

MPF – Miniature female jack only
MPFHT – Miniature female jack only, high temperature



MPJF – Miniature male plug & female jack
MPJFHT – Miniature male plug & female jack, high temperature



MPJFC – Miniature plug, jack & wire clamp
MPJFCHT – Miniature plug, jack & wire clamp, high temperature

For detailed descriptions of termination styles, see page 50.

Packing Gland

MIC

- For 0.040" and 0.062" diameter sheath
- Stainless steel construction
- Mounting thread 1/16 NPT

MICAL – Lava sealant
MICAT – Teflon sealant
MICAG – Grafoil sealant
(not available for 0.040" diameter)

MPG

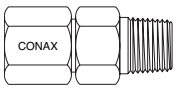
- For 0.040", 0.062", 0.125" and 0.187" diameter sheath
- Stainless steel construction
- Mounting thread 1/8 NPT

MPGAL – Lava sealant
MPGAT – Teflon sealant
MPGAN – Neoprene sealant
MPGAV – Viton sealant
MPGAG – Grafoil sealant
(not available for 0.040" diameter)

PG2

- For 0.125", 0.187" and 0.250" diameter sheath
- Stainless steel construction
- Mounting thread 1/4 NPT

PG2AL – Lava sealant
PG2AT – Teflon sealant
PG2AN – Neoprene sealant
PG2AV – Viton sealant
PG2AG – Grafoil sealant



PG4

- For 0.250" and 0.375" diameter sheath
- Stainless steel construction
- Mounting thread 1/2 NPT

PG4AL – Lava sealant
PG4AT – Teflon sealant
PG4AN – Neoprene sealant
PG4AV – Viton sealant
PG4AG – Grafoil sealant

Midlock Gland

MK062A

- For 0.062" diameter sheath
- Stainless steel construction
- Stainless steel ferrule
- Mounting thread 1/8 NPT

MK125A

- For 0.125" diameter sheath
- Stainless steel construction
- Stainless steel ferrule
- Mounting thread 1/8 NPT

MK187A

- For 0.187" diameter sheath
- Stainless steel construction
- Stainless steel ferrule
- Mounting thread 1/8 NPT

MK250A

- For 0.250" diameter sheath
- Stainless steel construction
- Stainless steel ferrule
- Mounting thread 1/4 NPT

MK375A

- For 0.375" diameter sheath
- Stainless steel construction
- Stainless steel ferrule
- Mounting thread 1/2 NPT

Spring-Load

CSLP

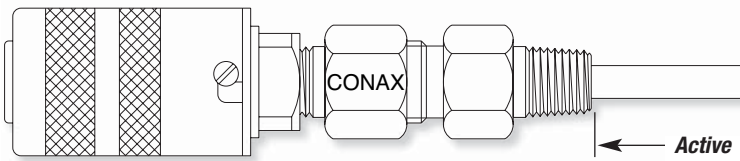
- For 0.125", 0.187" and 0.250" diameter sheaths
- Stainless steel construction
- Mounting thread 1/2 NPT
- *Additional dimensional data required, see page 44.*

Note: For sealant material details, see page 41.

Conax Buffalo Technologies

Thermocouple Assemblies

Conax Buffalo B-Series heads are compact, lightweight terminal heads that provide convenient hook-up of customer extension wire. The cap and body are nickel-plated to resist corrosion. The ceramic terminal block contains zinc-plated brass terminal posts that accept up to 14 AWG wire. Bayonet-style cover allows easy access to the terminal posts. B-Series heads are provided in direct or adjustable mounting styles.



Direct Mount
Progressive Description Example: ***J-SS12-U-B2(PG2BN)***

Sensor Element | 0.125" Stainless Steel Sheath | Ungrounded Tip Configuration | B2 Termination | Mounting Style

Specify Sensor Element

J – Iron/Constantan
- 32˚ F to +1400˚ F
- 0˚ C to +760˚ C

K – Chromel/Alumel
- -328˚ F to +2300˚ F
- -200˚ C to +1260˚ C

E – Chromel/Constantan
- -328˚ F to +1600˚ F
- -200˚ C to +870˚ C

T – Copper/Constantan
- -328˚ F to +700˚ F
- -200˚ C to +370˚ C

N – Nicrosil/Nisil
- 32˚ F to +2300˚ F
- 0˚ C to +1260˚ C

S – Platinum-10% Rhodium/Platinum
- 32˚ F to +2700˚ F
- 0˚ C to +1480˚ C

R – Platinum-13% Rhodium/Platinum
- 32˚ F to +2700˚ F
- 0˚ C to +1480˚ C

B – Platinum-30% Rhodium/Platinum-6% Rhodium
- 1600˚ F to +3100˚ F
- 870˚ C to +1700˚ C

C – Tungsten-5% Rhenium/Tungsten-26% Rhenium
- 32˚ F to +4200˚ F
- 0˚ C to +2315˚ C

Special limits of error are designated by a double catalog letter, e.g. JJ.

Specify Sheath Material

SS – 304 Stainless Steel
- Maximum service temperature: +1650˚ F (900˚ C)

316SS – 316 Stainless Steel
- Maximum service temperature: +1650˚ F (900˚ C)

INC – Inconel 600
- Maximum service temperature: +2100˚ F (1150˚ C)

Alternate Materials

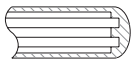
310SS – 310 Stainless Steel
188HN – Haynes 188
214HN – Haynes 214
230HN – Haynes 230
HC – Hastelloy C
HX – Hastelloy X
TI – Titanium
TA – Tantalum
PLT – Platinum

Certain calibrations and wire configurations (dual and triple) may not be available in all sheath materials and diameters. Consult factory for details.

Specify Sheath Diameter

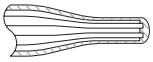
4 = 0.040" diameter
6 = 0.062" diameter
12 = 0.125" diameter
18 = 0.187" diameter
25 = 0.250" diameter

Specify Tip Configuration

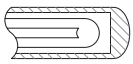


G – Grounded

G – Single, Grounded
2G – Dual, Grounded

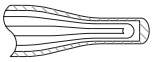


GR – Grounded, Reduced

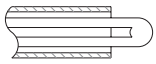


U – Ungrounded

U – Single, Ungrounded
2U – Dual, Ungrounded



UR – Ungrounded, Reduced

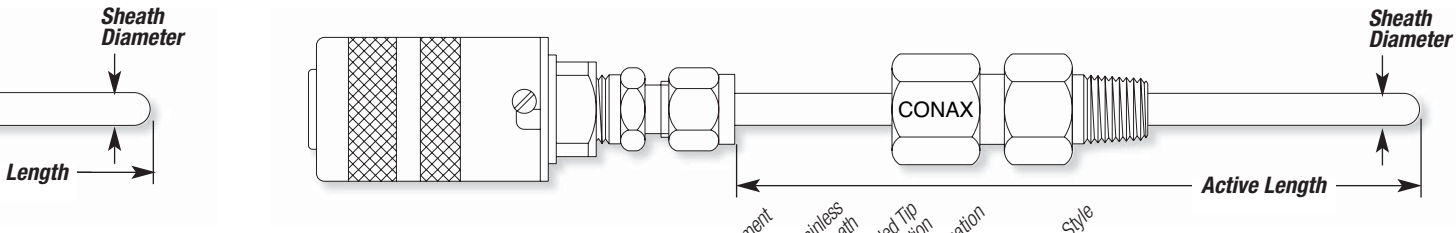


B – Bare Wire

Note: For more information on tip configurations, see page 25. For specialty tips, see page 71.

Conax Buffalo Technologies

with B-Series Terminal Head



Adjustable Mount
Progressive Description Example: **J-SS12-U-B2-PG2AL-12.00"**

J – Sensor Element
SS – 0.125" Stainless Steel Sheath
12 – Ungrounded Tip Configuration
U – B2 Termination
B2 – Mounting Style
PG2AL – Length
-12.00" – Length

Specify Termination Style

Specify Mounting Style

.00"
Specify Length in Inches (required)

B2
- Standard 2-wire
- Maximum service temperature is 200˚ F (93.3˚ C) with grommet and O-ring; 750˚ F (400˚ C) with grommet and O-ring removed

B4
- Standard 4-wire
- Maximum service temperature is 200˚ F (93.3˚ C) with grommet and O-ring; 750˚ F (400˚ C) with grommet and O-ring removed

For detailed descriptions of termination styles, see page 50.

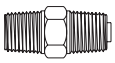
DIRECT MOUNT Packing Gland

MPG
- For 0.040", 0.062", 0.125" and 0.187" diameter sheath
- Stainless steel construction
- Mounting thread 1/8 NPT

MPGBL – Lava sealant
MPGBT – Teflon sealant
MPGBN – Neoprene sealant
MPGBV – Viton sealant
MPGBG – Grafoil sealant

PG2
- For 0.125", 0.187" and 0.250" diameter sheath
- Stainless steel construction
- Mounting thread 1/4 NPT

PG2BL – Lava sealant
PG2BT – Teflon sealant
PG2BN – Neoprene sealant
PG2BV – Viton sealant
PG2BG – Grafoil sealant



W4
- For 0.125", 0.187" & 0.250" diameter sheath
- 316 stainless steel construction
- Mounting thread 1/4 NPT
- Sheath welded to fitting

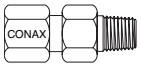
ADJUSTABLE MOUNT *(optional)* Packing Gland

MIC
- For 0.040" and 0.062" diameter sheath
- Stainless steel construction
- Mounting thread 1/16 NPT

MICAL – Lava sealant
MICAT – Teflon sealant
MICAG – Grafoil sealant
(not available for 0.040" diameter)

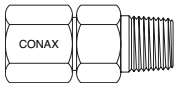
MPG
- For 0.040", 0.062", 0.125" and 0.187" diameter sheath
- Stainless steel construction
- Mounting thread 1/8 NPT

MPGAL – Lava sealant
MPGAT – Teflon sealant
MPGAN – Neoprene sealant
MPGAV – Viton sealant
MPGAG – Grafoil sealant



PG2
- For 0.125", 0.187" and 0.250" diameter sheath
- Stainless steel construction
- Mounting thread 1/4 NPT

PG2AL – Lava sealant
PG2AT – Teflon sealant
PG2AN – Neoprene sealant
PG2AV – Viton sealant
PG2AG – Grafoil sealant



PG4
- For 0.250" diameter sheath
- Stainless steel construction
- Mounting thread 1/2 NPT

PG4AL – Lava sealant
PG4AT – Teflon sealant
PG4AN – Neoprene sealant
PG4AV – Viton sealant
PG4AG – Grafoil sealant

Midlock Gland

MK062A
- For 0.062" diameter sheath
- Stainless steel construction
- Stainless steel ferrule
- Mounting thread 1/8 NPT

MK125A
- For 0.125" diameter sheath
- Stainless steel construction
- Stainless steel ferrule
- Mounting thread 1/8 NPT

MK187A
- For 0.187" diameter sheath
- Stainless steel construction
- Stainless steel ferrule
- Mounting thread 1/8 NPT

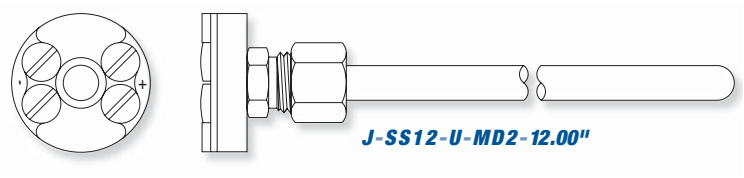
MK250A
- For 0.250" diameter sheath
- Stainless steel construction
- Stainless steel ferrule
- Mounting thread 1/4 NPT

Note: For sealant material details, see page 41.

Conax Buffalo Technologies

Thermocouple Assemblies

The MD disc-style termination is small, compact, lightweight and provides easy access and convenient wire termination. It is excellent for use in clean areas and confined spaces. The disc is molded from high-performance thermoset compounds, color-coded by thermocouple type (high-temperature models are red). The discs are mounted directly to the sheath using a brass metal-to-metal compression fitting.



Specify Sensor Element

J – Iron/Constantan
- 32˚ F to +1400˚ F
- 0˚ C to +760˚ C

K – Chromel/Alumel
- -328˚ F to +2300˚ F
- -200˚ C to +1260˚ C

E – Chromel/Constantan
- -328˚ F to +1600˚ F
- -200˚ C to +870˚ C

T – Copper/Constantan
- -328˚ F to +700˚ F
- -200˚ C to +370˚ C

N – Nicrosil/Nisil
- 32˚ F to +2300˚ F
- 0˚ C to +1260˚ C

S – Platinum-10% Rhodium/Platinum
- 32˚ F to +2700˚ F
- 0˚ C to +1480˚ C

R – Platinum-13% Rhodium/Platinum
- 32˚ F to +2700˚ F
- 0˚ C to +1480˚ C

B – Platinum-30% Rhodium/Platinum-6% Rhodium
- 1600˚ F to +3100˚ F
- 870˚ C to +1700˚ C

C – Tungsten-5% Rhenium/Tungsten-26% Rhenium
- 32˚ F to +4200˚ F
- 0˚ C to +2315˚ C

Special limits of error are designated by a double catalog letter, e.g. JJ.

Specify Sheath Material

SS – 304 Stainless Steel
- Maximum service temperature: +1650˚ F (900˚ C)

316SS – 316 Stainless Steel
- Maximum service temperature: +1650˚ F (900˚ C)

INC – Inconel 600
- Maximum service temperature: +2100˚ F (1150˚ C)

Alternate Materials

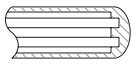
310SS – 310 Stainless Steel
188HN – Haynes 188
214HN – Haynes 214
230HN – Haynes 230
HC – Hastelloy C
HX – Hastelloy X
TI – Titanium
TA – Tantalum
PLT – Platinum

Specify Sheath Diameter

6 = 0.062" diameter
12 = 0.125" diameter
18 = 0.187" diameter
25 = 0.250" diameter

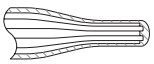
Certain calibrations and wire configurations (dual and triple) may not be available in all sheath materials and diameters. Consult factory for details.

Specify Tip Configuration

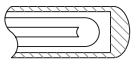


G – Grounded

G – Single, Grounded
2G – Dual, Grounded
3G – Triple, Grounded

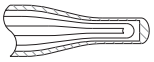


GR – Grounded, Reduced

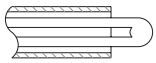


U – Ungrounded

U – Single, Ungrounded
2U – Dual, Ungrounded
3U – Triple, Ungrounded



UR – Ungrounded, Reduced

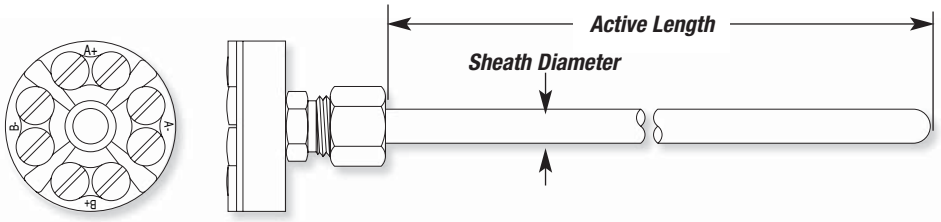


B – Bare Wire

Note: For more information on tip configurations, see page 25. For specialty tips, see page 71.

Conax Buffalo Technologies

with MD Disc Termination



Progressive Description Example: **J-SS12-2U-MD4-12.00"**

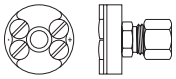
Sensor Element | 0.125" Stainless Steel Sheath | Dual Ungrounded Tip Configuration | MD4 Termination | Length

Specify Termination Style

Specify Mounting Style (optional)

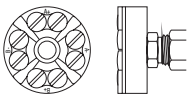
.00"

Specify Length in Inches (required)



MD2
- Standard 2-wire
- Maximum service temperature: 400˚ F (205˚ C) continuous, 500˚ F (260˚ C) intermittent
- Available with 0.062", 0.125", 0.187" or 0.250" diameter sheath
- 1" OD x 1.1" overall

MD2HT
- Standard 2-wire
- Maximum service temperature: 800˚ F (425˚ C) continuous, 1000˚ F (538˚ C) intermittent
- Available with 0.062", 0.125", 0.187" or 0.250" diameter sheath
- 1" OD x 1.1" overall



MD4
- Standard 4-wire
- Maximum service temperature: 400˚ F (205˚ C) continuous, 500˚ F (260˚ C) intermittent
- Available with 0.062", 0.125", 0.187" or 0.250" diameter sheath
- 1-1/4" OD x 1.1" overall

MD4HT
- Standard 4-wire
- Maximum service temperature: 800˚ F (425˚ C) continuous, 1000˚ F (538˚ C) intermittent
- Available with 0.062", 0.125", 0.187" or 0.250" diameter sheath
- 1-1/4" OD x 1.1" overall

For detailed descriptions of termination styles, see page 50.

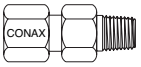
Packing Gland

MIC
- For 0.062" diameter sheath
- Stainless steel construction
- Mounting thread 1/16 NPT

MICAL – Lava sealant
MICAT – Teflon sealant
MICAG – Grafoil sealant

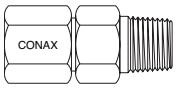
MPG
- For 0.062", 0.125" and 0.187" diameter sheath
- Stainless steel construction
- Mounting thread 1/8 NPT

MPGAL – Lava sealant
MPGAT – Teflon sealant
MPGAN – Neoprene sealant
MPGAV – Viton sealant
MPGAG – Grafoil sealant



PG2
- For 0.125", 0.187" and 0.250" diameter sheath
- Stainless steel construction
- Mounting thread 1/4 NPT

PG2AL – Lava sealant
PG2AT – Teflon sealant
PG2AN – Neoprene sealant
PG2AV – Viton sealant
PG2AG – Grafoil sealant



PG4
- For 0.250" diameter sheath
- Stainless steel construction
- Mounting thread 1/2 NPT

PG4AL – Lava sealant
PG4AT – Teflon sealant
PG4AN – Neoprene sealant
PG4AV – Viton sealant
PG4AG – Grafoil sealant

Midlock Gland

MK062A
- For 0.062" diameter sheath
- Stainless steel construction
- Stainless steel ferrule
- Mounting thread 1/8 NPT

MK125A
- For 0.125" diameter sheath
- Stainless steel construction
- Stainless steel ferrule
- Mounting thread 1/8 NPT

MK187A
- For 0.187" diameter sheath
- Stainless steel construction
- Stainless steel ferrule
- Mounting thread 1/8 NPT

MK250A
- For 0.250" diameter sheath
- Stainless steel construction
- Stainless steel ferrule
- Mounting thread 1/4 NPT

Note: For sealant material details, see page 41.

Conax Buffalo Technologies

This catalog presents the most commonly used methods to mount sensor probes. Conax Buffalo manufacturers a broad range of pressure/vacuum sealing devices for specific uses. For a complete selection of mounting methods and sealing glands, request Conax Pressure and Vacuum Sealing Assemblies catalog or visit www.conaxbuffalo.com/products/pres_vac.html.

Conax Buffalo Pressure/Vacuum Sealing Gland Assemblies conform to the Standard Engineering Practice (SEP) requirements of the European Pressure Equipment Directive (PED) 97/23/EC. Contact Conax Buffalo for further information.

Packing Gland – Catalog Types MIC, MPG & PG

This stainless steel, single bore compression sealing gland seals sheathed thermocouples, RTDs or other probes against gases or liquids. Conax "soft sealant" technology uses a compressable material, allowing the gland to be untorqued to adjust the probe immersion, then retorqued to re-establish the seal.

- Pressure: Vacuum to 10,000 psi (690 bar)
- Temperature Range: -400˚ F to +1600˚ F (-240˚ C to +870˚ C)
- Simple assembly, field adjustable
- Replaceable sealant permits repeated use of fitting
- Minimizes tube stress concentration

PRESSURE RATING GUIDE @ 68˚ F

Catalog Number	Pressure Rating by Sealant Type (PSI)** Neoprene	Viton	Teflon	Lava	Grafoil
MIC-040	—	—	3,200	8,000	—
MIC-062	—	—	3,200	8,000	10,000
MPG-040	2,400	3,200	4,000	5,600	—
MPG-062	2,400	3,200	4,000	4,000	5,000
MPG-125	2,400	2,400	2,400	4,000	5,000
MPG-187	1,200	1,500	1,500	4,000	4,000
PG2-125	5,000	10,000	3,200	10,000	10,000
PG2-187	3,200	4,500	2,400	10,000	5,000
PG2-250	2,400	3,000	1,200	10,000	4,000
PG4-250	1,500	1,500	2,400	10,000	5,000
PG4-375	1,200	500	1,400	10,000	3,200

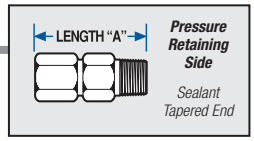
SPECIFICATIONS

Catalog Number	Tube or Probe Diameter***	Thread NPT	Length A	Length B	Hex Size	TORQUE** (Ft-Lbs except as noted) Neoprene/Viton	Teflon	Lava	Grafoil
MIC-040-*	.040	1/16"	15/16"	N.A.	3/8"	—	7-9 in-lbs	45-50 in-lbs	—
MIC-062-*	.062	1/16"	15/16"	N.A.	3/8"	—	7-9 in-lbs	45-50 in-lbs	45-50 in-lbs
MPG-040-*	.040	1/8"	1-3/16"	1-9/16"	1/2"	55-60 in-lbs	55-60 in-lbs	75-80 in-lbs	—
MPG-062-*	.062	1/8"	1-3/16"	1-9/16"	1/2"	55-60 in-lbs	55-60 in-lbs	75-80 in-lbs	55-60 in-lbs
MPG-125-*	.125	1/8"	1-3/16"	1-9/16"	1/2"	55-60 in-lbs	55-60 in-lbs	75-80 in-lbs	55-60 in-lbs
MPG-187-*	.187	1/8"	1-3/16"	1-9/16"	1/2"	55-60 in-lbs	55-60 in-lbs	75-80 in-lbs	55-60 in-lbs
PG2-125-*	.125	1/4"	2"	2-5/8"	3/4"	30-35	15-20	40-45	35-40
PG2-187-*	.187	1/4"	2"	2-5/8"	3/4"	30-35	15-20	40-45	35-40
PG2-250-*	.250	1/4"	2"	2-5/8"	3/4"	30-35	15-20	40-45	35-40
PG4-250-*	.250	1/2"	2-1/2"	3-1/4"	1"	55-60	55-60	125-140	90-100
PG4-375-*	.375	1/2"	2-1/2"	3-1/4"	1"	55-60	55-60	125-140	90-100

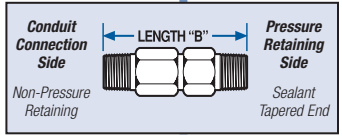
** Cap Style A or B*

*** All pressure and torque ratings determined at 68˚ F with solid stainless steel rod used as the element.*

**** Tolerance of tube or probe diameter, ±0.005. Deviation from the nominal may affect pressure ratings.*



Type A has mounting thread only.



Type B has cap end threaded.

Conax Buffalo Technologies

For more information call: ***1-800-223-2389*** *• e-mail:* ***conaxbuf@conaxbuffalo.com*** *• visit our website:* ***www.conaxbuffalo.com***

ting Methods

Midlock Gland – Catalog Type MK

This all stainless steel assembly for sealing gases and liquids is easy to use. Simply open the gland and slide the assembled fitting over the tube or probe. Tighten at the desired location. The ferrule is deformed against the probe and makes a seal without cutting the sheath surface.

- Pressure: Vacuum to 10,000 psi (690 bar)
- Temperature Range: Cryogenic to +1600˚ F (+870˚ C)
- Metal-to-metal seal
- Single ferrule is self-aligning (no lost pieces)
- Suitable for high vibration applications

PRESSURE RATING GUIDE @ 68° F

Catalog Number	Probe or Tube Diameter***	Thread NPT	Length	Hex Size	TORQUE** (Ft-Lbs)	Pressure Rating (PSI)**
MK-062-A	.062	1/8"	1-3/16"	1/2"	10	10,000
MK-125-A	.125	1/8"	1-3/16"	1/2"	12	10,000
MK-187-A	.187	1/8"	1-3/16"	1/2"	18	10,000
MK-250-A	.250	1/4"	1-5/8"	5/8"	30	10,000
MK-375-A	.375	1/2"	2"	1"	50	10,000

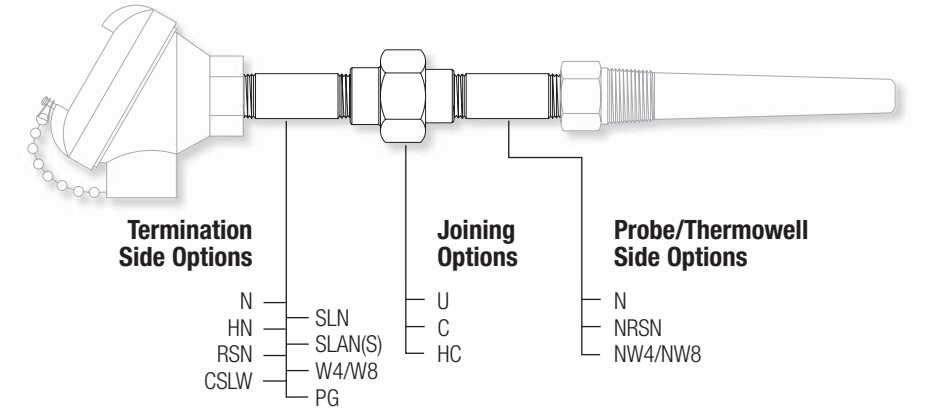
Available with Type A mounting only.
*** All pressure and torque ratings determined at 68˚ F with solid stainless steel rod used as the element.*
**** Tolerance of tube or probe diameter, ±0.005. Deviation from the nominal may affect pressure ratings.*

Sealant Selection Guide

Sealant Material	Temperature Range	Type of Material	Feature
Neoprene	-40˚ F to +200˚ F (-40˚ C to +93˚ C)	Synthetic Rubber (nonflammable)	Has the resilience of natural rubber with better resistance to oil, gasoline, ozone, weather and heat. Excellent memory for temperature cycling applications - good electrical resistivity - reusable in most cases.
Viton®	-10˚ F to +450˚ F (-20˚ C to +232˚ C)	Fluoroelastomer	Retains mechanical properties at high temperature. Resistant to oils, solvents, fuels, corrosive industrial chemicals. Good electrical properties - reusable in most cases.
Teflon®	-300˚ F to +450˚ F (-185˚ C to +232˚ C)	Tetrofluoroethylene Plastic (Thermoplastic Resin) (nonflammable)	Least permeable to gases. Has natural lubricity - resists adhesion of foreign matter - reusable in most cases.
Lava	-300˚ F to +1600˚ F (-185˚ C to +870˚ C)	Natural Magnesium Silicate	Low thermal coefficient. Crushes to powdered mass under compression - slightly porous to light gases and steam. NOT RECOMMENDED FOR HIGH VACUUM. Not reusable.
Grafoil®	-400˚ F to +925˚ F (-240˚ C to +495˚ C) +3000˚ F (+1650˚ C) in reducing atmosphere	Graphite in foil layers (conductive)	Low vapor pressure, low gas permeability - excellent for vacuum applications. Good for thermal cycling applications. Natural lubricity, electrically conductive. Superior sealing capabilities at +925˚ F (+496˚ C). Not reusable in most cases.

Additional Mou

Conax Buffalo offers numerous combinations of pipe nipples, hex nipples, unions and couplings to be used to mount your assembly to a vessel. These may also be used in combination with spring-loaded mounting devices. All pipe nipples and unions are 1/2 NPT stainless steel unless otherwise specified. Carbon steel is also available. Conax Buffalo does not recommend the use of nipple combinations (N, NU, NUN or HN) without additional probe support.



Standard Lengths

Catalog Designation	Length (inches)*
U	2.00
C	2.00
HC	1.56
N	4.00
HN	2.00
RSN, NRSN	4.00
W4, W8, NW4, NW8	2.00
SLN	4.00
SLAN(S)	2.00
CSLW	2.00
CSLP	1.00

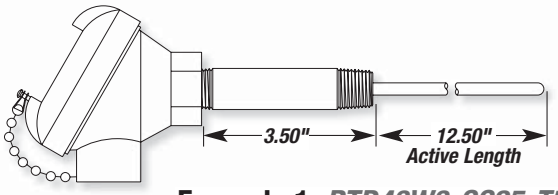
** Reference dimension*

Calculating the Length of Nipple Combinations

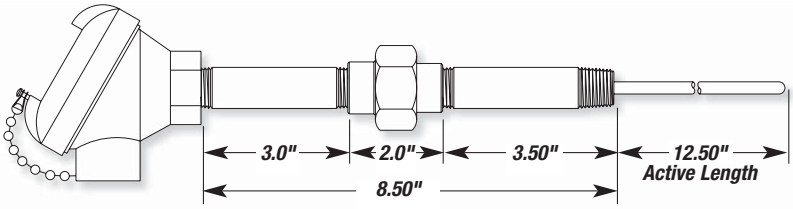
For assemblies using pipe nipples, the active length is the distance from the sensor end of the probe to the end of the pipe nipple.

The length of the pipe nipple must also be specified in an order, keeping in mind that when engaging 1/2 NPT threads, approximately 1/2" is lost per connection.

If a spring-loaded pipe nipple (SLN) is ordered, the active length is measured with the spring uncompressed. Conax Buffalo recommends 1/4" of spring compression when the probe is installed.



Example 1: *RTD43W3-SS25-T5AL(RSN3.50)-12.50"*



Example 2: *RTD43W3-SS25-T5AL(SLNUN8.50)-12.50"*

Note: Stainless steel is the standard material. For items where a carbon steel option is available, this is designated by adding "CS" after the mounting component length.

Stainless Steel Example:
RTD43W3-SS25-T5AL(RSN3.50)-12.50"

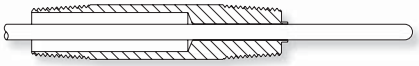
Carbon Steel Example:
RTD43W3-SS25-T5AL(RSN3.50CS)-12.50"

nting Methods

Catalog Designations

N – Pipe Nipple

Conax pipe nipples consist of Schedule 40 pipe with male threads on each end, 4 inch long stainless steel standard. Carbon steel (CS) and longer lengths are available options. Pipe nipples feature a 1/2 NPT and nominal bore ID of 0.62". Pipe nipples are used to provide temperature standoff between the pipe/vessel and terminal head. They are also often used as a spacer between insulated vessels/pipes and terminal heads.

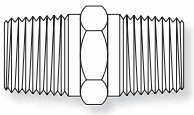


RSN – Rigidly Sealed Nipple

The Conax rigidly sealed nipple is similar in usage to a pipe nipple, but is weld sealed on the process end to provide pressure/vacuum sealing against liquid or gases reaching the terminal head. The RSN is sized to fit the requested sensor diameter. Available in stainless steel only, 1/2 NPT, 4" long standard. Other lengths are available.

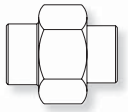
NRSN

This version of the RSN is not weld sealed on the process end. It provides a pilot for the probe without the seal.



HN – Hex Nipple

The hex nipple provides a shorter temperature standoff than the pipe nipple and includes wrench flats. The HN features a 2" long fixed overall length and is available in stainless steel only.

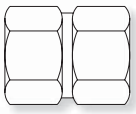


U – Union

This Class 150 lb., 1/2 NPT standard union allows disassembly, removal and positioning of the sensor assembly. Stainless steel is standard. Carbon steel (CS) is also available.

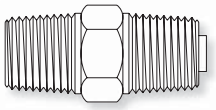
C – Coupling

A Class 150 lb. standard coupling may be used to join pipe nipple sections. Stainless steel is standard. Carbon steel (CS) is also available.



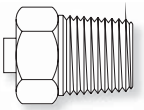
HC – Hex Coupling

The hex coupling offers wrench flats. Available in stainless steel only.



W Mounting

The Conax W fitting is a stainless steel fitting with male threads on both ends. The bore is sized to pass standard probe diameters of 0.125", 0.187" or 0.250". NW4 and NW8 fittings are not welded and can be used to pilot the probe for insertion into tubewells or thermowells. W4 and W8 fittings are weld sealed to form a rugged leak-tight mounting. Order W8 for a 1/2 NPT, W4 for a 1/4 NPT.

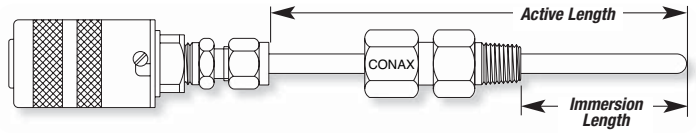


W7

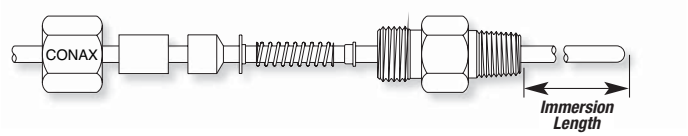
The Conax W7 fitting is a stainless steel fitting with male threads on one end only. The hex end is welded to the sheath to form a fixed mounting and liquid/gas seal. The bore is sized to pass standard probe diameters of 0.125", 0.187" or 0.250". When included in an assembly, both the active and immersion lengths must be specified.

Spring Loaded Assemblies

Conax Buffalo provides several types of spring-loaded assemblies to meet your application needs. All are designed to provide positive contact of the sensor tip with the surface to be measured.



When ordering spring loads, the immersion length should be measured with the spring uncompressed. We recommend 1/4" of spring compression when the probe is installed.



Spring Load Assembly (SL)

The SL assembly features rugged stainless steel construction with a Teflon sealant.

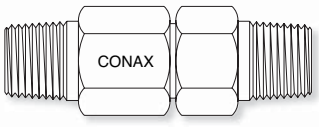
- Temperature Range: -190˚ F to +450˚ F (-123˚ C to +232˚ C)
- Spring Pressure: approximately 2 to 8 pounds
- Spring Travel: 1/4" to 3/8"
- Available with Type B cap for direct mount

A typical catalog number for a spring load assembly is:

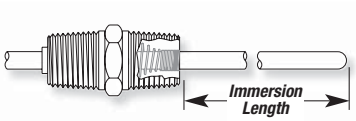
J-SS12-U-B2-SL-12.50", A=3.50"

Spring Loaded Assembly Specifications

Catalog Type	Probe Diameter (inches)	Mounting Thread NPT	Nominal Mounting Thread Engagement (inches)	Length with A Cap (inches)
SL6	0.062	1/8	1/4	1-3/16
SL12	0.125	1/8	1/4	1-3/16
SL18	0.187	1/4	3/8	2
SL25	0.250	1/2	1/2	2-1/2

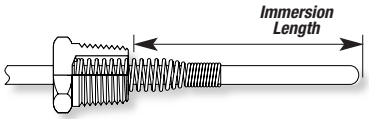


SL assembly shown with B cap.



Crimp Spring Load (CSLW)

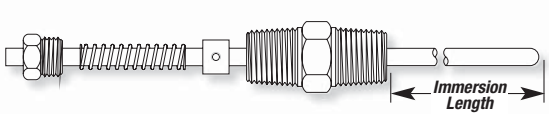
This assembly provides a spring load with male 1/2 NPT threads at both ends. Wrench flats permit easy tightening, removal and reuse. Constructed of sturdy stainless steel with an overall length of 2". Bores are sized to fit the diameter of the probe.



Crimp Spring Plug (CSLP)

This assembly includes threads on the mounting end only. It is designed for use with T3/T4, Plug & Jack and B-head assemblies to provide positive contact with a pipewell bottom or other vessel surfaces.

Example: ***J-SS12-U-B2-CSLP-12.50", A=3.50"***



Spring Load Adjustable Nipple (SLAN and SLANS)

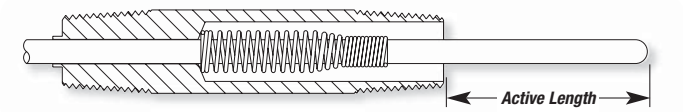
The SLAN is an adjustable spring-loaded sensor fitting. The set-screw collar allows the fitting to be fully adjustable and "forgiving" to accommodate errors in thermowell and sensor lengths.

- 1/2 NPT on both ends
- Available for 0.125", 0.187" and 0.250" diameters
- Stainless steel construction
- 2-1/4" overall length

The SLANS assembly includes a Viton O-ring.

- 50 psi maximum
- 1/2 NPT on both ends
- Available for 0.250" diameter only
- Stainless steel construction
- 2-1/4" overall length

Spring Loaded Assemblies



Spring Load Nipple Assembly (SLN)

The SLN assembly provides a spring load inside a pipe nipple. It is available for 0.125", 0.187" and 0.250" diameter probes. A union and additional nipple may also be added to form SLNU and SLNUN configurations.

- 4" overall length; other lengths available
- 1/2 NPT on both ends
- Stainless steel construction. Carbon steel optional

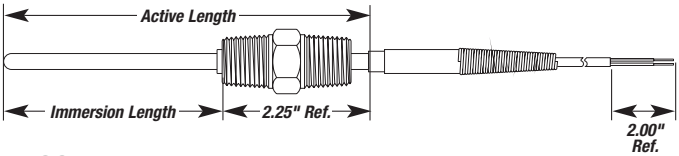
T11SL

- Includes spring loaded assembly built into the head
- Allows complete disassembly and removal of the sensor probe without dismantling the terminal head from the conduit or vessel
- Weathertight
- Lightweight cast aluminum construction
- Silver-painted finish designed to resist weak acids, organic solvents, alkalies, sunlight & dust
- Screw cover with chain leash and O-ring seal
- 6 terminal posts
- Service temperature upper limit: 275˚ F (135˚ C)
- Use of NW8 or N fitting recommended for mounting to probe
- Size (reference): 3.25" OD x 3.7" L, 0.7 lb.
- Conduit port 1/2 NPT

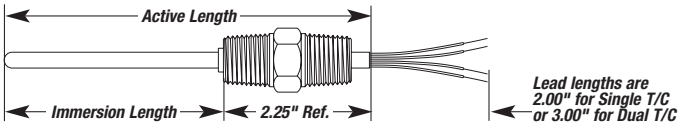
Replacement Probes

Replacement Probe with Type W8 or W4 Fitting Assemblies

Replacement Probe Fitting Assemblies are available for those who wish to replace the probe without replacing the terminal head. Order W8 for a 1/2 NPT, W4 for a 1/4 NPT. To order, both the immersion length and the active length must be specified, as demonstrated in the following examples:



J-SS25-U-T3-W8-7.75", A=5.50"

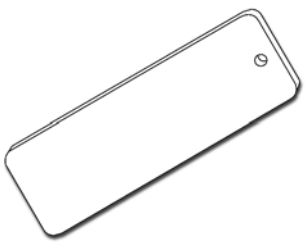


J-SS25-U-T1(2")-W8-7.75", A=5.50"

Identification Methods

Aluminum Foil Tag – All Conax sensor assemblies include an aluminum foil tag that identifies the catalog description for that assembly.

Stainless Steel Tag – Optional electro-etched stainless steel identification tags can be supplied. Consult factory for details.



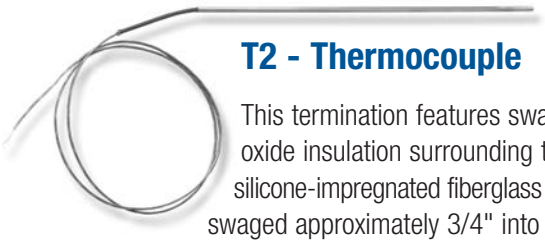
Conax Buffalo Technologies

Conax Buffalo offers an assortment of termination styles and terminal heads for multiple environment and application uses. In this section, the maximum service temperature cited applies to the terminal head without the thermocouple sensor. Thermocouple sensor cold end sealant maximum temperature is 300˚ F (150˚ C). Higher temperature cold end seals are available (consult factory). Specified dimensions are nominal values and do not include the length of sealing glands.

T1

This most basic termination is available on all Conax Buffalo probes.

- Probe end is impregnated with moisture-resistant compound to prevent liquid or gas penetration.
- Standard leads are 1" long on all but the 0.040" diameter, which uses 5/8" leads. Longer leads are available. Specify in inches, e.g. T1(3").
- Leads are solid wire color-coded Teflon sleeved.
- Maximum service temperature: 300˚ F (150˚ C)



T2 - Thermocouple

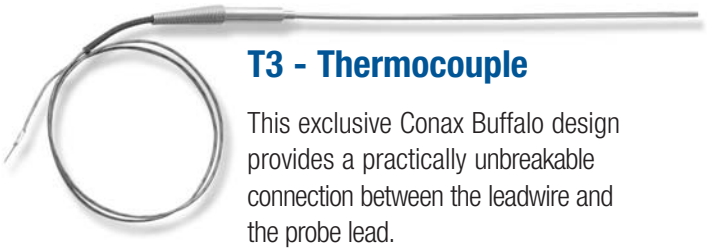
This termination features swaged magnesium oxide insulation surrounding the elements, with silicone-impregnated fiberglass leadwire insulation swaged approximately 3/4" into the sheath.

- The fiberglass insulation protects the integral leadwires under mildly adverse atmospheric conditions (not recommended where excessive vibration and abrasion are encountered).
- Standard cold end lead length is 24". Longer leads are available on request. Specify in feet, e.g. T2(3FT).
- Available with the following sheath sizes: 0.062" (AWG 30 leadwire), 0.125" (AWG 24 leadwire), and 0.187" (AWG 20 leadwire). Maximum sheath length is 5 ft.
- Service temperature upper limit: 700˚ F (370˚ C)

T2 - RTD

This termination features aluminum oxide powder insulation surrounding the element and Teflon-insulated leadwires, all capped with potting compound to prevent moisture penetration.

- The Teflon insulation protects the integral leadwires under mildly adverse atmospheric conditions.
- Unit is to be used straight. Bending is not recommended.
- Standard cold end lead length is 24". Longer leads are available on request. Specify in feet, e.g. T2(3FT).
- Standard probe diameter is 0.250".
- Service temperature upper limit: 300˚ F (150˚ C)



T3 - Thermocouple

This exclusive Conax Buffalo design provides a practically unbreakable connection between the leadwire and the probe lead.

- Silicone impregnated fiberglass braid insulation
- Leadwires are joined in the adaptor housing, secured by a special strain harness for diameters of 0.187" or smaller, and encapsulated in potting compound to prevent moisture penetration.
- Spring dampens and reduces vibration and abrasion.
- Standard cold end lead length is 24". Longer leads are available on request. Specify in feet, e.g. T3(3FT).
- Service temperature upper limit: 300˚ F (150˚ C).
- Leads sizes: AWG 20 for sheath sizes 0.125" to 0.375"; AWG 24 for 0.040" and 0.062" sheath diameters.
- The terminal barrel is larger than the sheath, crimped to the sheath and filled with potting compound to prevent moisture penetration. Barrel diameter sizes: 0.040" to 0.187" sheath diameter – 0.312", 0.250" sheath diameter – 0.375", 0.375" sheath diameter – 0.500".
- T3(HT) high temperature model uses high temperature insulation compound to achieve service temperature upper limit of 900˚ F (480˚ C).

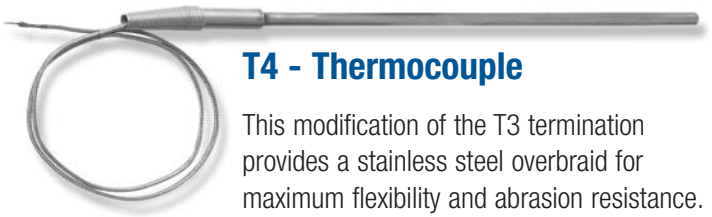
T3 - RTD

This exclusive Conax Buffalo design provides a practically unbreakable connection between the leadwire and the probe lead.

- Standard leadwires are 24 AWG stranded silver-plated copper, Teflon-insulated wire with Teflon overall.
- Leadwires are joined in the adaptor housing, secured by a special strain harness for diameters of 0.187" or smaller, and encapsulated in potting compound to prevent moisture penetration.
- Spring dampens and reduces vibration and abrasion.
- Standard cold end lead length is 24". Longer leads are available on request. Specify in feet, e.g. T3(3FT).
- Service temperature upper limit: 300˚ F (150˚ C).
- The terminal barrel is larger than the sheath, crimped to the sheath and filled with potting compound to prevent moisture penetration. Barrel diameter sizes: up to 4-wire probes – 0.375", 6- and 8-wire probes – 0.500".

Conax Buffalo Technologies

on Styles



T4 - Thermocouple

This modification of the T3 termination provides a stainless steel overbraid for maximum flexibility and abrasion resistance. The overbraid is embedded in the potting compound to ensure mechanical strength.

- Standard cold end lead length is 24". Longer leads are available on request. Specify in feet, e.g T4(3FT).
- Leads sizes: AWG 20 for sheath sizes 0.125" to 0.375"; AWG 24 for 0.040" and 0.062" sheath diameters.
- The terminal barrel is larger than the sheath, crimped to the sheath and filled with potting compound to prevent moisture penetration. Barrel diameter sizes: 0.040" to 0.187" sheath diameter – 0.312", 0.250" sheath diameter – 0.375", 0.375" sheath diameter – 0.500".
- T4(HT) high temperature model uses high temperature insulation compound to achieve service temperature upper limit of 900˚ F (480˚ C).

T4 - RTD

This modification of the T3 termination provides a stainless steel overbraid for maximum flexibility and abrasion resistance. The overbraid is embedded in the potting compound to ensure mechanical strength.

- Standard leadwires are 24 AWG stranded silver-plated copper, Teflon-insulated wire with Teflon overall.
- All probes with 4 wires or less include a spring to dampen vibration and reduce abrasion of the leadwire.
- Standard cold end lead length is 24". Longer leads are available on request. Specify in feet, e.g. T4(3FT).
- The terminal barrel is larger than the sheath, crimped to the sheath and filled with potting compound to prevent moisture penetration. Barrel diameter sizes: up to 4-wire probes – 0.375", 6- and 8-wire probes – 0.500".
- T4(HT) high temperature model uses fiberglass braid insulated wire and high temperature insulation compound to achieve service temperature upper limit of 900˚ F (480˚ C).

T5CI

- NEMA 4 rated
- Cast iron construction with durable gray paint applied to prevent rust
- Screw cover with chain leash and silicone gasket seal
- Service temperature upper limit: 300˚ F (150˚ C) with gasket
- 6 terminal posts
- Brass metal-to-metal compression fitting supplied when head is ordered with sensor probe
- Accepts “hockey puck” style transmitter
- Size (reference): 3.38" OD x 3.6" L, 1.8 lb.
- Conduit port 3/4 NPT

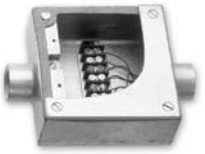
T5AL

- NEMA 4 rated
- Lightweight cast polished aluminum construction
- Screw cover with chain leash and silicone gasket seal
- Service temperature upper limit: 300˚ F (150˚ C) with gasket
- 6 terminal posts
- Brass metal-to-metal compression fitting supplied when head is ordered with sensor probe
- Accepts “hockey puck” style transmitter
- Size (reference): 3.3" OD x 3.6" L, 0.7 lb.
- Conduit port 3/4 NPT

T5SS

- NEMA 4X rated
- 316L stainless steel construction
- Screw cover with chain leash and silicone gasket seal
- Service temperature upper limit: 300˚ F (150˚ C) with gasket
- 6 terminal posts
- Conax PG Series stainless steel sealing gland with lava sealant supplied when head is ordered with sensor probe
- Accepts “hockey puck” style transmitter
- Size (reference): 3.1" OD x 3.6" L, 1.7 lb.
- Conduit port 3/4 NPT

T7



- Weathertight
- Aluminum conduit box with gasket seal
- Accommodates up to 8 terminals standard, 16 terminals optional
- Provides easy access to terminals
- Ideal for multiple probe or extra long thermocouple/RTD assemblies
- Optional PG series fitting available for use with single probes; MHM series fitting available for use with multiple probes
- Service temperature upper limit: 300˚ F (150˚ C)
- Size (reference): 4.75" W x 6.5" L x 2.25" H, 1.35 lb.
- Conduit port 3/4 NPT

Conax Buffalo Technologies

T8

- Weathertight
- Cast iron construction
- Gasket sealed
- Black epoxy-coated (E-Coat)
- Service temperature upper limit: 700˚ F (371˚ C)
- Accepts up to 8 leads
- Brass metal-to-metal compression fitting supplied when head is ordered with sensor probe
- Size (reference): 3.3" OD x 3.7" L, 2.4 lb.
- Conduit port 3/4 NPT

T8E

- Explosion proof - meets Class 1, Groups B, C and D; Class II, Groups E, F, G; and Class III requirements
- Gray iron body with aluminum screw cover
- O-ring sealed
- Service temperature upper limit: 300˚ F (150˚ C)
- Accepts up to 8 leads
- Brass metal-to-metal compression fitting supplied when head is ordered with sensor probe
- Size (reference): 3.75" OD x 4.6" L, 2.3 lb.
- Conduit port 1/2 NPT

T11

- Weathertight
- Lightweight cast aluminum construction
- Silver-painted finish designed to resist weak acids, organic solvents, alkalies, sunlight & dust
- Screw cover with chain leash and O-ring seal
- 6 terminal posts
- Accepts “hockey puck” style transmitter
- Service temperature upper limit: 275˚ F (135˚ C)
- Brass metal-to-metal compression fitting supplied when head is ordered with sensor probe
- Size (reference): 3.25" OD x 3.7" L, 0.7 lb.
- Conduit port 1/2 NPT

T11PL

- Weathertight
- Lightweight plastic construction
- Corrosion resistant
- Screw cover with chain leash and O-ring seal
- 6 terminal posts
- Accepts “hockey puck” style transmitter
- Service temperature upper limit: 275˚ F (135˚ C)
- Brass metal-to-metal compression fitting supplied when head is ordered with sensor probe
- Size (reference): 3.25" OD x 3.8" L 0.5 lb.
- Conduit port 1/2 NPSM

T11SL

- Includes spring loaded assembly built into the head
- Allows complete disassembly and removal of the sensor probe without dismantling the terminal head from the conduit or vessel
- Weathertight
- Lightweight cast aluminum construction
- Silver-painted finish designed to resist weak acids, organic solvents, alkalies, sunlight & dust
- Screw cover with chain leash and O-ring seal
- 6 terminal posts
- Service temperature upper limit: 275˚ F (135˚ C)
- Use of NW or N fitting recommended for mounting to probe
- Size (reference): 3.25" OD x 3.7" L, 0.7 lb.
- Conduit port 1/2 NPT

T12

- Weathertight
- Easy-open globe head with camlock
- Lightweight aluminum construction
- O-ring sealed
- Accepts up to 6 leads
- Accepts “hockey puck” style transmitter
- Service temperature upper limit: 300˚ F (150˚ C)
- Brass metal-to-metal compression fitting supplied when head is ordered with sensor probe
- Size (reference): 3.3" OD x 4.3" L, 0.6 lb.
- Conduit port 1/2 NPT

on Styles

T13

- FDA compliant, NEMA 4 rated
- Ideal for sanitary, corrosive or general purpose pharmaceutical and food applications
- White unpigmented polypropylene construction with stainless steel chain/pin
- Ethylene propylene gasket
- Good resistance to most acid solutions, alkalines and salt water
- 6 terminals
- Service temperature upper limit: 198˚ F (92˚ C)
- Conax PG Series stainless steel sealing gland with Teflon sealant supplied when head is ordered with sensor probe
- Size (reference): 3.0" OD x 3.3" L, 0.2 lb.
- Conduit port 3/4 NPT

T13F

- FDA compliant, NEMA 4 rated
- Ideal for sanitary, corrosive or general purpose pharmaceutical and food applications
- Easy open flip top
- White unpigmented polypropylene construction with stainless steel chain/pin
- Epichlorohydrin gasket
- Good resistance to most acid solutions, alkalines and salt water
- Accepts up to 6 leads
- Service temperature upper limit: 198˚ F (92˚ C)
- Conax PG Series stainless steel sealing gland with Teflon sealant supplied when head is ordered with sensor probe
- Size (reference): 3.2" OD x 3.4" L, 0.2 lb.
- Conduit port 3/4 NPT

T13T

- FDA compliant, NEMA 4X rated
- Ideal for sanitary, corrosive or general purpose pharmaceutical and food applications
- White unpigmented polypropylene construction with stainless steel chain/pin
- Screw cover with epichlorohydrin gasket
- Good resistance to most acid solutions, alkalines and salt water
- 4 terminal posts
- Accepts “hockey-puck” style transmitter
- Service temperature upper limit: 198˚ F (92˚ C)
- Size (reference): 2.8" OD x 3.2" L, 0.2 lb.
- Conduit port 3/4 NPT

T15EAL

- FM and CSA approved for hazardous environments with an Explosion-Proof rating for Class I, Division 1, Groups B, C and D, and Dust Proof/Ignition Proof Rating for Class II, Division 1, Groups E, F and G
- NEMA 4 rated when configured with a nitrile O-ring (standard). O-ring configuration service temperature upper limit: 300˚ F (150˚ C)
- Aluminum construction
- 6 terminal posts
- Accepts “hockey-puck” style transmitter
- Brass metal-to-metal compression fitting supplied when head is ordered with sensor probe
- Size (reference): 3.6" OD x 4.0" L, 1 lb.
- Conduit port 3/4 NPT

T15ESS

- FM and CSA approved for hazardous environments with an Explosion-Proof rating for Class I, Division 1, Groups B, C and D, and Dust Proof/Ignition Proof Rating for Class II, Division 1, Groups E, F and G
- NEMA 4X rated when configured with a nitrile O-ring (standard) O-ring configuration service temperature upper limit: 300˚ F (150˚ C)
- Stainless steel construction
- 6 terminal posts
- Accepts “hockey-puck” style transmitter
- Conax PG Series stainless steel sealing gland with lava sealant supplied when head is ordered with sensor probe
- Size (reference): 3.6" OD x 4.0" L, 1.9 lb.
- Conduit port 3/4 NPT

P Series

- Weathertight
- Small plastic termination head
- Screw cover with gasket
- Corrosion resistant
- 4 terminals
- Service temperature upper limit 350˚ F (177˚ C)
- Size (reference): 2.125" OD, 1.25" L, 0.2 lb.
- Brass compression fitting supplied when head is ordered with sensor probe
- Conduit port 1/4 NPT
- P2 accepts two leadwires
- P3 accepts three leadwires
- P4 accepts four leadwires

Conax Buffalo Technologies

Termination Styles

B Series

- Compact, lightweight head for convenient hookup of customer extension wire
- Nickel-plated for corrosion resistance
- Zinc-plated brass terminal posts secured on a ceramic terminal block
- Accepts up to 14 AWG wire
- Easy removal and access – loosen two screws and turn cover slightly
- Service temperature upper limit: 300˚ F (150˚ C)
- Size (reference): 1.2" OD x 2.4" L, 0.2 lb.
- Grommet hole diameter: 0.234" (reference)
- B2 accepts two leadwires
- B3 accepts three leadwires
- B4 accepts four leadwires
- Mounting port 1/4 NPT (standard), 1/8 NPT (optional)

C Series

- Provides a convenient and compact method to terminate one or more sensors contained within a single probe
- Stainless steel screw posts mounted in high purity alumina securely fasten leadwires in position
- Black anodized aluminum cover, stainless steel body
- 0.250" diameter probe only
- Available as C2 (two-wire), C3 (three-wire), C4 (four-wire), C6 (six-wire) or C8 (eight-wire). Terminal posts are provided for indicated number of wires only
- Service temperature upper limit: 200˚ F (93˚ C) with grommet, 700˚ F (371˚ C) with grommet removed

Quick Disconnect

- Water and vapor resistant when assembled tight
- Polarized plug and socket design prevents crossing of leads
- Easy to assemble and disassemble
- Plugs and sockets made of thermocouple material maintain continuity between thermocouple elements and leadwires
- Aluminum body and cap construction
- Available for sheath diameters 0.062" to 0.250"
- Size (reference): 0.8" OD x 2.9" L, 0.1 lb.
- Service temperature upper limit: 200˚ F (93˚ C) for QD; 450˚ F (232˚ C) for QDHT (high temperature model)

MD Series

- Bodies are molded of high performance thermoset compounds, color-coded by type
- Heads are mounted directly to the sheath using a brass metal-to-metal compression fitting
- Service temperature upper limit: 400˚ F (205˚ C)
- High temperature models are also available. Service temperature upper limit: 800˚ F (425˚ C)
- Available with 0.062", 0.125", 0.187" or 0.250" diameter sheath
- MD2 and MD2HT accepts two leadwires; size (reference): 1" OD x 1.1" long, 0.07 lb.
- MD3 and MD3HT accepts three leadwires; size (reference): 1.25" OD x 1.1" long, 0.07 lb.
- MD4 and MD4HT accepts four leadwires; size (reference): 1.25" OD x 1.1" long, 0.07 lb.

Plug & Jack

Polarized plug and jack assemblies are made from molded glass-filled thermoset compounds with contacts made of thermocouple alloy or copper.

- Pins are polarized and identification marks are molded into the connector bodies
- Connectors are color-coded according to type
- Standard and miniature sizes available
- Metal ferrule tube adapters secure the probe in place, and cable clamps are used to hold the wire and provide strain relief
- Maximum service temperature is 400˚ F (204˚ C)
- High Temperature connectors are available for temperatures to 800˚ F (427˚ C)
- Dual construction available for thermocouple models only. Dual polarized plug and jack assemblies offer the same features as standard plug and jack assemblies but are supplied with a dual tube adapter. Service temperature upper limit: 400˚ F (204˚ C)
- Size (reference): Standard PJFC (single) – 3.8" L x 0.6" H, 0.163 lb; Miniature PJFC – 1.75" L x 0.3" H, 0.042 lb.

Quick Reference Guide

Standards

NEMA 4

NEMA 4 heads meet requirements providing protection against windblown dust and rain, splashing water, hose-directed water, and external ice formation.

T5CI – Cast Iron
T5AL – Aluminum
T8E – Aluminum/Malleable Iron
T13 – Plastic
T15EAL – Aluminum

NEMA 4X

NEMA 4X heads meet NEMA 4 requirements and provide an added degree of corrosion resistance.

T5SS – Stainless Steel
T13F – Plastic
T13T – Plastic
T15ESS – Stainless Steel

FDA-Compliant

FDA-compliant heads meet standards for sanitary applications.

T13 – Plastic Screw Cover
T13F – Plastic Flip Top
T13T – Plastic Screw Cover

FM & CSA Approved for Hazardous Environments

T15EAL – Aluminum
T15ESS – Stainless Steel

Weathertight

Weathertight heads provide general protection against outdoor environmental challenges.

T7 – Aluminum
T8 – Cast Iron
T11 – Aluminum
T11PL – Plastic
T12 – Aluminum
B – Plated Steel
P4 – Plastic

Note: For NEMA definitions, see page 89.

Materials of Construction

Aluminum

T5AL – Screw cover, NEMA 4
T7 – Weathertight, conduit box
T11 – Screw cover, weathertight
T12 – Weathertight, flip top
T15EAL – Screw cover, FM & CSA Approved for Explosion-Proof Environments

Cast Iron

T5CI – Screw cover, NEMA 4
T8 – Screw cover, weathertight, E-Coat

Stainless Steel

T5SS – Screw cover, NEMA 4X
T15ESS – Screw cover, FM & CSA Approved for Explosion-Proof Environments

Combination Metals

T8E – Aluminum & Malleable Iron
B – Plated Steel

Plastic

T13 – Screw cover, FDA-white
T13F – Flip top, FDA-white
T13T – Screw cover, FDA-white
P4 – Screw cover, weathertight
T11PL – Screw cover, weathertight
Plug & Jack

Transmitters provide a convenient and economical way to send a signal from a sensor to a datalogger, controller or the control room of a processing plant. The transmitter converts the sensor's small voltage signal into a current output signal that runs on copper electrical wires. This method is more economical than running long lengths of multi-conductor shielded cables for RTDs or specially compensated, shielded extension-grade wire for thermocouples. In addition, the output is less subject to distortion/interference from external electrical noise, RFI and EMI.

Conax offers a variety of temperature transmitters to meet customer application requirements and configurations. For more information on any individual type of transmitter, request our data sheet on that type or our complete transmitter folder or visit www.conaxbuffalo.com.

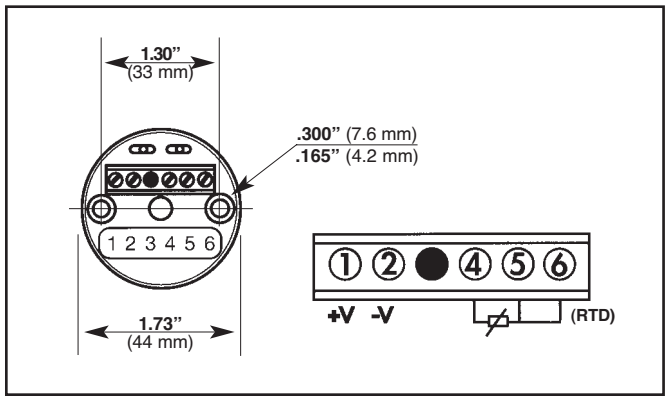
Hockey puck style transmitters fit in T5, T11, T12, T13T and T15 termination heads.

HPT

Model HPT is a low-cost, 2-wire, non-isolated temperature transmitter for RTD sensors. A removable base allows access to the electronics to permit temperature range changes.

- Input = RTD, 100Ω, 2- or 3-wire connection
- Output = 4-20mA, limiting @ <28mA

HPT Dimensions and Electrical Connections



For fixed range transmitters that are configured at the factory (Model HPT), the type of transmitter is added to the termination head designation and the temperature range is added at the end of the description, in parentheses, as follows:

Example: ***RTD43W3-SS25-T11HPT-9.00" (0/200C)***

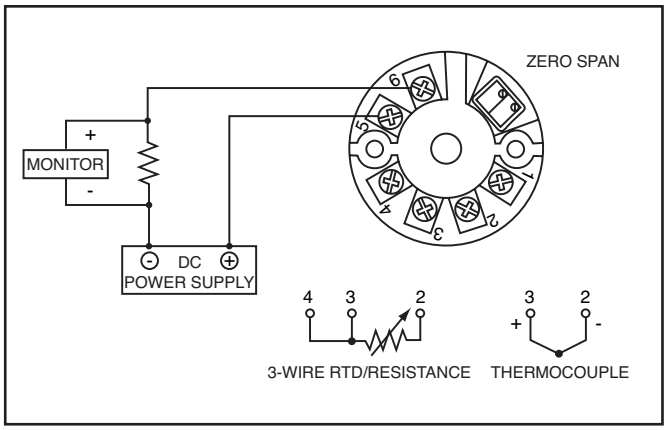
To order transmitter only, use the following catalog description. The temperature range is added in parentheses. Note that the unit of measure must be included in the temperature range.

Example: ***TRANSMITTER, HPT-RTD-(32/500F)***

HPTI

Model HPTI is a small, isolated 2-wire temperature transmitter for RTD or thermocouple sensors. A removable base allows access to the electronics to permit temperature range changes.

HPTI Electrical Connections



- Input = RTD, 100Ω, 2- or 3-wire connection; all common thermocouple types
- Output = 4-20mA, limiting @ <28mA

For fixed range transmitters that are configured at the factory (Model HPTI), the type of transmitter is added to the termination head designation and the temperature range is added at the end of the description, in parentheses, as follows:

Example: ***T-SS25-G-T11HPTI-PG2AT-9.00" (0/200C)***

nditioning

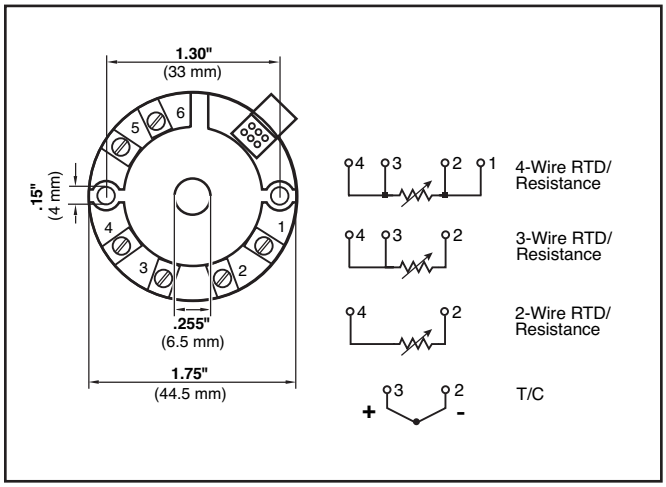
To order transmitter only, use the following catalog description. In this case, the sensor type may be RTD or T/C. The temperature range is added in parentheses. Note that the unit of measure must be included in the temperature range.

Example: ***TRANSMITTER, HPTI-RTD-(32/500F)***

PTH-400

PTH-400 is a small, PC-programmable 2-wire transmitter featuring a state-of-the-art microprocessor-based design that allows full configuration with a PC and user-friendly configuration software. No power supply is required for programming.

PTH-400 Wiring



To designate a field-programmable transmitter (Model PTH-400) in a catalog description, the type of transmitter is added to the termination head designation:

Example: ***RTD43W3-SS25-T11PTH400-PG4AV-12.00"***

To order transmitter only, use the following catalog description.

Example: ***TRANSMITTER, PTH-400***

An RS232 programming adaptor is also available. Order PA-400.

Conax also offers these other transmitter types:

PDT-400

DIN-rail mount version of the PTH-400.

PDT-400

Wall Mount Temperature Sensor

Provides accurate measurement of room air temperature. Available with sensor probe only or with HPT fixed-range transmitter or PTH-400 programmable transmitter.

Wall Mount

DRT-T/C

Model DRT-T/C

DIN-rail mounted transmitters for any thermocouple type.

Model DRT-RTD

DIN-rail mounted transmitters for 2-, 3- or 4-wire RTDs.

DRT-RTD

HST

Model HST

HART® Smart isolated 2-wire transmitter with universal input capability.

Thermowells are pressure-tight receptacles that extend the life of a temperature sensor in environments where the sensor is not chemically compatible with the process media or the sensor does not have the mechanical strength to withstand the process flow or pressure. Thermowells also facilitate removing, changing, checking or replacing sensors without draining the process system. The use of standardized thermowells throughout a plant permits easy relocation of sensors.

In designing a system using thermowells, a number of factors must be considered:

Material of Construction

Thermowell material must be chemically compatible with the process system and the temperature sensor. In most cases, thermowell selection is based on the corrosive conditions in the well environment. Sometimes the selection may be based solely on the mechanical strength needed to withstand operating pressure and process flow. Often a combination of factors must be considered. In addition to selecting the proper base material, coatings may be used to improve a thermowell's resistance to abrasion or the chemical process.

The thermowell wall must be thin enough to minimize sensor error caused by thermal conduction and slow sensor response, but thick enough to withstand collapse from process pressure, erosion from abrasive media and bending from the process flow.

Spring-load mounting styles are recommended to ensure positive contact to maximize thermal transfer and minimize sensor vibration within a thermowell.

Insertion Length

The insertion length or "U" length is the distance from the end of the well to the underside of the thermowell thread or other connection device. For maximum accuracy, this length must be long enough to permit the temperature sensor to be fully immersed in the media to be measured and minimize sensor error caused by thermal conduction, but short enough to withstand damage caused by process flow vibration. As a general rule of thumb, the thermowell should extend into the process a minimum of 10 times the sensor diameter or, in the case of RTDs, 10 times the sensor diameter plus one inch. This should extend the sensor into the process between 1/3 and 1/2 the diameter of the process pipe. The insertion length must also take into consideration any dead length required to pass through walls, pipe fittings and insulation.

Velocity

The most common cause of well failure is the vibrational effect caused by fluid forming a turbulent wake as it flows past the well. This turbulence has a definite vibration frequency based on the diameter of the well and the velocity of the fluid. The well must have sufficient stiffness to ensure that the wake frequency will never equal the natural frequency of the well. If the natural frequency of the well coincides with the wake frequency, the well will potentially vibrate to destruction. To be in compliance with the ASME Performance Test Code, the thermowell should have a natural frequency a minimum of 125% of the wake frequency.

Tapered shank wells (heavy duty – Type H) have a higher strength-to-weight ratio with a resultant higher natural resonant frequency than the equivalent length straight shank well. Tapered shank wells are preferred for operation at higher fluid velocities.

Process Connection

Conax Buffalo Technologies provides standardized wells in most of the common connection types, including threaded, flanged and socket weld types with standard bore sizes. Threaded wells are available in materials that can be readily welded. Flanged wells are manufactured by welding a bar stock well to the specified flange style. Double-welded construction reduces crevice corrosion and stress problems by ensuring that no open joints are exposed inside or outside the installation.

Socket-weld thermowells can be easily installed by merely welding the thermowell into a mating sockolet.

Bore Size

Selection of a standard bore size throughout the plant permits the use of several types of temperature measuring instruments in the same wells. Conax standard bore sizes fit most commonly used temperature sensing devices. Most applications use 0.260" or 0.385" diameter bores. This number represents the inside diameter of the well, expressed in thousandths of an inch.

Standard Manufacturing Practices

Conax Buffalo thermowells are constructed to the following tolerances/descriptions:

Item	Tolerance/Description
Lengths	±1/16" on lengths 12" or less ±1/8" on lengths over 12"
O.D. Tolerances	±0.015
Bore I.D.	+0.005 –0.003
End Thickness	1/4" ±1/16"
Concentricity of Bore to O.D.	±10% of minimum wall thickness
Wetted Surfaces Finish	16-32 Ra is standard. Special finishes are available on request.
Process Connection Thread	In compliance with ANSI BI.20.1-92. Thread specifications vary with the process connection size.
Instrument Connection	1/2-14 NPT standard, 1/2-14 NPSM optional*
End of Wells	Break corners, no burrs
Lagging Extension	Hex on threaded wells (or wrench flats where applicable)
Stamping	Type of material standard; customer name and heat or tag number if required.
Flanges	Made in accordance with ANSI B16.5. Raised face is serrated 125/250 RMS STD
Welding	Full penetration welds are standard on 300 lb. and up

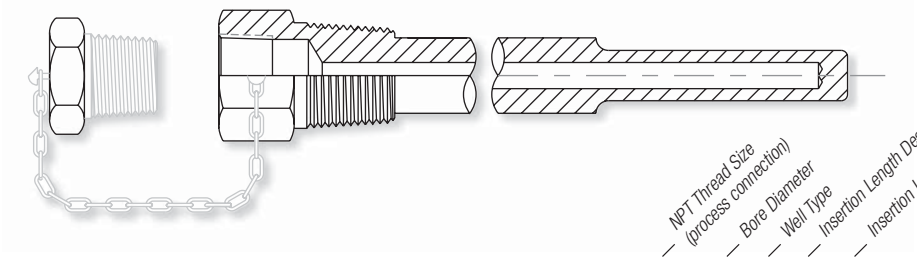
** Pending availability, NPSM instrument connection may be substituted for NPT.*

Thermowell Catalog Descriptions

The following format is used when ordering thermowells. When ordering a thermowell by itself, the initials "TW" precede the description. When ordering a thermowell as part of an assembly, the thermowell description immediately follows the mounting style designation, replacing the sensor active length.

Thermowell:
TW, .50-260S-U5.00-S316

Assembly:
E-SS25-U-T5AL(CSLW)-.50-260S-U5.00-S316



NPT Thread Size (process connection) / Bore Diameter / Well Type / Insertion Length Designator / Insertion Length / Material of Construction / Additional Information (e.g., cap and chain, T = Lagging Extension Length if not standard)

Example: ***.50-260S-U7.50-S316,T=3.50", BRASS PLUG & CHAIN***

NPT Thread Size	Bore Diameter	Well Type	Insertion Length Designator	Insertion Length in Inches (2.50" min.)	Material of Construction	Additional Information
			U	.50		

NPT Thread Size
- .50 = 1/2 NPT
- .75 = 3/4 NPT
- 1.00 = 1 NPT

Bore Diameter
- 260 - for 0.250" diameter probes
- 385 - for 0.375" diameter probes

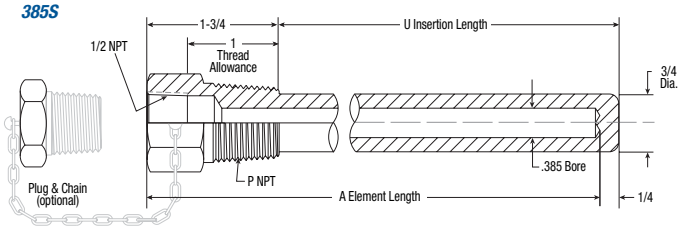
Well Type
- S – Standard (straight shank)
- H – Heavy Duty (tapered shank)
- L – Lagging Extension (straight shank)
- HL – Heavy Duty with Lagging Extension (tapered shank)

Material of Construction
- S304 – Stainless Steel
- S316 – 316 Stainless Steel
- CS – Carbon Steel
- BRASS – Brass

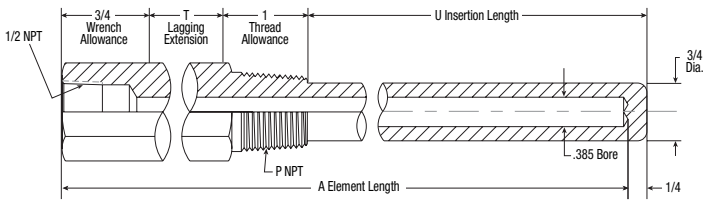
Note: Specific material grade specifications may be added to callout, e.g. S316(A182). Other materials (titanium, Hastelloy, Monel, S316L, etc.) are available. Consult factory for details.

Ordering Information

385S



385L

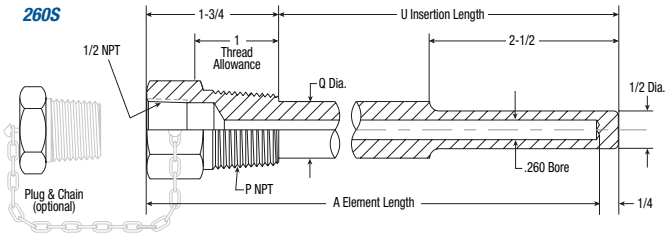


External Thread P	Type Number		Lag. Ext. T	Elem. Length A	Insert Length U
3/4 NPT	385S	U 2-1/2	–	4	2-1/2
		U 4-1/2	–	6	4-1/2
		U 7-1/2	–	9	7-1/2
		U 10-1/2	–	12	10-1/2
		U 13-1/2	–	15	13-1/2
		U 16-1/2	–	18	16-1/2
		U 22-1/2	–	22	22-1/2
1 NPT	385S	U 2-1/2	–	4	2-1/2
		U 4-1/2	–	6	4-1/2
		U 7-1/2	–	9	7-1/2
		U 10-1/2	–	12	10-1/2
		U 13-1/2	–	15	13-1/2
		U 16-1/2	–	18	16-1/2
		U 22-1/2	–	24	22-1/2
3/4 NPT	385L	U 2-1/2	2	6	2-1/2
		U 4-1/2	3	9	4-1/2
		U 7-1/2	3	12	7-1/2
		U 10-1/2	3	15	10-1/2
		U 13-1/2	3	18	13-1/2
		U 19-1/2	3	24	19-1/2
1 NPT	385L	U 2-1/2	2	6	2-1/2
		U 4-1/2	3	9	4-1/2
		U 7-1/2	3	12	7-1/2
		U 10-1/2	3	15	10-1/2
		U 13-1/2	3	18	13-1/2
		U 19-1/2	3	24	19-1/2

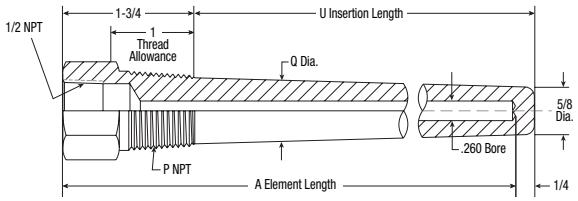
Conax Buffalo Technologies

Ordering Information

260S



260H



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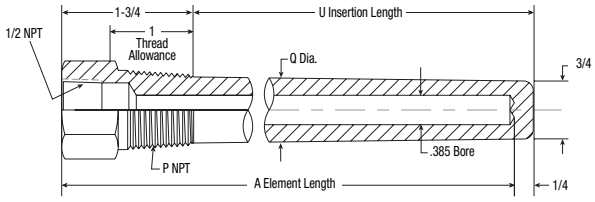

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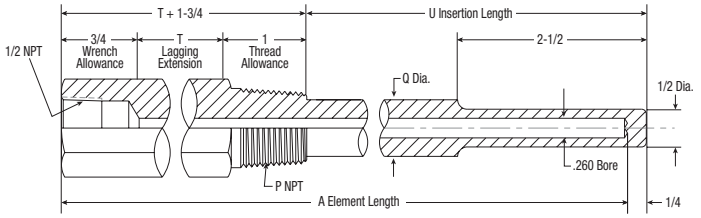

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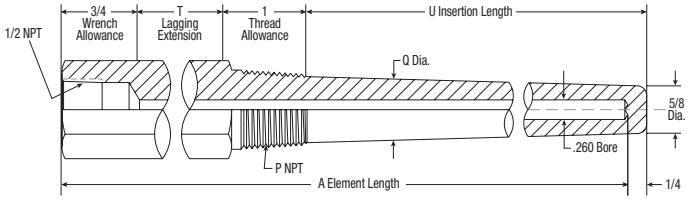

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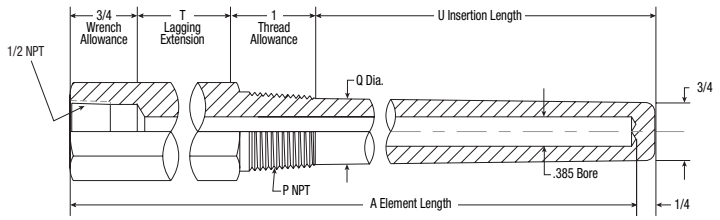


External Thread P	Type Number		Lag. Ext. T	Elem. Length A	Insert Length U	Shank Diameter Q
1/2 NPT	260S	U 2-1/2	–	4	2-1/2	–
		U 4-1/2	–	6	4-1/2	5/8
		U 7-1/2	–	9	7-1/2	5/8
		U 10-1/2	–	12	10-1/2	5/8
		U 13-1/2	–	15	13-1/2	5/8
		U 16-1/2	–	18	16-1/2	5/8
		U 22-1/2	–	24	22-1/2	5/8
3/4 NPT	260S	U 2-1/2	–	4	2-1/2	–
		U 4-1/2	–	6	4-1/2	3/4
		U 7-1/2	–	9	7-1/2	3/4
		U 10-1/2	–	12	10-1/2	3/4
		U 13-1/2	–	15	13-1/2	3/4
		U 16-1/2	–	18	16-1/2	3/4
		U 22-1/2	–	24	22-1/2	3/4
	260H 385H	U 2-1/2	–	4	2-1/2	7/8
		U 4-1/2	–	6	4-1/2	7/8
		U 7-1/2	–	9	7-1/2	7/8
		U 10-1/2	–	12	10-1/2	7/8
		U 13-1/2	–	15	13-1/2	7/8
		U 16-1/2	–	18	16-1/2	7/8
		U 22-1/2	–	24	22-1/2	7/8
1 NPT	260S	U 2-1/2	–	4	2-1/2	7/8
		U 4-1/2	–	6	4-1/2	7/8
		U 7-1/2	–	9	7-1/2	7/8
		U 10-1/2	–	12	10-1/2	7/8
		U 13-1/2	–	15	13-1/2	7/8
		U 16-1/2	–	18	16-1/2	7/8
		U 22-1/2	–	24	22-1/2	7/8
	260H 385H	U 2-1/2	–	4	2-1/2	1-1/16
		U 4-1/2	–	6	4-1/2	1-1/16
		U 7-1/2	–	9	7-1/2	1-1/16
		U 10-1/2	–	12	10-1/2	1-1/16
		U 13-1/2	–	15	13-1/2	1-1/16
		U 16-1/2	–	18	16-1/2	1-1/16
		U 22-1/2	–	24	22-1/2	1-1/16
1/2 NPT	260L	U 2-1/2	2	6	2-1/2	–
		U 4-1/2	3	9	4-1/2	5/8
		U 7-1/2	3	12	7-1/2	5/8
		U 10-1/2	3	15	10-1/2	5/8
		U 13-1/2	3	18	13-1/2	5/8
		U 19-1/2	3	24	19-1/2	5/8
3/4 NPT	260L	U 2-1/2	2	6	2-1/2	–
		U 4-1/2	3	9	4-1/2	3/4
		U 7-1/2	3	12	7-1/2	3/4
		U 10-1/2	3	15	10-1/2	3/4
		U 13-1/2	3	18	13-1/2	3/4
		U 19-1/2	3	24	19-1/2	3/4
	260HL 385HL	U 2-1/2	2	6	2-1/2	7/8
		U 4-1/2	3	9	4-1/2	7/8
		U 7-1/2	3	12	7-1/2	7/8
		U 10-1/2	3	15	10-1/2	7/8
		U 13-1/2	3	18	13-1/2	7/8
		U 19-1/2	3	24	19-1/2	7/8
1 NPT	260L	U 2-1/2	2	6	2-1/2	–
		U 4-1/2	3	9	4-1/2	7/8
		U 7-1/2	3	12	7-1/2	7/8
		U 10-1/2	3	15	10-1/2	7/8
		U 13-1/2	3	18	13-1/2	7/8
		U 19-1/2	3	24	19-1/2	7/8
	260HL 385HL	U 2-1/2	2	6	2-1/2	1-1/16
		U 4-1/2	3	9	4-1/2	1-1/16
		U 7-1/2	3	12	7-1/2	1-1/16
		U 10-1/2	3	15	10-1/2	1-1/16
		U 13-1/2	3	18	13-1/2	1-1/16
		U 19-1/2	3	24	19-1/2	1-1/16

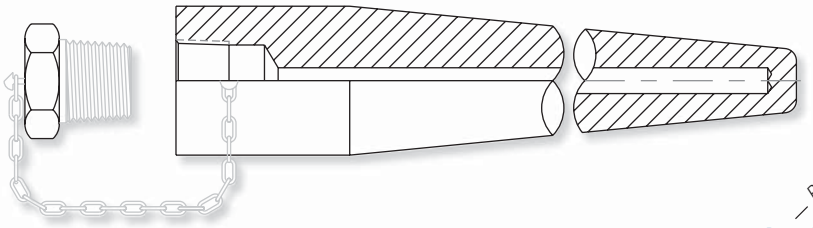
Threaded Thermowells

Ordering Information

Well Type	Material	MAXIMUM FLUID VELOCITY – feet per second* Insertion Length - U								PRESSURE - TEMPERATURE RATING Temperature - °F						
		2-1/2	4-1/2	7-1/2	10-1/2	13-1/2	16-1/2	19-1/2	22-1/2	70°	200°	400°	600°	800°	1000°	1200°
3/4-260H 3/4-260HL	Brass	305 (97.5)	93.8 (54.1)	33.9	17.1	10.5	7.0	5.0	3.7	5300	4750	1100	–	–	–	–
	Carbon Steel	386 (175)	180 (97.2)	65.3 (59.3)	33.0	20.1	13.4	9.6	7.1	5950	5750	5450	5250	4000	1750	–
	A.I.S.I. 304	440 (243)	197 (135)	71.2	36.0	22.0	14.7	10.5	7.8	7800	7050	6400	6150	6000	5190	1875
	A.I.S.I. 316	440 (243)	197 (135)	71.2	36.0	22.0	14.7	10.5	7.8	7800	7800	7250	7100	6950	5800	2720
	Monel	354 (195)	155 (108)	56.1	28.4	17.3	11.6	7.5	5.6	7450	6850	6150	6100	5940	1750	–
1-260H 1-260HL	Brass	354 (161)	108 (89.5)	39.4	19.8	12.2	8.1	5.8	4.3	5300	4750	1100	–	–	–	–
	Carbon Steel	448 (289)	209 (161)	75.7	38.4	23.3	15.5	11.1	8.2	5950	5750	5450	5250	4000	1750	–
	A.I.S.I. 304	490 (403)	228 (225)	82.5	41.8	25.5	17.1	12.2	9.1	7800	7050	6400	6150	6000	5190	1875
	A.I.S.I. 316	490 (403)	228 (225)	82.5	41.8	25.5	17.1	12.2	9.1	7800	7800	7250	7100	6950	5800	2720
	Monel	410 (322)	179 (178)	65.1	33.0	20.1	13.5	8.7	6.5	7450	6850	6150	6100	5940	1750	–
3/4-385H 3/4-385HL	Brass	276 (127)	124 (79)	44.0	22.0	13.0	8.0	6.0	4.0	5000	4200	1000	–	–	–	–
	Carbon Steel	352 (228)	191 (114)	68.9	35.0	21.0	14.0	10.0	7.5	5200	5000	4800	4600	3500	1500	–
	A.I.S.I. 304	415 (299)	203 (154)	73.2	37.3	22.5	15.0	11.0	8.0	7000	6200	5600	5400	5200	4500	1650
	A.I.S.I. 316	415 (299)	203 (154)	73.2	37.3	22.5	15.0	11.0	8.0	7000	7000	6400	6200	6100	5100	2500
	Monel	340 (195)	172 (134)	62.0	31.0	19.0	12.8	8.0	6.0	6500	6000	5400	5300	5200	1500	–
1-385H 1-385HL	Brass	321 (150)	129 (83.5)	46.8	23.6	14.5	9.6	6.9	5.1	5000	4200	1000	–	–	–	–
	Carbon Steel	410 (270)	249 (150)	90.3	45.6	27.8	18.5	13.2	9.8	5200	5000	4800	4600	3500	1500	–
	A.I.S.I. 304	483 (350)	272 (208)	97.3	49.7	30.4	20.3	14.5	10.7	7000	6200	5600	5400	5200	4500	1650
	A.I.S.I. 316	483 (350)	272 (208)	97.3	49.7	30.4	20.3	14.5	10.7	7000	7000	6400	6200	6100	5100	2500
	Monel	396 (306)	214 (167)	77.5	39.2	23.8	16.0	10.3	7.7	6500	6000	5400	5300	5200	1500	–
3/4-385S 3/4-385L 1-385S 1-385L	Brass	290 (145)	150 (80)	54.1 (49)	27.6	16.7	11.1	8.0	6.0	5000	4200	1000	–	–	–	–
	Carbon Steel	326 (260)	192 (144)	69.5	35.4	20.5	14.3	10.3	7.7	5200	5000	4800	4600	3500	1500	–
	A.I.S.I. 304	349 (360)	199	71.9	36.6	21.2	14.8	10.7	8.0	7000	6200	5600	5400	5200	4500	1650
	A.I.S.I. 316	349 (360)	199	71.9	36.6	21.2	14.8	10.7	8.0	7000	7000	6400	6200	6100	5100	2500
	Monel	316 (320)	189 (178)	68.1	34.8	20.8	14.0	10.0	7.5	6500	6000	5400	5300	5200	1500	–
1/2-260L 1/2-260S	Brass	207 (59.3)	75.5 (32.2)	27.3 (19.7)	13.9	8.4	5.6	4.1	3.0	5000	4200	1000	–	–	–	–
	Carbon Steel	290 (106)	105 (59)	38.2 (36.3)	19.4	11.8	7.8	5.7	4.2	5200	5000	4800	4600	3500	1500	–
	A.I.S.I. 304	300 (148)	109 (82.2)	39.5	20.1	12.2	8.1	5.9	4.4	7000	6200	5600	5400	5200	4500	1650
	A.I.S.I. 316	300 (148)	109 (82.2)	39.5	20.1	12.2	8.1	5.9	4.4	7000	7000	6400	6200	6100	5100	2500
	Monel	261 (118)	95 (65.5)	34.4	17.5	10.5	7.1	5.2	3.8	6500	6000	5400	5300	5200	1500	–
3/4-260S 3/4-260L	Brass	207 (59.3)	89.1 (39.8)	32.2 (23.9)	16.4	9.9	6.6	4.8	3.6	5000	4200	1000	–	–	–	–
	Carbon Steel	290 (106)	123 (71.2)	44.9 (42.7)	22.8	13.8	9.3	6.7	4.9	5200	5000	4800	4600	3500	1500	–
	A.I.S.I. 304	300 (148)	128 (99.3)	46.4	23.6	14.3	9.6	6.9	5.1	7000	6200	5600	5400	5200	4500	1650
	A.I.S.I. 316	300 (148)	128 (99.3)	46.4	23.6	14.3	9.6	6.9	5.1	7000	7000	6400	6200	6100	5100	2500
	Monel	261 (118)	112 (79.8)	40.6	20.7	12.4	8.3	6.1	4.5	6500	6000	5400	5300	5200	1500	–
1-260S 1-260L	Brass	207 (59.3)	102 (47.6)	37.0 (28)	18.8	11.4	7.6	5.5	4.1	5000	4200	1000	–	–	–	–
	Carbon Steel	290 (106)	143 (84.3)	51.6 (50.6)	26.2	15.9	10.6	7.6	5.7	5200	5000	4800	4600	3500	1500	–
	A.I.S.I. 304	300 (148)	148 (117)	53.5	27.2	16.5	11.0	7.9	5.9	7000	6200	5600	5400	5200	4500	1650
	A.I.S.I. 316	300 (148)	148 (117)	53.5	27.2	16.5	11.0	7.9	5.9	7000	7000	6400	6200	6100	5100	2500
	Monel	261 (118)	128 (93.3)	46.7	23.7	14.4	9.5	6.9	5.1	6500	6000	5400	5300	5200	1500	–

** Maximum velocity rating is based on operating temperatures of 1000° F for wells made of carbon steel, 304SST and 316SST; 350° F for wells made of brass; and 900° F for wells made of Monel. Slightly higher velocity is possible at lower temperatures. In these tables, single numbers represent the safe values for water, steam, air or gas. In the shorter insertion lengths, consideration is given to the velocity pressure effect of water flowing at higher velocities. In these cases, the values in parentheses represent safe values for water flow, and the unbracketed values may be used for steam, air, gas and similar density fluids.*

Weld-In Thermowells



Pipe Size (outside diameter of well) / Bore Diameter / Well Type / Insertion Length Designator / Insertion Length / Material of Construction / Additional Information (e.g., cap and chain, T = Lagging Extension Length if not standard)

Example: ***1.50-260WELDIN-U7.50-S316,T=3.50"***

Pipe Size	Bore Diameter	Well Type	Insertion Length Designator	Insertion Length in Inches (2.50" min.)	Material of Construction	Additional Information
			U	.50		

Pipe Size
- 1.50 = 1-1/2"

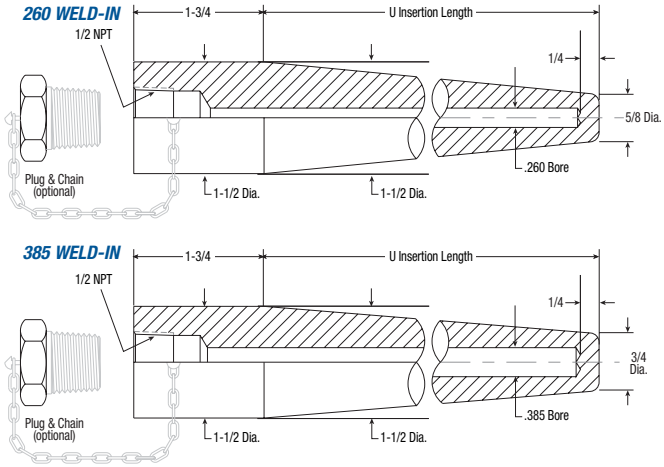
Bore Diameter
- 260 - for 0.250" diameter probes
- 385 - for 0.375" diameter probes

Well Type
- WELDIN – Weld In

Material of Construction
- S304 – Stainless Steel
- S316 – 316 Stainless Steel
- F11 – Chrome Molybdenum Steel
- F22 – Chrome Molybdenum Steel
- F91 – Chrome Molybdenum Steel
- CS – Carbon Steel

Note: Specific material grade specifications may be added to callout, e.g. S316(A182). Other materials (titanium, Hastelloy, Monel, S316L, etc.) are available. Consult factory for details.

Ordering Information



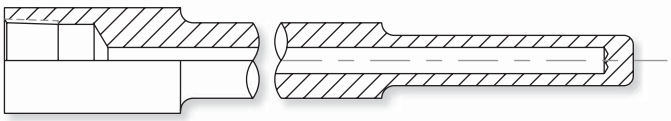
Thread Size	Type Number		Elem. Length A	Insert Length U	Bore Diameter B
1-1/2	260 WELDIN	U 2-1/2	4	2-1/2	0.260
		U 4-1/2	6	4-1/2	
		U 7-1/2	9	7-1/2	
		U 10-1/2	12	10-1/2	
		U 13-1/2	15	13-1/2	
		U 16-1/2	18	16-1/2	
		U 22-1/2	24	22-1/2	
1-1/2	385 WELDIN	U 2-1/2	4	2-1/2	0.385
		U 4-1/2	6	4-1/2	
		U 7-1/2	9	7-1/2	
		U 10-1/2	12	10-1/2	
		U 13-1/2	15	13-1/2	
		U 16-1/2	18	16-1/2	
		U 22-1/2	24	22-1/2	

Well Type	Material	MAXIMUM FLUID VELOCITY – feet per second* Insertion Length - U								PRESSURE - TEMPERATURE RATING Temperature - °F						
		2-1/2	4-1/2	7-1/2	10-1/2	13-1/2	16-1/2	19-1/2	22-1/2	70°	200°	400°	600°	800°	1000°	1200°
1-1/2-260 WELDIN	Carbon Steel	493 (306)	220 (170)	79.4	40.5	24.5	16.4	11.7	8.8	5950	5750	5450	5250	4000	1750	–
	A.I.S.I. 304	539 (443)	233.5 (231)	84.0	42.8	25.9	17.3	12.4	9.3	7800	7050	6400	6150	6000	5190	1875
	A.I.S.I. 316	539 (443)	233.5 (231)	84.0	42.8	25.9	17.3	12.4	9.3	7800	7800	7250	7100	6950	5800	2720
	F-11	549 (451)	237 (235)	85.5	43.0	26.4	17.6	12.6	9.5	7350	7350	7350	7350	7350	2898	504
	F-22	549 (451)	237 (235)	85.5	43.0	26.4	17.6	12.6	9.5	7224	7224	7224	7224	7098	3192	546
1-1/2-385 WELDIN	Carbon Steel	451 (286)	269 (159)	96.9	49.0	29.9	20.0	14.0	10.7	5200	5000	4800	4600	3500	1500	–
	A.I.S.I. 304	531 (385)	285 (220)	102	52.0	31.6	21.2	15.0	11.4	7000	6200	5600	5400	5200	4500	1650
	A.I.S.I. 316	531 (385)	285 (220)	102	52.0	31.6	21.2	15.0	11.4	7000	7000	6400	6200	6100	5100	2500
	F-11	542 (392)	290 (224)	104	53.2	32.0	21.5	15.4	11.6	6562	6562	6562	6562	6562	2587	450
	F-22	542 (392)	290 (224)	104	53.2	32.0	21.5	15.4	11.6	6450	6450	6450	6450	6337	2850	487

** Maximum velocity rating is based on operating temperatures of 1000° F for wells made of carbon steel, 304SST and 316SST; 350° F for wells made of brass; and 900° F for wells made of Monel. Slightly higher velocity is possible at lower temperatures. In these tables, single numbers represent the safe values for water, steam, air or gas. In the shorter insertion lengths, consideration is given to the velocity pressure effect of water flowing at higher velocities. In these cases, the values in parentheses represent safe values for water flow, and the unbracketed values may be used for steam, air, gas and similar density fluids.*

Conax Buffalo Technologies

Socket-Weld



Example: .75-260W-U 7.50-S316,T=3.50"

(Pipe Size (outside diameter of well) / Bore Diameter / Well Type / Insertion Length Designator / Insertion Length / Material of Construction / Additional Information (e.g., cap and chain, T = Lagging Extension Length if not standard))

Pipe Size	Bore Diameter	Well Type	Insertion Length Designator	Insertion Length in Inches (2.50" min.)	Material of Construction	Additional Information
			U	.50		

Pipe Size
- .75 (1.050" OD)
- 1.00 (1.315" OD)

Bore Diameter
- 260 - for 0.250" diameter probes
- 385 - for 0.375" diameter probes

Well Type
- W – Socket Weld (straight shank)
- WH – Heavy Duty Socket Weld (tapered shank)
- WL – Socket Weld with Lagging Extension (straight shank)
- WHL – Heavy Duty Socket Weld with Lagging Extension

Insertion Length Designator: U

Insertion Length in Inches (2.50" min.): .50

Material of Construction
- S304 – Stainless Steel
- S316 – 316 Stainless Steel
- F11 – Chrome Molybdenum Steel
- F22 – Chrome Molybdenum Steel
- F91 – Chrome Molybdenum Steel
- CS – Carbon Steel

Additional Information

Note: Specific material grade specifications may be added to callout, e.g. S316(A182). Other materials (titanium, Hastelloy, Monel, S316L, etc.) are available. Consult factory for details.

Ordering Information

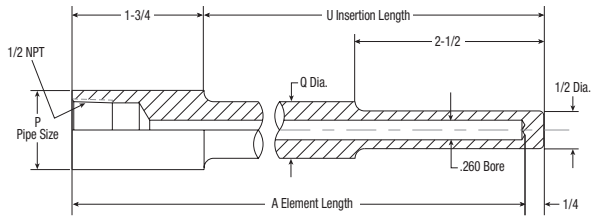
Well Type	Material	MAXIMUM FLUID VELOCITY – feet per second* Insertion Length - U 2-1/2	4-1/2	7-1/2	10-1/2	13-1/2	16-1/2	19-1/2	22-1/2	PRESSURE - TEMPERATURE RATING Temperature - °F 70°	200°	400°	600°	800°	1000°	1200°
3/4-260WH	Carbon Steel	386 (175)	180 (97.2)	65.3 (59.3)	33.0	20.1	13.4	9.6	7.1	5950	5750	5450	5250	4000	1750	–
	A.I.S.I. 304	440 (243)	197 (135)	71.2	36.0	22.0	14.7	10.5	7.8	7800	7050	6400	6150	6000	5190	1875
	A.I.S.I. 316	440 (243)	197 (135)	71.2	36.0	22.0	14.7	10.5	7.8	7800	7800	7250	7100	6950	5800	2720
1-260WH	Carbon Steel	448 (289)	209 (161)	75.7	38.4	23.3	15.5	11.1	8.2	5950	5750	5450	5250	4000	1750	–
	A.I.S.I. 304	490 (403)	228 (225)	82.5	41.8	25.5	17.1	12.2	9.1	7800	7050	6400	6150	6000	5190	1875
	A.I.S.I. 316	490 (403)	228 (225)	82.5	41.8	25.5	17.1	12.2	9.1	7800	7800	7250	7100	6950	5800	2720
3/4-385WH	Carbon Steel	352 (228)	191 (114)	69.0	35.0	21.0	14.0	10.0	7.5	5200	5000	4800	4600	3500	1500	–
	A.I.S.I. 304	415 (299)	203 (154)	73.2	37.3	22.5	15.0	11.0	8.0	7000	6200	5600	5400	5200	4500	1650
	A.I.S.I. 316	415 (299)	203 (154)	73.2	37.3	22.5	15.0	11.0	8.0	7000	7000	6400	6200	6100	5100	2500
1-385WH	Carbon Steel	410 (270)	249 (150)	90.3	45.6	27.8	18.5	13.2	9.8	5200	5000	4800	4600	3500	1500	–
	A.I.S.I. 304	483 (350)	272 (208)	97.3	49.7	30.4	20.3	14.5	10.7	7000	6200	5600	5400	5200	4500	1650
	A.I.S.I. 316	483 (350)	272 (208)	97.3	49.7	30.4	20.3	14.5	10.7	7000	7000	6400	6200	6100	5100	2500
3/4-260W	Carbon Steel	290 (106)	123 (71.2)	44.9 (42.7)	22.8	13.8	9.3	–	4.9	5200	5000	4800	4600	3500	1500	–
	A.I.S.I. 304	300 (148)	128 (99.3)	46.4	23.6	14.3	9.6	–	5.1	7000	6200	5600	5400	5200	4500	1650
	A.I.S.I. 316	300 (148)	128 (99.3)	46.4	23.6	14.3	9.6	–	5.1	7000	7000	6400	6200	6100	5100	2500
1-260W	Carbon Steel	290 (106)	143 (84.3)	51.6 (50.6)	26.2	15.9	10.6	–	5.7	5200	5000	4800	4600	3500	1500	–
	A.I.S.I. 304	300 (148)	148 (117)	53.5	27.2	16.5	11.0	–	5.9	7000	6200	5600	5400	5200	4500	1650
	A.I.S.I. 316	300 (148)	148 (117)	53.5	27.2	16.5	11.0	–	5.9	7000	7000	6400	6200	6100	5100	2500
3/4-385W 1-385W	Carbon Steel	426 (260)	192 (144)	69.5	35.4	20.5	14.6	–	7.7	5200	5000	4800	4600	3500	1500	–
	A.I.S.I. 304	449 (360)	199	71.9	36.6	21.2	14.8	–	8.0	7000	6200	5600	5400	5200	4500	1650
	A.I.S.I. 316	449 (360)	199	71.9	36.6	21.2	14.8	–	8.0	7000	7000	6400	6200	6100	5100	2500

** Maximum velocity rating is based on operating temperatures of 1000° F for wells made of carbon steel, 304SST and 316SST; 350° F for wells made of brass; and 900° F for wells made of Monel. Slightly higher velocity is possible at lower temperatures. In these tables, single numbers represent the safe values for water, steam, air or gas. In the shorter insertion lengths, consideration is given to the velocity pressure effect of water flowing at higher velocities. In these cases, the values in parentheses represent safe values for water flow, and the unbracketed values may be used for steam, air, gas and similar density fluids.*

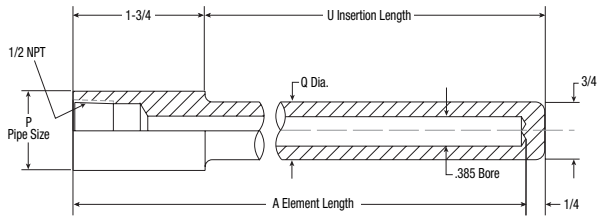
Conax® Buffalo Technologies

Ordering Information

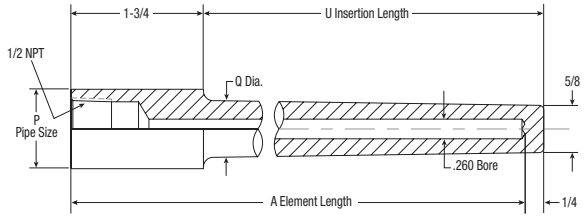
260W



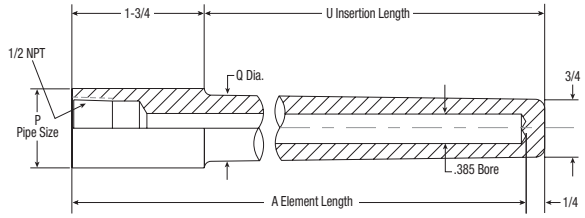
385W



260WH

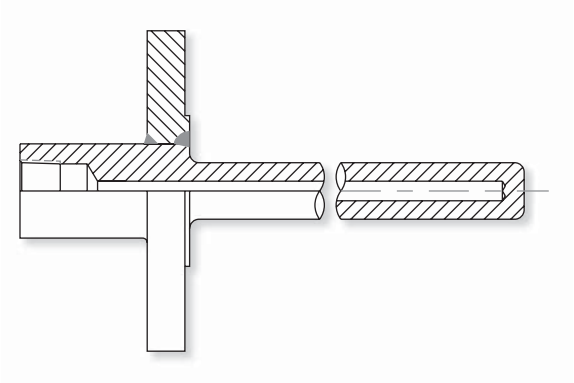


385WH



Pipe Size P	Type Number		Elem. Length A	Insert Length U	Shank Diameter Q
3/4" Nominal (1.050 diameter)	260W 385W	U 2-1/2	4	2-1/2	–
		U 4-1/2	6	4-1/2	3/4
		U 7-1/2	9	7-1/2	3/4
		U 10-1/2	12	10-1/2	3/4
		U 13-1/2	15	13-1/2	3/4
		U 16-1/2	18	16-1/2	3/4
		U 22-1/2	24	22-1/2	3/4
1" Nominal (1.315 diameter)	260W 385W	U 2-1/2	4	2-1/2	–
		U 4-1/2	6	4-1/2	7/8
		U 7-1/2	9	7-1/2	7/8
		U 10-1/2	12	10-1/2	7/8
		U 13-1/2	15	13-1/2	7/8
		U 16-1/2	18	16-1/2	7/8
		U 22-1/2	24	22-1/2	7/8
3/4" Nominal (1.050 diameter)	260WH 385WH	U 2-1/2	4	2-1/2	7/8
		U 4-1/2	6	4-1/2	7/8
		U 7-1/2	9	7-1/2	7/8
		U 10-1/2	12	10-1/2	7/8
		U 13-1/2	15	13-1/2	7/8
		U 16-1/2	18	16-1/2	7/8
		U 22-1/2	24	22-1/2	7/8
1" Nominal (1.315 diameter)	260WH 385WH	U 2-1/2	4	2-1/2	1
		U 4-1/2	6	4-1/2	1
		U 7-1/2	9	7-1/2	1
		U 10-1/2	12	10-1/2	1
		U 13-1/2	15	13-1/2	1
		U 16-1/2	18	16-1/2	1
		U 22-1/2	24	22-1/2	1

ANSI Flanged



Example: **260F-U22.50-RF39(S304)-S316,T=3.50"**

Bore Diameter / Flange Type / Insertion Length Designator / Insertion Length / Flange Designator / Flange Class / Flange Pipe Size / Flange Material of Construction / Well Material of Construction / Additional Information

Bore Diameter	Flange Well Type	Ins. Length Designator	Insertion Length (2.50" min.)	Flange Designator	Flange Class	Flange Pipe Size	Flange Material of Construction	Well Material of Construction	Additional Information
		U	.50	RF			( )		

Bore Diameter
- 260 - for 0.250" diameter probes
- 385 - for 0.375" diameter probes

Flange Well Type
- F – ANSI Flange (straight shank)
- FH – Heavy Duty Flange (tapered shank)
- FL – Flange with Lagging Extension (straight shank)
- FHL – Heavy Duty Flange with Lagging Extension (tapered shank)

Flange Class
- 1 = 150 lb.
- 2 = 300 lb.
- 3 = 600 lb.
- 4 = 900 lb.
- 5 = 1500 lb.
- 6 = 2500 lb

Flange Pipe Size
- 4 = .50"
- 5 = .75"
- 6 = 1.00"
- 8 = 1.50"
- 9 = 2.00"
- 16 = 8.00"

Flange Material of Construction
- S304 – Stainless Steel
- S316 – 316 Stainless Steel
- CS – Carbon Steel

Note: Specific material grade specifications may be added to callout, e.g. S316(A182). Other materials (titanium, Hastelloy, Monel, S316L, etc.) are available. Consult factory for details.

Ordering Information

Well Type	Material	MAXIMUM FLUID VELOCITY – feet per second* Insertion Length - U							MAXIMUM PRESSURE - TEMPERATURE RATING Temperature - °F						
		2	4	7	10	13	16	22	70°	200°	400°	600°	800°	1000°	1125°
260F	Carbon Steel	404 (129)	184 (71.2)	67.0 (42.7)	34.0	20.6	13.7	7.4	Up to 2500#						
	A.I.S.I. 304	430 (179)	192 (99.3)	69.7 (59.6)	35.4	21.5	14.3	7.7	Up to 2500#						
	A.I.S.I. 316	430 (179)	192 (99.3)	69.7 (59.6)	35.4	21.5	14.3	7.7	Up to 2500#						
	Monel	350 (143)	168 (79.8)	61.0 (47.7)	31.0	18.8	12.5	3.7	Up to 2500#						
385F	Carbon Steel	410 (152)	248 (84.3)	91.3 (50.6)	45.7	27.6	18.5	10.0	Up to 2500#						
	A.I.S.I. 304	444 (211)	258 (117)	95.2 (70.3)	47.6	28.8	19.3	10.4	Up to 2500#						
	A.I.S.I. 316	444 (211)	258 (117)	95.2 (70.3)	47.6	28.8	19.3	10.4	Up to 2500#						
	Monel	338 (168)	226 (93.3)	83.3 (56.0)	41.6	25.2	16.9	9.1	Up to 2500#						
260FH	Carbon Steel	603 (273)	227 (125)	74.0 (67.0)	36.0	21.0	14.0	7.5	Up to 2500#						
	A.I.S.I. 304	687 (379)	249 (170)	81.0	39.8	23.6	15.5	8.2	Up to 2500#						
	A.I.S.I. 316	687 (379)	249 (170)	81.0	39.8	23.6	15.5	8.2	Up to 2500#						
	Monel	553 (304)	196 (136)	64.0	31.0	18.0	12.0	6.0	Up to 2500#						
385FH	Carbon Steel	550 (356)	241 (144)	78.9	38.0	22.8	15.0	7.9	Up to 2500#						
	A.I.S.I. 304	648 (467)	257 (194)	83.8	41.0	24.0	16.0	8.4	Up to 2500#						
	A.I.S.I. 316	648 (467)	257 (194)	83.8	41.0	24.0	16.0	8.4	Up to 2500#						
	Monel	531 (398)	217 (169)	71.0	34.8	20.6	13.0	7.0	Up to 2500#						

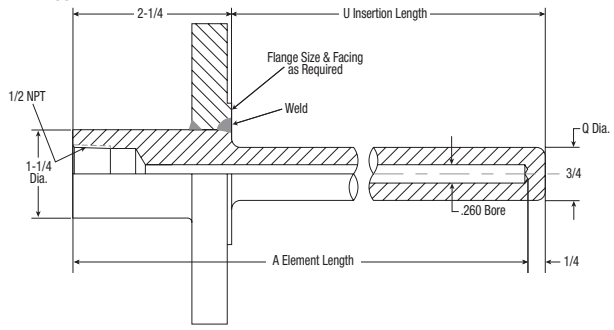
** Maximum velocity rating is based on operating temperatures of 1000° F for wells made of carbon steel, 304SST and 316SST; 350° F for wells made of brass; and 900° F for wells made of Monel. Slightly higher velocity is possible at lower temperatures. In these tables, single numbers represent the safe values for water, steam, air or gas. In the shorter insertion lengths, consideration is given to the velocity pressure effect of water flowing at higher velocities. In these cases, the values in parentheses represent safe values for water flow, and the unbracketed values may be used for steam, air, gas and similar density fluids.*

Flange dimensions meet ANSI B16.5 standard.

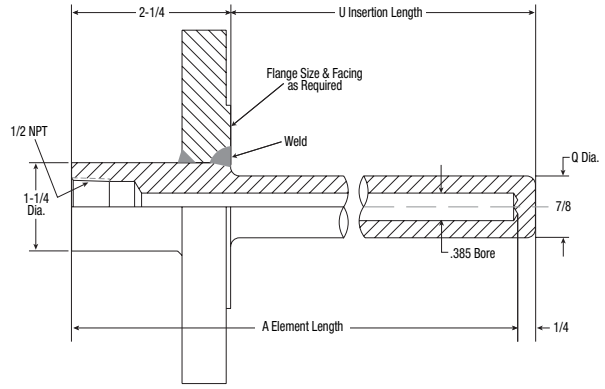
Conax Buffalo Technologies

Ordering Information

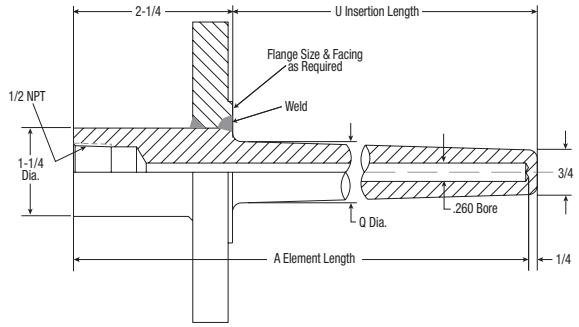
260F



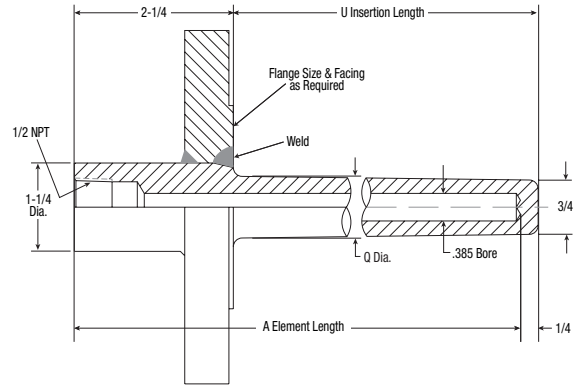
385F



260FH

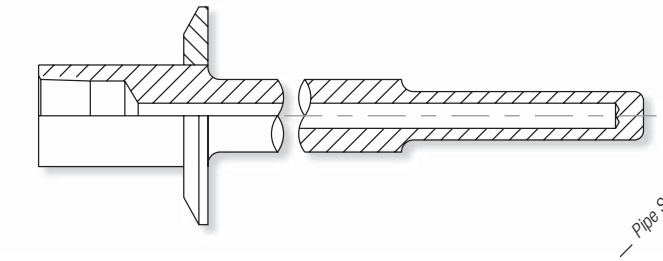


385FH



Type Number		Elem. Length A	Insert Length U	Shank Diameter Q	Bore Diameter B
260F	U 2	4	2	3/4	0.260
	U 4	6	4	3/4	
	U 7	9	7	3/4	
	U 10	12	10	3/4	
	U 13	15	13	3/4	
	U 16	18	16	3/4	
	U 22	24	22	3/4	
385F	U 2	4	2	7/8	0.385
	U 4	6	4	7/8	
	U 7	9	7	7/8	
	U 10	12	10	7/8	
	U 13	15	13	7/8	
	U 16	18	16	7/8	
	U 22	24	22	7/8	
260FH	U 2	4	2	7/8	0.260
	U 4	6	4	7/8	
	U 7	9	7	7/8	
	U 10	12	10	7/8	
	U 13	15	13	7/8	
	U 16	18	16	7/8	
	U 22	24	22	7/8	
385FH	U 2	4	2	7/8	0.385
	U 4	6	4	7/8	
	U 7	9	7	7/8	
	U 10	12	10	7/8	
	U 13	15	13	7/8	
	U 16	18	16	7/8	
	U 22	24	22	7/8	

Sanitary Flange Thermowells



Pipe Size (outside diameter of well) / Bore Diameter / Well Type / Designator for Sanitary Flange Assembly / Sanitary Flange Size / Sanitary Flange Material of Construction / Insertion Length Designator / Insertion Length / Well Material of Construction / Additional Information (e.g., cap and chain, T = Lagging Extension Length if not standard)

Example: ***.75-260W(SFA10/S316)-U7.50-S316,T=3.50"***

			(SFA		)	U	.50		
Pipe Size	*Bore Diameter*	*Well Type*	*Sanitary Flange Designator*	*Sanitary Flange Size (16 AMP)*	*Sanitary Flange Material*	*Ins. Length Designator*	*Insertion Length (2.50" min.)*	*Well Material of Construction*	*Additional Information*

Pipe Size
- .75 (1.050 OD)

Bore Diameter
- 260 - for 0.250" diameter probes
- 385 - for 0.375" diameter probes

Well Type

Sanitary Flange Designator
- W – Socket Weld (straight shank)
- WH – Heavy Duty Socket Weld (tapered shank)
- WL – Socket Weld with Lagging Extension (straight shank)
- WHL – Heavy Duty Socket Weld with Lagging Extension

Sanitary Flange Size (16 AMP)

Sanitary Flange Material
- S316L – 316L stainless steel standard

Note: Other materials are available. Consult factory for details.

Ins. Length Designator
- 10 = 1.0" & 1.5"*
- 20 = 2.0"
- 25 = 2.5"
- 30 = 3.0"
- 40 = 4.0"

**Note: SFA10 available for .75 pipe size only.*

Insertion Length (2.50" min.)

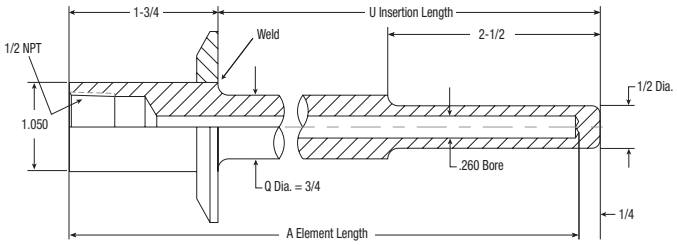
Well Material of Construction
- S304 – Stainless Steel
- S316L – 316L Stainless Steel

Note: Other materials are available. Consult factory for details.

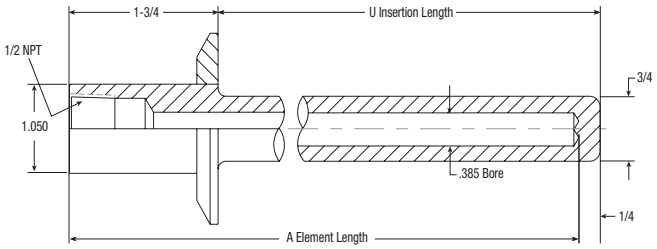
Additional Information

Ordering Information

260 – Well Type W Shown



385 – Well Type W Shown



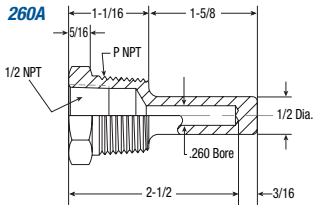
Type Number		Elem. Length A	Insert Length U	Shank Diameter Q
260 Sanitary	U 2-1/2	4	2-1/2	–
	U 4-1/2	6	4-1/2	3/4
	U 7-1/2	9	7-1/2	3/4
	U 10-1/2	12	10-1/2	3/4
	U 13-1/2	15	13-1/2	3/4
	U 16-1/2	18	16-1/2	3/4
	U 22-1/2	24	22-1/2	3/4
385 Sanitary	U 2-1/2	4	2-1/2	3/4
	U 4-1/2	6	4-1/2	3/4
	U 7-1/2	9	7-1/2	3/4
	U 10-1/2	12	10-1/2	3/4
	U 13-1/2	15	13-1/2	3/4
	U 16-1/2	18	16-1/2	3/4
	U 22-1/2	24	22-1/2	3/4

Conax Buffalo Technologies

Limited Space Thermowells

Ordering Information

260A

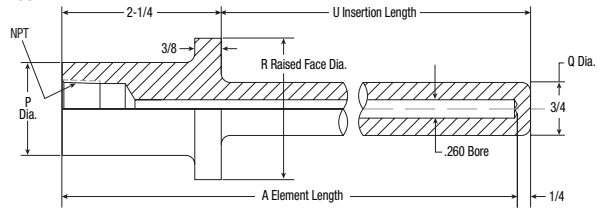


External Thread P	Type Number	Well Type	Material	MAXIMUM FLUID VELOCITY feet per second* Insertion Length - U 1-5/8	PRESSURE - TEMPERATURE RATING Temperature - °F 70°	200°	400°	600°	800°	1000°	1200°
3/4 NPT	3/4-260A-U1-5/8	3/4-260A	Brass	207 (59.3)	5000	4200	1000	–	–	–	–
			Carbon Steel	290 (106)	5200	5000	4800	4600	3500	1500	–
			A.I.S.I. 304	300 (148)	7000	6200	5600	5400	5200	4500	1650
			A.I.S.I. 316	300 (148)	7000	7000	6400	6200	6100	5100	2500
			Monel	261 (118)	6500	6000	5400	5300	5200	1500	–
1 NPT	1-260A-U1-5/8	1-260A	Brass	207 (59.3)	5000	4200	1000	–	–	–	–
			Carbon Steel	290 (106)	5200	5000	4800	4600	3500	1500	–
			A.I.S.I. 304	300 (148)	7000	6200	5600	5400	5200	4500	1650
			A.I.S.I. 316	300 (148)	7000	7000	6400	6200	6100	5100	2500
			Monel	261 (118)	6500	6000	5400	5300	5200	1500	–

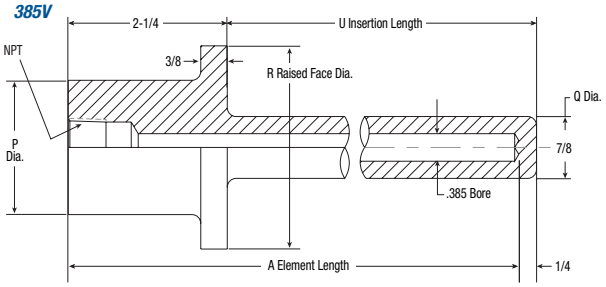
** Maximum velocity rating is based on operating temperatures of 1000° F for wells made of carbon steel, 304SST and 316SST; 350° F for wells made of brass; and 900° F for wells made of Monel. Slightly higher velocity is possible at lower temperatures. In these tables, single numbers represent the safe values for water, steam, air or gas. In the shorter insertion lengths, consideration is given to the velocity pressure effect of water flowing at higher velocities. In these cases, the values in parentheses represent safe values for water flow, and the unbracketed values may be used for steam, air, gas and similar density fluids.*

Van Stone Thermowells

260V



385V



Ordering Information

Type Number		Elem. Length A	Insert Length U	Shank Dia. Q	Bore Dia. B
260V	U 2	4	2	3/4	0.260
	U 4	6	4	3/4	
	U 7	9	7	3/4	
	U 10	12	10	3/4	
	U 13	15	13	3/4	
	U 16	18	16	3/4	
	U 22	24	22	3/4	
385V	U 2	4	2	7/8	0.385
	U 4	6	4	7/8	
	U 7	9	7	7/8	
	U 10	12	10	7/8	
	U 13	15	13	7/8	
	U 16	18	16	7/8	
	U 22	24	22	7/8	

Well Type	Material	MAXIMUM FLUID VELOCITY – feet per second* Insertion Length - U 2	4	7	10	13	16	22	MAXIMUM PRESSURE - TEMPERATURE RATING Temperature - °F 70°	200°	400°	600°	800°	1000°	1125°
260V	Carbon Steel	404 (129)	184 (71.2)	67.0 (42.7)	34.0	20.6	13.7	7.4	5200	5000	4800	4600	3500	1500	–
	A.I.S.I. 304	430 (179)	192 (99.3)	69.7 (59.6)	35.4	21.5	14.3	7.7	7000	6200	5600	5400	5200	4500	1650
	A.I.S.I. 316	430 (179)	192 (99.3)	69.7 (59.6)	35.4	21.5	14.3	7.7	7000	7000	6400	6200	6100	5100	2500
	Monel	350 (143)	168 (79.8)	61.0 (47.7)	31.0	18.8	12.5	3.7	6500	6000	5400	5300	5200	1500	–
385V	Carbon Steel	410 (152)	248 (84.3)	91.3 (50.6)	45.7	27.6	18.5	10.0	5200	5000	4800	4600	3500	1500	–
	A.I.S.I. 304	444 (211)	258 (117)	95.2 (70.3)	47.6	28.8	19.3	10.4	7000	6200	5600	5400	5200	4500	1650
	A.I.S.I. 316	444 (211)	258 (117)	95.2 (70.3)	47.6	28.8	19.3	10.4	7000	7000	6400	6200	6100	5100	2500
	Monel	338 (168)	226 (93.3)	83.3 (56.0)	41.6	25.2	16.9	9.1	6500	6000	5400	5300	5200	1500	–

** Maximum velocity rating is based on operating temperatures of 1000° F for wells made of carbon steel, 304SST and 316SST; 350° F for wells made of brass; and 900° F for wells made of Monel. Slightly higher velocity is possible at lower temperatures. In these tables, single numbers represent the safe values for water, steam, air or gas. In the shorter insertion lengths, consideration is given to the velocity pressure effect of water flowing at higher velocities. In these cases, the values in parentheses represent safe values for water flow, and the unbracketed values may be used for steam, air, gas and similar density fluids.*

Conax Buffalo Technologies

Conax Buffalo offers protection tubes in a variety of types and materials. Protection tubes are intended for use in applications where the tube will not be exposed to high pressure or fluid velocities. Pipewells, made from Schedule 40, 80 or 160 pipe, are the most commonly used form of protection tube. Mounting is generally achieved through a flange or threaded bushing welded to the pipe.

Pipewell Catalog Description

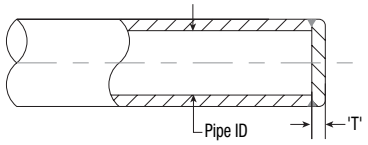
The following format is used when ordering pipewells. When ordering a pipewell by itself, the initials "PW" precede the description. When ordering a pipewell as part of an assembly, the pipewell description immediately follows the mounting style designation, replacing the sensor active length.

Pipewell: *PW, .50X40/S316-L24.00-R*

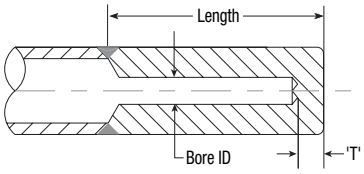
Assembly: *E-SS25-U-T5AL(CSLWC)-.50X40/S316-L24.00-R*

Tip Configurations

STANDARD PIPEWELL TIP (R Tip)

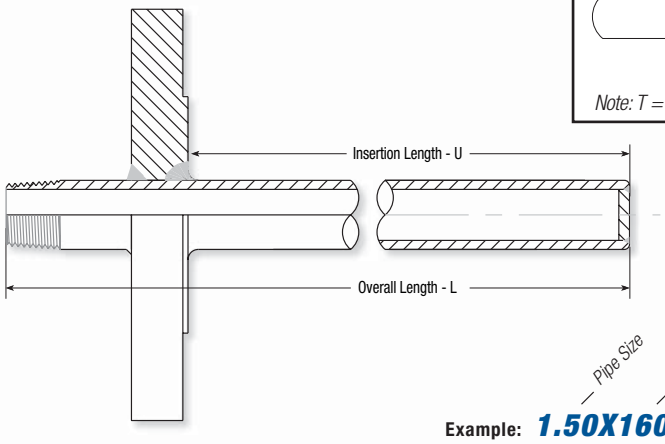


DRILLED PIPEWELL TIP (D)



Note: T = 0.25" minimum for pipe sizes 1" and smaller; 0.375" minimum for pipe sizes greater than 1"

Pipewell with Mounting Flange



Example: **1.50X160/S316 - L24.00 - R(260-4) - RF29(S316) - U18.00**

Pipe Size	Pipe Schedule	Pipewell Material of Construction	Length Designator	Overall Length	Tip Configuration	Flange Type	Flange Class	Flange Pipe Size	Flange Material of Construction	Insertion Length Designator	Insertion Length
			L	.00						U	.00

Pipe Size
- .50 = .840" OD
- .75 = 1.050" OD
- 1.00 = 1.315" OD
- 1.50 = 1.900" OD
- 2.00 = 2.375" OD

Pipe Schedule
- 40
- 80
- 160

Pipewell Material of Construction
- S304 – Stainless Steel
- S316 – 316 Stainless Steel
- CS – Carbon Steel

Note: Other materials are available. Consult factory for details.

Length Desig. — L

Overall Length in Inches — .00

Tip Config.
- R = Round*
- D = Drilled Bar Stock

Example: D (260-3)
- ID of Bore (thousandths of an inch)
  - 260 - 0.250" diameter probes
  - 385 - 0.375" diameter probes
- Length of Bar Stock (3-6", 1/2" increments)

**Full radius tip configuration may be substituted.*

Flange Type
- FF = Flat Faced
- RF = Raised Faced

Flange Class
- 1 = 150 lb.
- 2 = 300 lb.

Flange Pipe Size
- 4 = .50"
- 5 = .75"
- 6 = 1.00"
- 8 = 1.50"
- 9 = 2.00"
- 16 = 8.00"

Flange Material of Construction
- S304 – Stainless Steel
- S316 – 316 Stainless Steel
- CS – Carbon Steel

Note: Specific material grade specifications may be added to callout, e.g. S316(A182). Other materials (titanium, Hastelloy, Monel, S316L, etc.) are available. Consult factory for details.

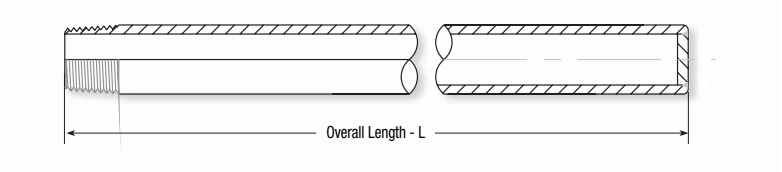
Insertion Length Designator — U

Insertion Length in Inches — .00

Conax Buffalo Technologies

For more information call: ***1-800-223-2389*** *• e-mail:* ***conaxbuf@conaxbuffalo.com*** *• visit our website:* ***www.conaxbuffalo.com***

Pipewell Only



Pipe Size / Pipe Schedule / Material of Construction / Length Designator / Overall Length / Tip Configuration

Example: 1.50X160/S316-L25.00-R

Pipe Size	Pipe Schedule	Material of Construction	Length Designator	Length in Inches	Tip Configuration	Optional Information
			L	.00		

Pipe Size
- .50 = .840" OD
- .75 = 1.050" OD
- 1.00 = 1.315" OD
- 1.50 = 1.900" OD
- 2.00 = 2.375" OD

Pipe Schedule
- 40
- 80
- 160

Material of Construction
- S304 – Stainless Steel
- S316 – 316 Stainless Steel
- CS – Carbon Steel

Note: Specific material grade specifications may be added to callout, e.g. S316(A182). Other materials (titanium, Hastelloy, Monel, S316L, etc.) are available. Consult factory for details.

Overall Length Designator: L

Length in Inches: .00

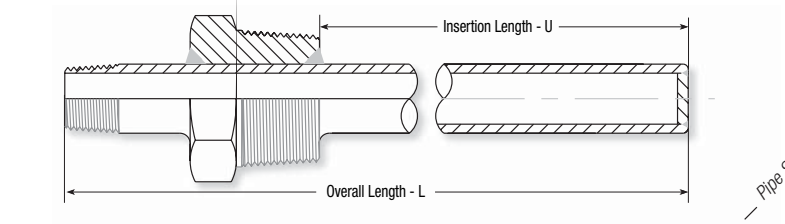
Tip Configuration
- R = Round
- D = Drilled Bar Stock

Example: D (260-3)
- ID of Bore (thousandths of an inch)
  - 260 - 0.250" diameter probes
  - 385 - 0.375" diameter probes
- Length of Bar Stock (3-6", 1/2" increments)

Optional Information

Special surface finishes, etc.

Pipewell with Mounting Plug



Pipe Size / Pipe Schedule / Pipewell Material of Construction / Length Designator / Overall Length / Tip Configuration / Pipe Plug / Pipe Plug Material of Construction / Insertion Length Designator / Insertion Length

Example: 1.50X160/S316-L24.00-R-PTM9(S316)-U18.00

Pipe Size	Pipe Schedule	Material of Construction	Length Designator	Overall Length (in.)	Tip Configuration	Drilled Pipe Plug	( )	Ins. Length Designator	Insertion Length (in.)
			L	.00			( )	U	.00

Pipe Size
- .50 = .840" OD
- .75 = 1.050" OD
- 1.00 = 1.315" OD
- 1.50 = 1.900" OD
- 2.00 = 2.375" OD

Pipe Schedule
- 40
- 80
- 160

Material of Construction
- S304 – Stainless Steel
- S316 – 316 Stainless Steel
- CS – Carbon Steel

Note: Other materials are available. Consult factory for details.

Length Designator: L

Overall Length (in.): .00

Tip Configuration
- R = Round
- D = Drilled Bar Stock

Example: D (260-3)
- ID of Bore (thousandths of an inch)
  - 260 - 0.250" diameter probes
  - 385 - 0.375" diameter probes
- Length of Bar Stock (3-6", 1/2" increments)

Drilled Pipe Plug

Pipe Plug Material of Construction: ( )
- PTM4 = 1/2 NPT
- PTM5 = 3/4 NPT
- PTM6 = 1 NPT
- PTM8 = 1-1/2 NPT
- PTM9 = 2 NPT
- PTM10 = 2-1/2 NPT

Ins. Length Designator: U
- S304 – Stainless Steel
- S316 – 316 Stainless Steel
- CS – Carbon Steel

Note: Specific material grade specifications may be added to callout, e.g. S316(A182). Other materials (titanium, Hastelloy, Monel, S316L, etc.) are available. Consult factory for details.

Insertion Length (in.): .00

Location of pipe plug on pipe

Conax Buffalo Technologies

Flexible Tube Assemblies

Conax Buffalo Flex-Tube Assemblies protect wires from mechanical abuse. They are available in any length, factory assembled and furnished complete with end fittings (standard male or female pipe thread). Standard end fittings are plated brass or steel. Stainless steel Conax Buffalo Packing Glands may be substituted at additional cost.

Interlock construction uses galvanized steel for 3/4" OD and brass for 3/8" OD, both with overall polyvinyl covering.

Ordering Notes:
To order cable and connectors only, order as follows:
FT4-M30

To add a terminal head, order as follows:
B2(FT4-M30), .25NPT

To order as part of a complete assembly, order as follows:
J-SS12-U-B2(FT4-M30)-12.00"

FLEX-TUBE ASSEMBLY SPECIFICATIONS

Catalog Type	Nominal ID	Nominal OD	NPT Fitting Thread Size	Type of Fitting
FT4-F*	3/16"	3/8"	1/4"	Female only
FT4-FF*	3/16"	3/8"	1/4"	Female-Female
FT4-M*	3/16"	3/8"	1/4"	Male only
FT4-MM*	3/16"	3/8"	1/4"	Male-Male
FT4-MF*	3/16"	3/8"	1/4"	Male-Female
FT8-F*	3/8"	3/4"	1/2"	Female only
FT8-FF*	3/8"	3/4"	1/2"	Female-Female
FT8-M*	3/8"	3/4"	1/2"	Male only
FT8-MM*	3/8"	3/4"	1/2"	Male-Male
FT8-MF*	3/8"	3/4"	1/2"	Male-Female

** Specify length in inches.*

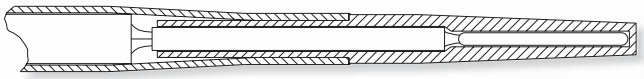
Multiple Probe Assemblies

Multiple probe assemblies terminating into a single T7 or other terminal heads are available. Consult the factory for details or request the Conax Pressure and Vacuum Sealing Assemblies catalog.

To order, for example, four thermocouple probes of varying lengths, terminating into a single terminal head, the following catalog number would be used:

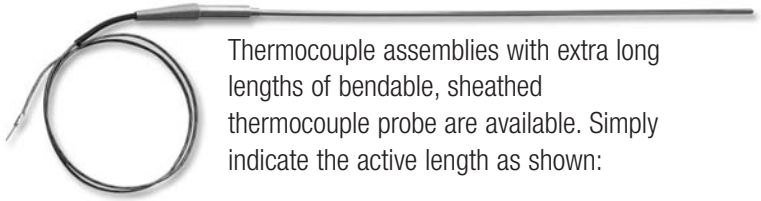
Example: ***K-SS12-U-T7(MHM4B4L)-155.00", 162.00", 169.00", 176.00"***

Fast Response RTD



For applications requiring the accuracy of an RTD combined with a response time approaching that of a thermocouple, Conax Buffalo offers this fast-response design. The RTD element is installed directly into a tight-fitting machined silver tip, maximizing thermal transfer. The diameter of the tip can also be adjusted to maintain lateral contact, making this the preferred design to replace an RTD into an existing field-installed thermowell with a non-standard bore.

Extra Long Thermocouple Assembly

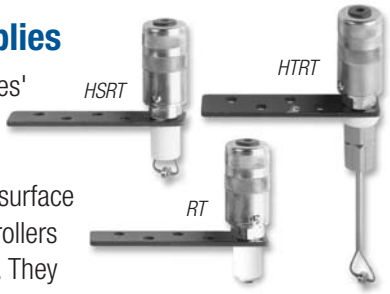


Thermocouple assemblies with extra long lengths of bendable, sheathed thermocouple probe are available. Simply indicate the active length as shown:

Example: ***J-SS25-U-T3-400.00"***

semblies & Hardware

Roll Temp Assemblies



Conax Buffalo Technologies' Roll Temp Sensor Assemblies provide repeatable monitoring of surface temperatures on drums, rollers or other moving surfaces. They are ideal for detecting temperature variations in continuous process applications, such as plastic-film processing, wire manufacturing and painting processes.

Compact and easy to install, Roll Temp Assemblies are furnished with Conax B2 terminal heads. Brass contact buttons, flush-mounted in a spring-loaded Teflon plunger, provide excellent thermal transfer to the temperature sensor. They are available in all base metal thermocouple calibrations. Three models are offered.

SLIDING CONTACT ASSEMBLY – CATALOG TYPE RT

- Designed for temperature sensing on surface speeds up to 900 ft. per minute
- Temperature range: -90˚ F to +500˚ F (-68˚C to +260˚ C).
- 1/2 lb. spring force on sensor
- Not available in special tolerances

Example: For a Chromel-Constantan thermocouple, the catalog number would be RT-E.

HIGH-SPEED ASSEMBLY – CATALOG TYPE HSRT

- Features a mounted roller bearing for surface speeds up to 1000 ft. per minute or use on highly polished surfaces that might be damaged by a sliding contact
- Bearing outer race is in contact with the process and the inner race is in intimate contact with the sensor hot junction
- Optional sterling silver roller is available for fast response at slower speeds
- Temperature range: -90˚ F to +400˚ F (-68˚ C to +204˚ C)
- Not available in dual or triple configurations or in special tolerances

Example: For an Iron-Constantan thermocouple, the catalog number would be HSRT-J.

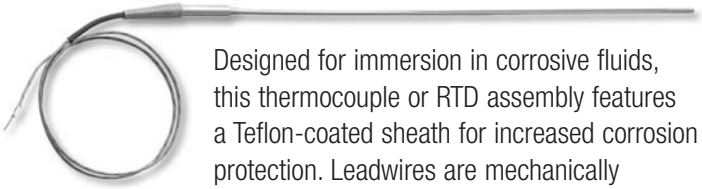
HIGH-TEMPERATURE ASSEMBLY – CATALOG TYPE HTRT

- Temperature range: -90˚ F to +700˚ F (-68˚ C to +371˚ C)
- Similar in construction to Type HSRT except that continuous surface contact is assured by use of a Conax Buffalo spring-loaded packing gland assembly
- Speeds up to 1000 ft./min.
- Available in all base metal calibrations
- Not available in dual or triple configurations or in special tolerances

Example: For a Chromel-Alumel thermocouple, the catalog number would be HTRT-K.

Note: Due to factors of friction and dynamic properties of the environment, these sensors may not conform to ANSI/ASTM published tolerances. Mounting bracket dimensions: 4-1/2" x 1" x 1/8" with four 0.250" diameter mounting holes over a 2-1/2" length.

Teflon-Coated Probe Assembly



Designed for immersion in corrosive fluids, this thermocouple or RTD assembly features a Teflon-coated sheath for increased corrosion protection. Leadwires are mechanically protected by a stainless steel braid (T4). The assembly is normally terminated with a Conax Buffalo PJ male plug. Teflon coating can be applied to most sensor probe assemblies presented in this catalog.

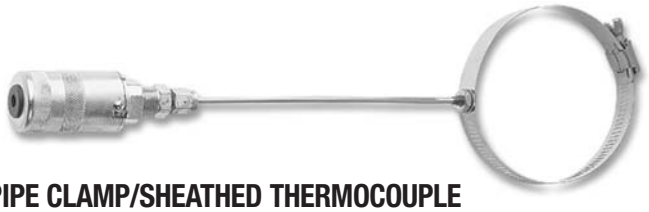
Conax Buffalo Con-O-Clad® Bulk Thermocouple Wire

Conax Buffalo manufactures our exclusive mineral insulated (MgO) Con-O-Clad® bulk material for single and multiple pair wires. This is available in all ASTM base metal thermocouple calibrations in sizes from 0.040" to 0.375" diameters. Other non-standard material combinations can be furnished for special requirements.

Pipe Clamp Thermocouples

Conax Buffalo stainless steel pipe clamp assemblies assist in obtaining accurate readings of outside pipe temperatures. They can be used wherever direct immersion probes are impractical or undesirable or where extreme corrosion is a problem.

- Outside application leaves high-pressure lines unbroken
- Easily installed - simply place the opened clamp around the pipe, slip the band end into the worm-gear housing and tighten with a screwdriver.



PIPE CLAMP/SHEATHED THERMOCOUPLE

The catalog number for a pipe clamp/sheathed thermocouple with a terminal head is indicated by placing the pipe clamp catalog number immediately after the terminal head designation. For example, an adjustable pipe clamp thermocouple with a 0.125" diameter 304SS sheath, using an Iron-Constantan grounded junction thermocouple 18" long and terminated with a B2 head for a 2" pipe would have this catalog number:

Example: ***J-SS12-G-B2-CL40-18.00"***

PIPE CLAMP/WIRE THERMOCOUPLE

Pipe clamp thermocouples are also available in an alternative design consisting of a clamp with 20 gauge thermocouple wire (Types J, K, E & T) and a spring vibration dampener. Standard wire length is 18.00". Longer lengths are available. To order this assembly, indicate the pipe clamp catalog number, followed by the calibration and optional wire length if applicable (if nothing is indicated, 18" standard will be supplied).

Examples: ***CL-10-J***
CL-10-J-36.00"

PIPE CLAMP THERMOCOUPLE SPECIFICATIONS

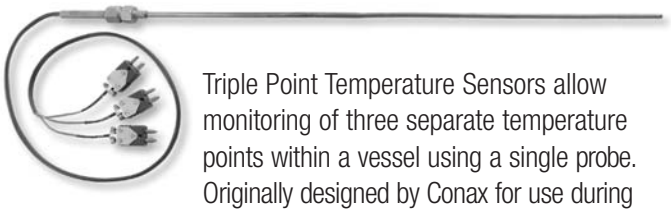
Catalog Number	Nominal Pipe Sizes (NPT)	Minimum I.D.
CL-10	3/8", 1/2", 3/4"	5/8"
CL-16	1/2", 3/4", 1"	13/16"
CL-24	1", 1-1/4", 1-1/2"	11/16"
CL-40	2", 2-1/2"	2-1/16"
CL-52	2-1/2", 3"	2-13/16"
CL-64	3-1/2", 4"	3-9/16"
CL-88	5"	5-1/16"
CL-104	6"	6-1/16"

Speed Wells

Speed well assemblies enclose the sensor element in a stainless steel protection tube with the tip sealed with a homogenous weld. This design permits a very fast response rate, as the stainless steel protection tube provides low mass and low thermal inertia. The thermocouple is sealed inside the speed well and protected from oxidation or corrosion. The thermocouple wire is insulated with silicone impregnated fiberglass for temperatures up to 900˚ F (482˚ C). Ceramic insulation can be provided inside the well for temperatures above 900˚ F. Speed wells are suitable for use at pressures from vacuum to 3000 psi. Temperatures range from -300˚ F to 2000˚ F (-184˚ C to 1090˚ C), depending on the pressure.

semblies & Hardware

Triple Point Sensors

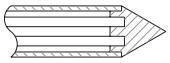


Triple Point Temperature Sensors allow monitoring of three separate temperature points within a vessel using a single probe. Originally designed by Conax for use during the calibration of epitaxial reactors, this technology is now used in a range of industrial process control applications. A tapered sheath ensures the proper location of the measuring junctions.

The original application uses Tungsten/Rhenium thermocouple wires to supply very accurate operation in a 1200˚ C environment. An inert-gas backfill protects the thermocouple wires from high temperature oxidation.

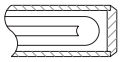
Specialty Tip Configurations

In addition to our standard tip configurations, the following are available for special applications:



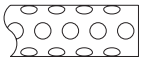
PG - Pointed, Grounded
PU - Pointed, Ungrounded

- Designed for easy insertion
- Machined with a 60˚ included angle
- Ideal for taking fast, repetitive readings in penetrable materials
- Not designed for use in human or animal applications



FRU - Fast Response, Ungrounded

- Uses a sterling silver tip for contact and surface temperature measurements where optimum response time and rugged construction characteristics are required.



EP- Exposed, Protected

- Designed for applications demanding fast response.
- The element is exposed within its cavity, and media flow reaches it through drilled orifices.
- Insulation is completely sealed with epoxy resin against liquid or gas penetration.
- Maximum service temperature: 300˚ F (150˚ C).

Trimmable Sheath RTD Assembly

Trimmable RTDs provide versatility, accuracy and ease of use in one rugged unit, with a 4-wire lead configuration that provides measurements of the highest precision. The trimmable RTD's easy, cut-to-fit feature allows the user to alter the length of the RTD sheath to fit into various thermowells, pipewells and tubewells. The stainless steel sheath is trimmable, using a commercially available tube cutter, down to a length of 6".

The leadwire is constructed of 24 AWG Teflon®-insulated, stranded wire, color coded Red/Red White/White. The platinum 100 ohm element complies with DIN 43760, and IEC 751, Class B tolerance.

- High accuracy
- Stock a single sensor for various applications
- Fast delivery
- 100 ohm Platinum RTD Sensor
- Maximum service temperature: 400˚ F (204˚ C)
- Available Lengths:
  Minimum Sheath Length – 6 inches
  Maximum Sheath Length – 5 feet
  Maximum Leadwire Length – 20 feet

To order, specify the leadwire length in inches, followed by the sheath length in inches:

Example: ***RTD43W4-SS25-TR(120")-24"***

Miniature Bearing Sensors

Shown with mounting fitting

The bearings of industrial rotating equipment operate under arduous conditions – often for considerable periods of time. The most reliable indicator of bearing condition is the temperature of the metal beneath the shoe.

Recognition of rising temperature can provide a warning of the breakdown of the lubricating oil film; thus allowing machine shutdown and maintenance to take place – avoiding the probable catastrophic failure of the bearing and possible damage to its mounting. Conax Miniature Bearing Sensors provide a simple and cost-effective method to monitor bearing temperatures.

FEATURES:

- For embedded applications in rotating machines
- RTDs – 100Ω platinum, 0.00385 Ω/Ω/˚C
- Thermocouples types J, K, T & E
- Single and duplex sensors
- Various styles and sizes
- Operating Temperature: to +250˚ F (+120˚ C)

SPECIFICATIONS

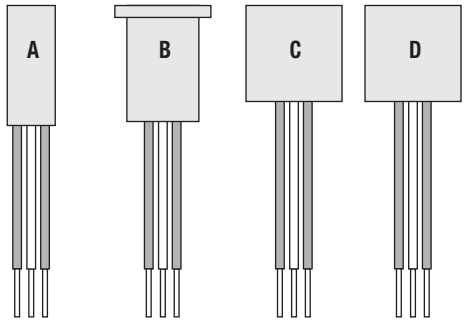
RTDs: single or duplex 100Ω platinum – 2 wire or 3 wire connection. Class 'B' tolerance to BS EN60751:1996, DIN 43760:1980 & IEC 751:1983

Silver plated, stranded, copper conductors, PTFE insulated to ASTM B298. Single sensors: 28 AWG, diameter over insulation 0.028" (each wire). Duplex sensors: 30 AWG, diameter over insulation 0.026" (each wire). Overall stainless steel braid optional.

Thermocouples: Single or duplex types J, K, T and E with PTFE insulated conductors. Single sensors: 24 AWG stranded conductors, diameters over insulation 0.040" (each wire); or 28 AWG solid conductors, diameter of extruded insulation 0.093". Duplex sensors: 26 AWG stranded conductors, diameter over insulation 0.032" (each wire). Overall stainless steel braid optional.

General: Sheath materials: 316SS, Copper or Brass.

TYPES AND DIMENSIONS



For individual tolerances consult CBT.

Sensor Type	A	B	C	D
Diameter (in.)	0.125	0.187 sheath 0.250 end cap	0.250	0.276
Length (in.)	0.300	0.281	0.250	0.250

ORDERING INFORMATION

Miniature Bearing Sensor / Sheath Type / Sheath Material / Sensor Type / Junction Type / Sensor Configurations / Leadwire Type / Leadwire Length

Example: ***MBS-C-CU-P1.3-X-1-ST-72.0/2.0***

Sheath Type

- **A** = 0.125" dia. x 0.300" length
- **B** = 0.187" dia. x 0.281" length
- **C** = 0.250" dia. x 0.250" length
- **D** = 0.276" dia. x 0.250" length

Sheath Material

- **SS = 316SS**
- **CU = Copper**
- **BR = Brass**

Sensor Type

- **P1.2 = RTD 2 wire**
- **P1.3 = RTD 3 wire**
- **TCJ = T/C Type J**
- **TCK = T/C Type K**
- **TCT = T/C Type T**
- **TCE = T/C Type E**

Junction Type

- **X = RTD**
- **U = Ungrounded T/C**
- **G = Grounded T/C**

Sensor Configuration

- **1 = Single Detector**
- **2 = Duplex Detector**

Leadwire Type

- **TE = Individual PTFE insulated leads**
- **ST = TE leads with overall SS braid**
- **SH = 28 AWG solid conductors (Single T/Cs only)**
- **SP = Special requirements (specify)**

Leadwire Length

- **Length x (in.)/ length y (in)**

x = Overall length (36.0" std.)

y = Length of exposed leads or wires (1.0" std.)

Braid (ST)/insulation (SH) removed. Not applicable to types TE and SP. Standard length entry = 36.0"/1.0"

Conax Buffalo Technologies

For more information call: ***1-800-223-2389*** *•* *e-mail:* ***conaxbuf@conaxbuffalo.com*** *•* *visit our website:* ***www.conaxbuffalo.com***

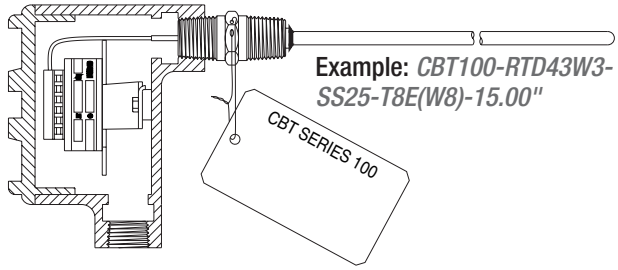
RTD & Thermocouple Assemblies for Hazardous Locations

CBT 100, CBT 200 and CBT 300 Series assemblies meet U.S. and Canadian standards (NRTL/C, CSA) for use in hazardous locations as defined by NEC Class 1, Division 1, Groups B, C & D; Class II, Groups E, F & G; and Class III.

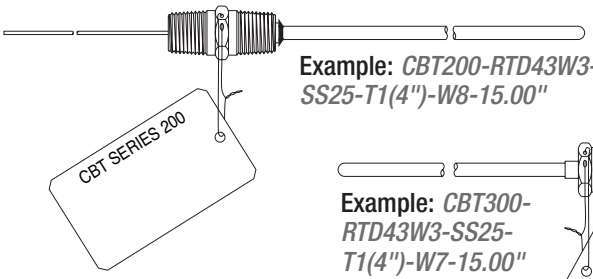
CBT 100 Series sensor-terminal head assemblies are available in all thermocouple calibrations and in RTD assemblies with 100, 200, 500 and 1000 ohm platinum, 10 ohm copper or 120 ohm nickel elements. Assemblies are available with stainless steel or Inconel sheaths, a W8 mounting fitting and explosion-proof terminal head with terminal strip. An optional 4-20mA transmitter can be provided.

CBT 200 and CBT 300 assemblies are NEC-compliant replacement probes for use with UL and CSA-approved terminal heads in hazardous locations. CBT 200 provides a W8 fitting for attachment to the terminal head and to the vessel. CBT 300 provides a W7 fitting for attachment to the terminal head. A separate adjustable fitting is required to attach the probe to the vessel.

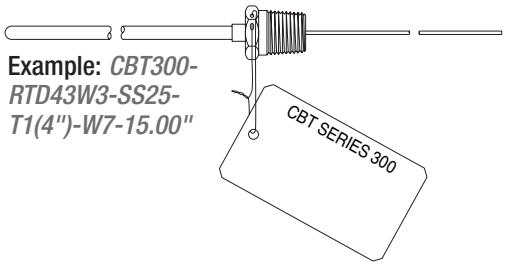
Certificate No. LR111664-1



Example: *CBT100-RTD43W3-SS25-T8E(W8)-15.00"*



Example: *CBT200-RTD43W3-SS25-T1(4")-W8-15.00"*

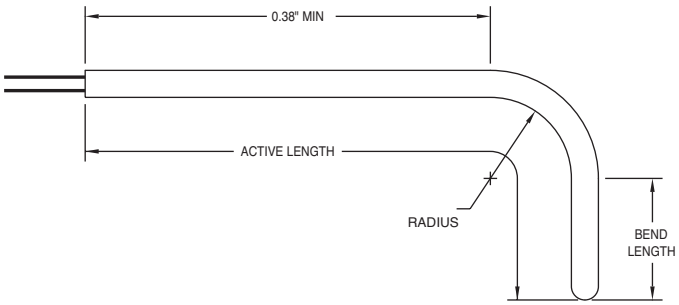


Example: *CBT300-RTD43W3-SS25-T1(4")-W7-15.00"*

Sensor Probes with 90° Bends

Thermocouple and RTD sensors are available with a single right angle (90°) bend in the sheath. This is indicated by adding a dimension and the letter "R" to the catalog description. The dimension indicates the distance from the tip of the sensor to the start of the bend. The standard bend radius is 1/2" for 0.062" diameters and smaller, 3/4" for 0.125"-0.250" diameters, and 2" for 0.375" diameters.

Example: ***RTD43W3-SS25-T1-12.00", 4.50R***



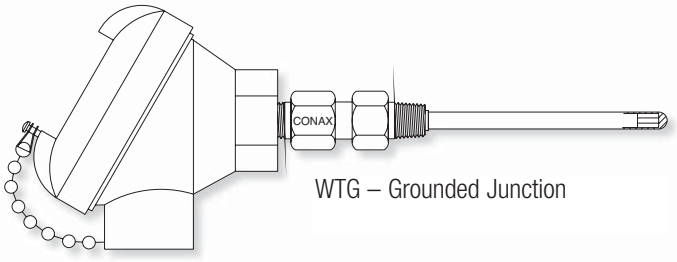
In general accepted practice, the bend should never start closer to the tip than 3" for any RTD; or for thermocouples, 1/2" for 0.062" and smaller probe diameters; 2" for 0.375" probe diameters or 4 times the sheath diameter for 0.125" through 0.250" probe diameters. The termination should not be closer than 3/8" from the completion of the bend. For 0.375" probe diameters, the termination should be no closer than 2" from the bend. Type ERTD and MRTD assemblies should never be bent. Other bend radii and multiple bends are available as custom items. Consult factory.

Safety Well Thermocouple Assemblies

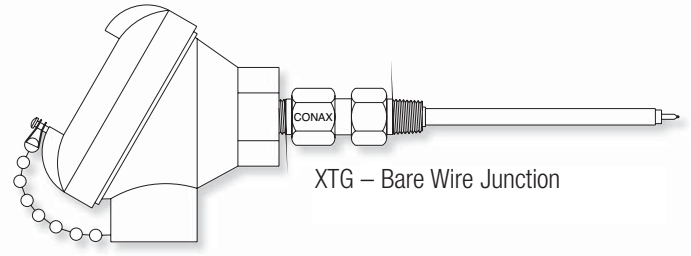
Conax WTG and XTG thermocouple assemblies employ Transducer Glands (TG) as the component part for sealing sensor thermocouple wires and the primary environment seal. The seal prevents contamination of the electronics within the terminal head and leakage of gas or liquid into the control room.

- WTG – Grounded Junction
- XTG – Bare Wire Junction

Assemblies consist of base metal thermocouple wire (Types E, J, T and K) surrounded by hard-fired alumina insulators. Use of hard-fired insulators eliminates low IR problems often found in MgO mineral insulated wire junctions. Exposed junction thermocouples offer excellent temperature measurement speed of response.



WTG – Grounded Junction



XTG – Bare Wire Junction

The Conax TG gland uses Conax-designed "soft sealant" technology to seal on the bare wires. It is available with Lava, Teflon, Neoprene or Viton sealant materials. Selection of the proper sealant is dependent on the application. For details, request Conax's Pressure and Vacuum Sealing Assemblies catalog or contact a Conax sales engineer. The protection tube is welded to the gland body on the mounting thread side. The other end of the gland is attached to the terminal head.

SPECIFICATIONS

Catalog Number	Tube Diameter	NPT	Wire Gauge
WTG-24	3/16"	1/4	24
WTG-20	1/4"	1/4	20
WTG-14	3/8"	1/2	14
WTG-8	5/8"	3/4	8
XTG-20	1/4"	1/4	20
XTG-14	3/8"	1/2	14
XTG-8	5/8"	3/4	8

Catalog Numbering Examples:

WTG-20-B2-L-J-T5CI-12.00"
XTG-14-B4-L-K-T8-14.00"

(For assistance in developing catalog numbers, refer to Conax's Pressure and Vacuum Sealing Assemblies catalog or call a Conax sales engineer.)

Thermistor Assemblies

Thermistors are semiconductive devices whose electrical resistivity is designed to vary in a definite desired manner with temperature. Their temperature coefficient of resistance is approximately ten times that of metals, providing very high sensitivity to small temperature differences. Thermistors offer very high sensitivity over a narrow temperature range, with very good stability and repeatability.

Conax provides thermistors in easy-to-use probe form to fit any need. Conax engineers welcome the opportunity to assist you in applying this technology to your applications.

semblies & Hardware

Integrated Circuit Sensors

An integrated circuit sensor uses a small temperature transducer to convert temperature input into a proportional current output. These sensors are designed for use in temperatures from -67˚ to 302˚ F (-55˚ to 150˚ C) where solid state reliability and accuracy are required. Sensor output (within this temperature range) is 1µA/˚K. These sensors are also useful in remote sensing applications, as the high impedance current output makes them insensitive to voltage drops over long lines.

Multiple Quick Disconnect

CATALOG TYPE MQD

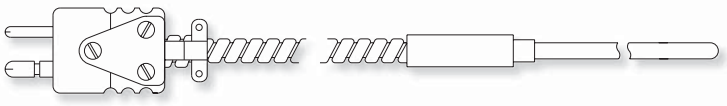
Multiple Quick Disconnect assemblies are available for E, J, T and K calibrations. This six-pin configuration is polarized for each thermocouple type to eliminate sensor mismatch. The plug and receptacle use base metal thermocouple contacts, molded and staked in phenolic inserts. The plug is brazed to the thermocouple probe and filled with epoxy. The receptacle features Teflon-insulated twisted shielded pair conductors. When mated, the connector is waterproof. The termination and sensor sheath are supplied as an integral unit.

Example: ***E-SS25-2U-MQD-MK250A-12.00"***

Weld Pads

To facilitate welding thermocouples to surfaces in the field, Conax Buffalo can fit the measuring junction with a weld pad. Flat or curved pads are 0.125" thick x 1.00" square and are available in 304 or optional 316 stainless steel. Flat pads may be welded flat (Style F) or perpendicular (Style P). Curved pads may also be welded flat (FC) or perpendicular (PC) and offer a choice of radius of 0.567" (for 1" nominal pipe) or 0.875" (for 1.5" nominal pipe).

Armored Assemblies



Sensor assemblies can be provided with helically wound stainless steel interlocked armor cable for exceptional mechanical strength, flexibility and RFI/EMI resistance. One of our more popular models consists of a T3 assembly terminated with a Conax Buffalo PJ male plug. This assembly is ideal for rugged service in physically demanding environments where the leadwires could be exposed to compression and wire abrasion.

Example: ***J-SS12-G-T3(ARM 20FT)-PJC-12.00"***

High Density Feedthrough Assemblies

High Density (HD) assemblies consist of a stainless steel tube swaged over 12, 24, 40 or 60 bundled Teflon-coated thermocouple grade and/or copper wires, providing a continuous wire feedthrough for thermocouples, RTDs or low voltage instrumentation. No epoxy or potting is used in the construction. The assembly can be furnished with or without junctions and comes standard with 24 inches of leadwire on each end. Longer wire lengths can be supplied as required. A single high density feedthrough can pass through a Conax packing gland for environmental sealing. Greater density through a single port can be achieved by using a multi-hole metal gland that accommodates multiple HD assemblies.

HD18 - 0.187" diameter, 12 conductors
HD25 - 0.250" diameter, 24 conductors
HD31 - 0.312" diameter, 40 conductors
HD37 - 0.375" diameter, 60 conductors

- Sheath Material: 300 Series SST, 4.5" nominal length
- Temperature Range: -112˚ F to +250˚ F (-80˚ to +120˚ C)
- Vacuum Rating: 5 x 10^{-6} mm HG @ 68˚ F (20˚ C)
- Leak Rate: 1 x 10^{-9} scc/sec He @ 68˚ F (20˚ C), 1 atm. applied
- Voltage Rating: 100 VDC
- Amperage Rating: 500mA
- Feedthrough Pressure Rating @ 68˚ F (20˚ C): 5000 psi (345 bar)

CATALOG NUMBERING SYSTEM:

- High Density Feedthrough
- Diameter of Feedtrhough
- Tube Length 450 = 4.5"
- Number of T/C pairs or copper wire conductors
  HD18 = 12 total conductors or 6 T/C pairs;
  HD25 = 24 total conductors or 6 T/C pairs;
  HD31 = 40 total conductors or 6 T/C pairs;
  HD37 = 60 total conductors or 6 T/C pairs;
- Wire Type
  (J) Iron vs Constantan
  (K) Chromel vs Alumel®
  (T) Copper vs Constantan
  (E) Chromel vs Constantan
  (CU) Copper Wires
  Consult factory for RS/SX or CX
- Gland Type: (Bore size understood same as feedthrough diameter). Omit gland callout when gland not required and specify length of SST feedthrough tube.

HD 25-450 (12K) PG2AT, 24/24

Wire length cap side in inches •
Wire length body side in inches •

TG Gland with 24 AWG Insulated Leadwire

This assembly consists of a Conax Buffalo manufactured transducer gland (TG) with a Teflon sealant and Teflon-coated thermocouple grade or copper wires. Typical applications include the sealing of wires exiting compressor bearing housings, pressure vessels, instruments, furnaces and reactors. The gland is furnished with 24" of wire on each side. Longer wire lengths can be furnished as required.

Temperature Range: -300˚ to +450˚ F (-184˚ to +232˚ C)
Pressure Rating @ 68˚ F (20˚ C): Vacuum to 4400 psi (300 bar)

CATALOG NUMBERING SYSTEM:

- Transducer Gland
- Wire Gauge, 24 = 24 AWG solid
- Teflon® Coated
- Wire Type
  (J) Iron vs Constantan
  (K) Chromel vs Alumel®
  (T) Copper vs Constantan
  (E) Chromel vs Constantan
  (CU) Copper Wires
  (CX) 405/426 Tungsten 5% Rhenium vs Tungsten 26% Rhenium
  (RS/SX) Platinum Type R and S
- Cap Description
  Type "A" has mounting thread only
  Type "B" has both ends threaded
- Number of wires sealed
- Sealant Material, T = Teflon

TG - 24T(J) - A2 - T, 24/36

Wire length cap side in inches •
Wire length body side in inches •

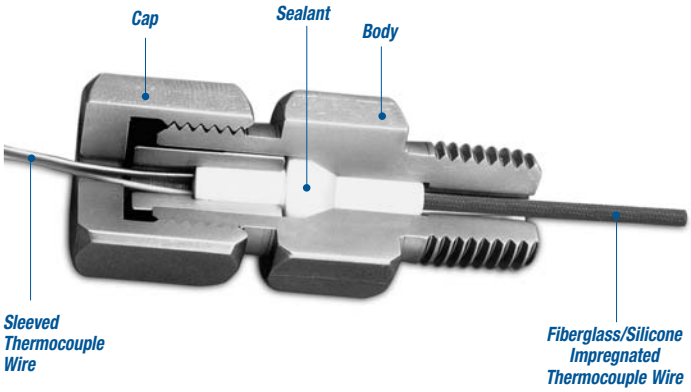
Catalog Number	Mounting Thread	TORQUE (FT-LBS)		Pressure Rating @ 68˚ F (PSI)
		Standard T/C Grade Wire (except Type T)	Copper & Type T	
MTG-24T(X)-*2-T	1/8"	20–25	72–78 in-lbs	3200
MTG-24T(X)-*4-T	1/8"	20–25	72–78 in-lbs	3200
TG-24T(X)-*2-T	1/4"	30–35	10–12	4400
TG-24T(X)-*4-T	1/4"	30–35	10–12	4400
TG-24T(X)-*6-T	1/2"	50–55	25–30	3200
TG-24T(X)-*8-T	1/2"	50–55	25–30	3200
TG-24T(X)-*12-T	3/4"	75–85	60–65	3200
TG-24T(X)-*16-T	3/4"	75–85	60–65	3200

** Specify Type "A" or "B"*

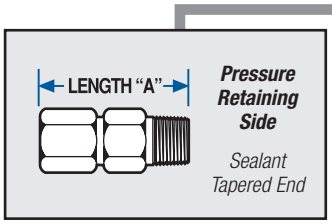
Conax Buffalo Technologies®

TG Gland with High Temperature Wires

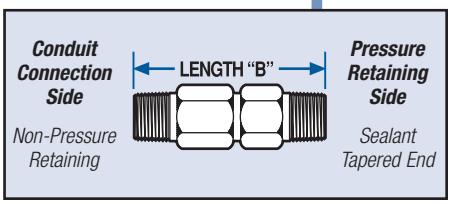
Transducer gland assemblies with fiberglass-insulated thermocouple wire are specially designed for applications where the sensor wire is exposed to process temperatures reaching up to 900˚ F (482˚ C). This assembly is particularly targeted for use with vacuum and/or inert gas back-filled furnaces with vessel wall temperatures up to 200˚ F (93˚ C) and pressures not exceeding 300 psi. The assembly consists of bonded fiberglass-insulated/silicone impregnated thermocouple grade wires on the body side, with stripped bare wires passing through the Conax-manufactured transducer gland. An alternative high-temperature fiberglass for Type K wire is also available with temperature capabilities up to 1400˚ F (760˚ C). Sleeved insulation material on the wires exiting the cap side may be fiberglass/silicone impregnated, Teflon® or polyolefin. Available gland sealant materials are Viton® and Teflon.



Catalog Number	Wire Gauge	Number of Wires	Thread NPT	Length A	Length B	Hex Size	TORQUE (Ft-Lbs except as noted) Viton/Teflon	Pressure Rating** Viton/Teflon
MTG-24F(x)-*2	24	2	1/8"	1-3/8"	1-3/4"	9/16"	72-78 in-lbs	300
TG-24F(x)-*2	24	2	1/4"	2"	2-5/8"	3/4"	10-12	300
MTG-24F(x)-*4	24	4	1/8"	1-3/8"	1-3/4"	9/16"	72-78 in-lbs	300
TG-24F(x)-*4	24	4	1/4"	2"	2-5/8"	3/4"	10-12	300
MTG-20F(x)-*2	20	2	1/8"	1-3/8"	1-3/4"	9/16"	72-78 in-lbs	300
TG-20F(x)-*2	20	2	1/4"	2"	2-5/8"	3/4"	10-12	300
MTG-20F(x)-*4	20	4	1/8"	1-3/8"	1-3/4"	9/16"	72-78 in-lbs	300
TG-20F(x)-*4	20	4	1/4"	2"	2-5/8"	3/4"	10-12	300
TG-20F(x)-*6	20	6	1/2"	2-5/8"	3-3/8"	1"	25-30	300
TG-20F(x)-*8	20	8	1/2"	2-5/8"	3-3/8"	1"	25-30	300
TG-20F(x)-*16	20	16	3/4"	2-7/8"	3-5/8"	1-1/4"	60-65	300

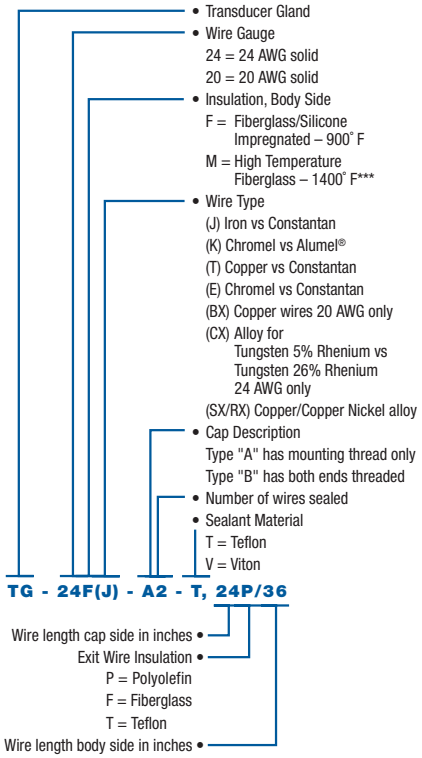


Type A has mounting thread only.



Type B has cap end threaded.

CATALOG NUMBERING SYSTEM:



NOTE:

— *Other size NPT, MS 33656 Style E mounting thread, and sealing gland materials of construction are available. Consult factory.*

* *Specify Type "A" or "B"*

** *Pressure rating guide values are for glands with elements restrained by compressed sealant.*

*** *Magnesia alumina silicate vitreous fiber braid, modified polyester impregnated, continuous operating temperature to 1400˚ F (760˚ C), Type K, 20 AWG only.*

Conax Buffalo Technologies®

Temperature Versus Resistance-100ΩRTD ∝=0.003850Ω/Ω/°C

°C	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10
-200	18.52										
-190	22.83	22.40	21.97	21.54	21.11	20.68	20.25	19.82	19.38	18.95	18.52
-180	27.10	26.67	26.24	25.82	25.39	24.97	24.54	24.11	23.68	23.25	22.83
-170	31.34	30.91	30.49	30.07	29.64	29.22	28.80	28.37	27.95	27.52	27.10
-160	35.54	35.12	34.70	34.28	33.86	33.44	33.02	32.60	32.18	31.76	31.34
-150	39.72	39.31	38.89	38.47	38.05	37.64	37.22	36.80	36.38	35.96	35.54
-140	43.88	43.46	43.05	42.63	42.22	41.80	41.39	40.97	40.56	40.14	39.72
-130	48.00	47.59	47.18	46.77	46.36	45.94	45.53	45.12	44.70	44.29	43.88
-120	52.11	51.70	51.29	50.88	50.47	50.06	49.65	49.24	48.83	48.42	48.00
-110	56.19	55.79	55.38	54.97	54.56	54.15	53.75	53.34	52.93	52.52	52.11
-100	60.26	59.85	59.44	59.04	58.63	58.23	57.82	57.41	57.01	56.60	56.19
-90	64.30	63.90	63.49	63.09	62.68	62.28	61.88	61.47	61.07	60.66	60.26
-80	68.33	67.92	67.52	67.12	66.72	66.31	65.91	65.51	65.11	64.70	64.30
-70	72.33	71.93	71.53	71.13	70.73	70.33	69.93	69.53	69.13	68.73	68.33
-60	76.33	75.93	75.53	75.13	74.73	74.33	73.93	73.53	73.13	72.73	72.33
-50	80.31	79.91	79.51	79.11	78.72	78.32	77.92	77.52	77.12	76.73	76.33
-40	84.27	83.87	83.48	83.08	82.69	82.29	81.89	81.50	81.10	80.70	80.31
-30	88.22	87.83	87.43	87.04	86.64	86.25	85.85	85.46	85.06	84.67	84.27
-20	92.16	91.77	91.37	90.98	90.59	90.19	89.80	89.40	89.01	88.62	88.22
-10	96.09	95.69	95.30	94.91	94.52	94.12	93.73	93.34	92.95	92.55	92.16
0	100.00	99.61	99.22	98.83	98.44	98.04	97.65	97.26	96.87	96.48	96.09
°C	0	1	2	3	4	5	6	7	8	9	10
0	100.00	100.39	100.78	101.17	101.56	101.95	102.34	102.73	103.12	103.51	103.90
10	103.90	104.29	104.68	105.07	105.46	105.85	106.24	106.63	107.02	107.40	107.79
20	107.79	108.18	108.57	108.96	109.35	109.73	110.12	110.51	110.90	111.29	111.67
30	111.67	112.06	112.45	112.83	113.22	113.61	114.00	114.38	114.77	115.15	115.54
40	115.54	115.93	116.31	116.70	117.08	117.47	117.86	118.24	118.63	119.01	119.40
50	119.40	119.78	120.17	120.55	120.94	121.32	121.71	122.09	122.47	122.86	123.24
60	123.24	123.63	124.01	124.39	124.78	125.16	125.54	125.93	126.31	126.69	127.08
70	127.08	127.46	127.84	128.22	128.61	128.99	129.37	129.75	130.13	130.52	130.90
80	130.90	131.28	131.66	132.04	132.42	132.80	133.18	133.57	133.95	134.33	134.71
90	134.71	135.09	135.47	135.85	136.23	136.61	136.99	137.37	137.75	138.13	138.51
100	138.51	138.88	139.26	139.64	140.02	140.40	140.78	141.16	141.54	141.91	142.29
110	142.29	142.67	143.05	143.43	143.80	144.18	144.56	144.94	145.31	145.69	146.07
120	146.07	146.44	146.82	147.20	147.57	147.95	148.33	148.70	149.08	149.46	149.83
130	149.83	150.21	150.58	150.96	151.33	151.71	152.08	152.46	152.83	153.21	153.58
140	153.58	153.96	154.33	154.71	155.08	155.46	155.83	156.20	156.58	156.95	157.33
150	157.33	157.70	158.07	158.45	158.82	159.19	159.56	159.94	160.31	160.68	161.05
160	161.05	161.43	161.80	162.17	162.54	162.91	163.29	163.66	164.03	164.40	164.77
170	164.77	165.14	165.51	165.89	166.26	166.63	167.00	167.37	167.74	168.11	168.48
180	168.48	168.85	169.22	169.59	169.96	170.33	170.70	171.07	171.43	171.80	172.17
190	172.17	172.54	172.91	173.28	173.65	174.02	174.38	174.75	175.12	175.49	175.86
200	175.86	176.22	176.59	176.96	177.33	177.69	178.06	178.43	178.79	179.16	179.53

Temperature Versus Resistance-100ΩRTD ∝=0.003850Ω/Ω/°C

°C	0	1	2	3	4	5	6	7	8	9	10
210	179.53	179.89	180.26	180.63	180.99	181.36	181.72	182.09	182.46	182.82	183.19
220	183.19	183.55	183.92	184.28	184.65	185.01	185.38	185.74	186.11	186.47	186.84
230	186.84	187.20	187.56	187.93	188.29	188.66	189.02	189.38	189.75	190.11	190.47
240	190.47	190.84	191.20	191.56	191.92	192.29	192.65	193.01	193.37	193.74	194.10
250	194.10	194.46	194.82	195.18	195.55	195.91	196.27	196.63	196.99	197.35	197.71
260	197.71	198.07	198.43	198.79	199.15	199.51	199.87	200.23	200.59	200.95	201.31
270	201.31	201.67	202.03	202.39	202.75	203.11	203.47	203.83	204.19	204.55	204.90
280	204.90	205.26	205.62	205.98	206.34	206.70	207.05	207.41	207.77	208.13	208.48
290	208.48	208.84	209.20	209.56	209.91	210.27	210.63	210.98	211.34	211.70	212.05
300	212.05	212.41	212.76	213.12	213.48	213.83	214.19	214.54	214.90	215.25	215.61
310	215.61	215.96	216.32	216.67	217.03	217.38	217.74	218.09	218.44	218.80	219.15
320	219.15	219.51	219.86	220.21	220.57	220.92	221.27	221.63	221.98	222.33	222.68
330	222.68	223.04	223.39	223.74	224.09	224.45	224.80	225.15	225.50	225.85	226.21
340	226.21	226.56	226.91	227.26	227.61	227.96	228.31	228.66	229.02	229.37	229.72
350	229.72	230.07	230.42	230.77	231.12	231.47	231.82	232.17	232.52	232.87	233.21
360	233.21	233.56	233.91	234.26	234.61	234.96	235.31	235.66	236.00	236.35	236.70
370	236.70	237.05	237.40	237.74	238.09	238.44	238.79	239.13	239.48	239.83	240.18
380	240.18	240.52	240.87	241.22	241.56	241.91	242.26	242.60	242.95	243.29	243.64
390	243.64	243.99	244.33	244.68	245.02	245.37	245.71	246.06	246.40	246.75	247.09
400	247.09	247.44	247.78	248.13	248.47	248.81	249.16	249.50	249.85	250.19	250.53
410	250.53	250.88	251.22	251.56	251.91	252.25	252.59	252.93	253.28	253.62	253.96
420	253.96	254.30	254.65	254.99	255.33	255.67	256.01	256.35	256.70	257.04	257.38
430	257.38	257.72	258.06	258.40	258.74	259.08	259.42	259.76	260.10	260.44	260.78
440	260.78	261.12	261.46	261.80	262.14	262.48	262.82	263.16	263.50	263.84	264.18
450	264.18	264.52	264.86	265.20	265.53	265.87	266.21	266.55	266.89	267.22	267.56
460	267.56	267.90	268.24	268.57	268.91	269.25	269.59	269.92	270.26	270.60	270.93
470	270.93	271.27	271.61	271.94	272.28	272.61	272.95	273.29	273.62	273.96	274.29
480	274.29	274.63	274.96	275.30	275.63	275.97	276.30	276.64	276.97	277.31	277.64
490	277.64	277.98	278.31	278.64	278.98	279.31	279.64	279.98	280.31	280.64	280.98
500	280.98	281.31	281.64	281.98	282.31	282.64	282.97	283.31	283.64	283.97	284.30
510	284.30	284.63	284.97	285.30	285.63	285.96	286.29	286.62	286.95	287.29	287.62
520	287.62	287.95	288.28	288.61	288.94	289.27	289.60	289.93	290.26	290.59	290.92
530	290.92	291.25	291.58	291.91	292.24	292.56	292.89	293.22	293.55	293.88	294.21
540	294.21	294.54	294.86	295.19	295.52	295.85	296.18	296.50	296.83	297.16	297.49
550	297.49	297.81	298.14	298.47	298.80	299.12	299.45	299.78	300.10	300.43	300.75
560	300.75	301.08	301.41	301.73	302.06	302.38	302.71	303.03	303.36	303.69	304.01
570	304.01	304.34	304.66	304.98	305.31	305.63	305.96	306.28	306.61	306.93	307.25
580	307.25	307.58	307.90	308.23	308.55	308.87	309.20	309.52	309.84	310.16	310.49
590	310.49	310.81	311.13	311.45	311.78	312.10	312.42	312.74	313.06	313.39	313.71
600	313.71	314.03	314.35	314.67	314.99	315.31	315.64	315.96	316.28	316.60	316.92
610	316.92	317.24	317.56	317.88	318.20	318.52	318.84	319.16	319.48	319.80	320.12
620	320.12	320.43	320.75	321.07	321.39	321.71	322.03	322.35	322.67	322.98	323.30
630	323.30	323.62	323.94	324.26	324.57	324.89	325.21	325.53	325.84	326.16	326.48
640	326.48	326.79	327.11	327.43	327.74	328.06	328.38	328.69	329.01	329.32	329.64
650	329.64										

Temperature Versus Resistance-100Ω Platinum RTD $\propto$=0.003916Ω/Ω/°C

°C	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10
-200	17.14										
-190	21.46	21.03	20.59	20.16	19.73	19.29	18.86	18.43	18.00	17.57	17.14
-180	25.80	25.37	24.93	24.50	24.07	23.63	23.20	22.76	22.33	21.90	21.46
-170	30.12	29.69	29.26	28.83	28.40	27.97	27.53	27.10	26.67	26.24	25.80
-160	34.42	33.99	33.56	33.13	32.70	32.28	31.85	31.42	30.99	30.56	30.12
-150	38.68	38.26	37.83	37.41	36.98	36.55	36.13	35.70	35.27	34.85	34.42
-140	42.91	42.49	42.07	41.64	41.22	40.80	40.38	39.95	39.53	39.10	38.68
-130	47.11	46.69	46.27	45.85	45.43	45.01	44.59	44.17	43.75	43.33	42.91
-120	51.29	50.87	50.45	50.04	49.62	49.20	48.78	48.37	47.95	47.53	47.11
-110	55.44	55.02	54.61	54.19	53.78	53.36	52.95	52.53	52.12	51.70	51.29
-100	59.57	59.16	58.74	58.33	57.92	57.50	57.09	56.68	56.26	55.85	55.44
-90	63.68	63.27	62.86	62.45	62.04	61.63	61.21	60.80	60.39	59.98	59.57
-80	67.77	67.36	66.96	66.55	66.14	65.73	65.32	64.91	64.50	64.09	63.68
-70	71.85	71.44	71.04	70.63	70.22	69.81	69.41	69.00	68.59	68.18	67.77
-60	75.91	75.51	75.10	74.70	74.29	73.88	73.43	73.07	72.66	72.26	71.85
-50	79.96	79.56	79.15	78.75	78.34	77.94	77.53	77.13	76.72	76.32	75.91
-40	83.99	83.59	83.19	82.79	82.38	81.98	81.58	81.17	80.77	80.36	79.96
-30	88.01	87.61	87.21	86.81	86.41	86.01	85.60	85.20	84.80	84.40	83.99
-20	92.02	91.62	91.22	90.82	90.42	90.02	89.62	89.22	88.82	88.42	88.01
-10	96.02	95.62	95.22	94.82	94.42	94.02	93.62	93.22	92.82	92.42	92.02
0	100.00	99.60	99.20	98.81	98.41	98.01	97.61	97.21	96.81	96.42	96.02
°C	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
0	100.00	100.40	100.80	101.19	101.59	101.99	102.38	102.78	103.18	103.57	103.97
10	103.97	104.37	104.76	105.16	105.56	105.95	106.35	106.74	107.14	107.53	107.93
20	107.93	108.32	108.72	109.11	109.51	109.90	110.30	110.69	111.09	111.48	111.88
30	111.88	112.27	112.66	113.06	113.45	113.84	114.24	114.63	115.02	115.42	115.81
40	115.81	116.20	116.59	116.99	117.38	117.77	118.16	118.56	118.95	119.34	119.73
50	119.73	120.12	120.51	120.91	121.30	121.69	122.08	122.47	122.86	123.25	123.64
60	123.64	124.03	124.42	124.81	125.20	125.59	125.98	126.37	126.76	127.15	127.54
70	127.54	127.93	128.32	128.71	129.09	129.48	129.87	130.26	130.65	131.04	131.42
80	131.42	131.81	132.20	132.59	132.98	133.36	133.75	134.14	134.52	134.91	135.30
90	135.30	135.68	136.07	136.46	136.84	137.23	137.62	138.00	138.39	138.77	139.16
100	139.16	139.55	139.93	140.32	140.70	141.09	141.47	141.86	142.24	142.63	143.01
110	143.01	143.39	143.78	144.16	144.55	144.93	145.31	145.70	146.08	146.46	146.85
120	146.85	147.23	147.61	148.00	148.38	148.76	149.15	149.53	149.91	150.29	150.67
130	150.67	151.06	151.44	151.82	152.20	152.58	152.96	153.35	153.73	154.11	154.49
140	154.49	154.87	155.25	155.63	156.01	156.39	156.77	157.15	157.53	157.91	158.29
150	158.29	158.67	159.05	159.43	159.81	160.19	160.57	160.95	161.33	161.70	162.08
160	162.08	162.46	162.84	163.22	163.60	163.97	164.35	164.73	165.11	165.48	165.86
170	165.86	166.24	166.62	166.99	167.37	167.75	168.12	168.50	168.88	169.25	169.63

Temperature Versus Resistance-100Ω Platinum RTD ∝=0.003916Ω/Ω/°C

°C	0	1	2	3	4	5	6	7	8	9	10
180	169.63	170.00	170.38	170.76	171.13	171.51	171.88	172.26	172.63	173.01	173.38
190	173.38	173.76	174.13	174.51	174.88	175.26	175.63	176.01	176.38	176.75	177.13
200	177.13	177.50	177.88	178.25	178.62	179.00	179.37	179.74	180.12	180.49	180.86
210	180.86	181.23	181.61	181.98	182.35	182.72	183.09	183.47	183.84	184.21	184.58
220	184.58	184.95	185.32	185.70	186.07	186.44	186.81	187.18	187.55	187.92	188.29
230	188.29	188.66	189.03	189.40	189.77	190.14	190.51	190.88	191.25	191.62	191.99
240	191.99	192.36	192.73	193.09	193.46	193.83	194.20	194.57	194.94	195.31	195.67
250	195.67	196.04	196.41	196.78	197.14	197.51	197.88	198.25	198.61	198.98	199.35
260	199.35	199.71	200.08	200.45	200.81	201.18	201.55	201.91	202.28	202.64	203.01
270	203.01	203.38	203.74	204.11	204.47	204.84	205.20	205.57	205.93	206.30	206.66
280	206.66	207.02	207.39	207.75	208.12	208.48	208.85	209.21	209.57	209.94	210.30
290	210.30	210.66	211.03	211.39	211.75	212.11	212.48	212.84	213.20	213.56	213.93
300	213.93	214.29	214.65	215.01	215.37	215.74	216.10	216.46	216.82	217.18	217.54
310	217.54	217.90	218.26	218.63	218.99	219.35	219.71	220.07	220.43	220.79	221.15
320	221.15	221.51	221.87	222.23	222.59	222.94	223.30	223.66	224.02	224.38	224.74
330	224.74	225.10	225.46	225.81	226.17	226.53	226.89	227.25	227.61	227.96	228.32
340	228.32	228.68	229.04	229.39	229.75	230.11	230.46	230.82	231.18	231.53	231.89
350	231.89	232.25	232.60	232.96	233.31	233.67	234.03	234.38	234.74	235.09	235.45
360	235.45	235.80	236.16	236.51	236.87	237.22	237.58	237.93	238.28	238.64	238.99
370	238.99	239.35	239.70	240.05	240.41	240.76	241.11	241.47	241.82	242.17	242.53
380	242.53	242.88	243.23	243.58	243.94	244.29	244.64	244.99	245.35	245.70	246.05
390	246.05	246.40	246.75	247.10	247.46	247.81	248.16	248.51	248.86	249.21	249.56
400	249.56	249.91	250.26	250.61	250.96	251.31	251.66	252.01	252.36	252.71	253.06
410	253.06	253.41	253.76	254.11	254.46	254.80	255.15	255.50	255.85	256.20	256.55
420	256.55	256.89	257.24	257.59	257.94	258.29	258.63	258.98	259.33	259.67	260.02
430	260.02	260.37	260.72	261.06	261.41	261.75	262.10	262.45	262.79	263.14	263.49
440	263.49	263.83	264.18	264.52	264.87	265.21	265.56	265.90	266.25	266.59	266.94
450	266.94	267.28	267.63	267.97	268.31	268.66	269.00	269.35	269.69	270.03	270.38
460	270.38	270.72	271.06	271.41	271.75	272.09	272.44	272.78	273.12	273.46	273.80
470	273.80	274.15	274.49	274.83	275.17	275.51	275.86	276.20	276.54	276.88	277.22
480	277.22	277.56	277.90	278.24	278.58	278.92	279.26	279.61	279.95	280.29	280.63
490	280.63	280.96	281.30	281.64	281.98	282.32	282.66	283.00	283.34	283.68	284.02
500	284.02	284.36	284.69	285.03	285.37	285.71	286.05	286.39	286.72	287.06	287.40

Tolerances for a 100Ω Platinum RTD per IEC 751-95

Temperature Degree (C)	Tolerance					
	Class B		1/3 Class B		Class A	
	(±C)[1]	(±Ohm)	(±C)	(±Ohm)	(±C)[2]	(±Ohm)
-200	1.30	0.56	1.10	0.48	0.55	0.24
-100	0.80	0.32	0.60	0.24	0.35	0.14
0	0.30	0.12	0.10	0.04	0.15	0.06
100	0.80	0.30	0.60	0.23	0.35	0.13
200	1.30	0.48	1.10	0.40	0.55	0.20
300	1.80	0.64	1.60	0.57	0.75	0.27
400	2.30	0.79	2.10	0.72	0.95	0.33
500	2.80	0.93	2.60	0.87	1.15	0.38
600	3.30	1.06	3.10	1.00	1.35	0.43

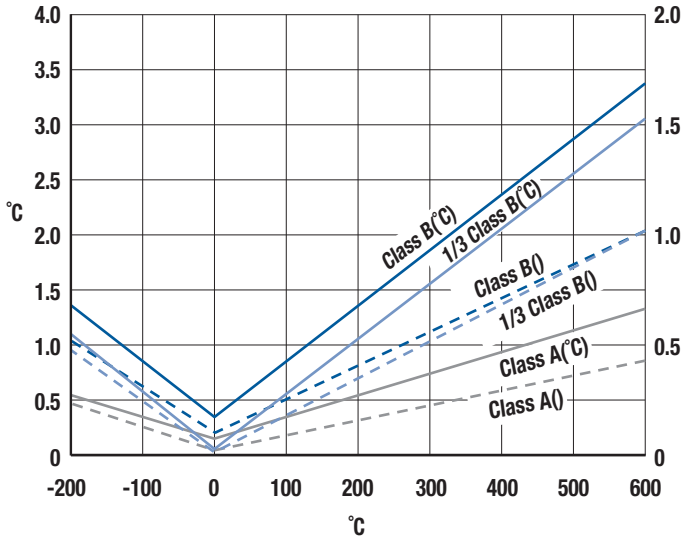
Notes: [1]C=±(.3+.005[t]) [2]C=±(.15+.002*[t])*

Tolerances for a 100Ω Platinum RTD per ASTM E1137-97

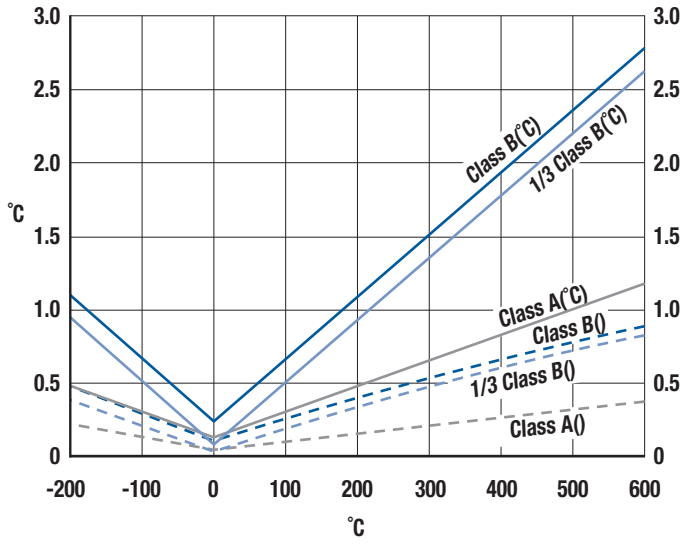
Temperature Degree (C)	Tolerance					
	Class B		1/3 Class B		Class A	
	(±C)[1]	(±Ohm)	(±C)	(±Ohm)	(±C)[2]	(±Ohm)
-200	1.1	0.47	0.92	0.38	0.47	0.20
-100	0.67	0.27	0.50	0.20	0.30	0.12
0	0.25	0.10	0.08	0.03	0.13	0.05
100	0.67	0.25	0.50	0.19	0.30	0.11
200	1.1	0.40	0.92	0.34	0.47	0.17
300	1.5	0.54	1.34	0.48	0.64	0.23
400	1.9	0.66	1.76	0.61	0.81	0.28
500	2.4	0.78	2.18	0.73	0.98	0.33
600	2.8	0.88	2.60	0.84	1.15	0.37

Notes: [1]C=±(.25+.0042[t]) [2]C=±(.13+.0017*[t])*

Tolerance Values as Function of Temperature for a 100Ω RTD per IEC 751 (1983)



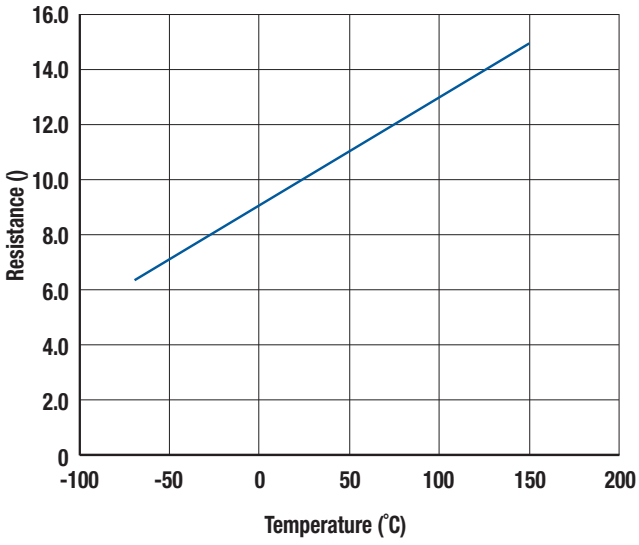
Tolerance Values as Function of Temperature for a 100Ω RTD per ASTM E1137



Temperature vs. Resistance – 10Ω Copper

Temperature (˚C)	Resistance (ohms)
-70	6.331
-60	6.722
-50	7.111
-40	7.499
-30	7.886
-20	8.272
-10	8.657
0	9.042
10	9.427
20	9.812
30	10.198
40	10.583
50	10.968
60	11.353
70	11.738
80	12.124
90	12.509
100	12.894
110	13.279
120	13.664
130	14.050
140	14.435
150	14.820

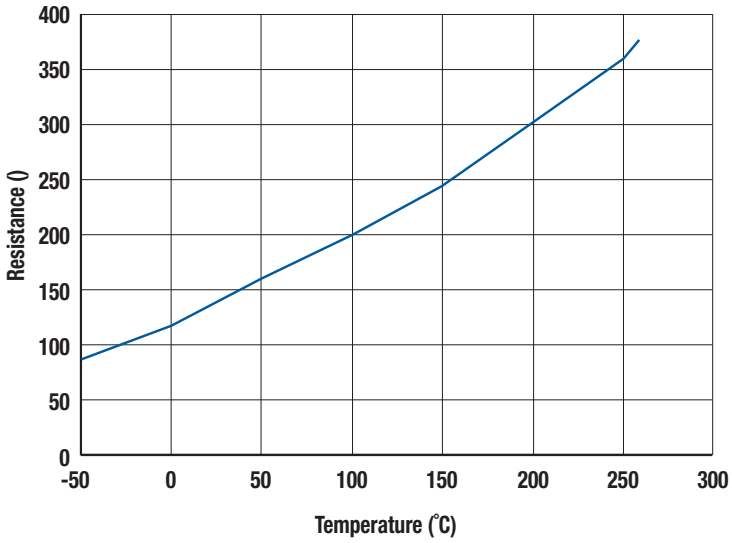
Temperature vs. Resistance – 10Ω Copper per SAMA RC21-4-1973



Temperature vs. Resistance – 120Ω Nickel

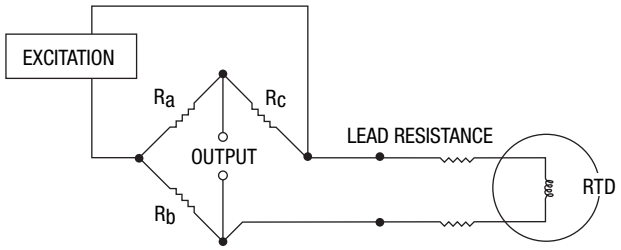
Temperature (˚C)	Resistance (ohms)	Temperature (˚C)	Resistance (ohms)
-50	86.16	110	209.85
-40	92.76	120	219.29
-30	99.41	130	228.95
-20	106.15	140	238.84
-10	113.00	150	248.95
0	120.00	160	259.30
10	127.17	170	269.89
20	134.52	180	280.77
30	142.06	190	291.95
40	149.80	200	303.45
50	157.75	210	315.31
60	165.90	220	327.54
70	174.27	230	340.14
80	182.85	240	353.14
90	191.64	250	366.53
100	200.64	260	380.31

Temperature vs. Resistance – 120Ω Nickel



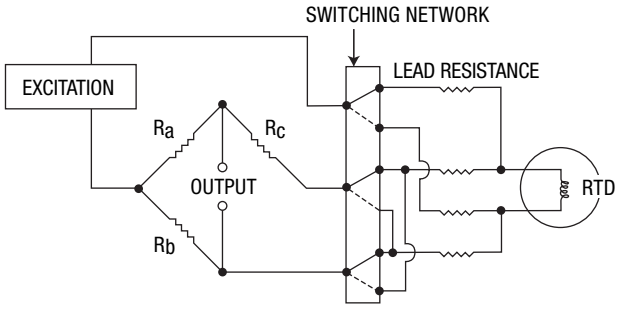
Bridge Network Connections

FIGURE A



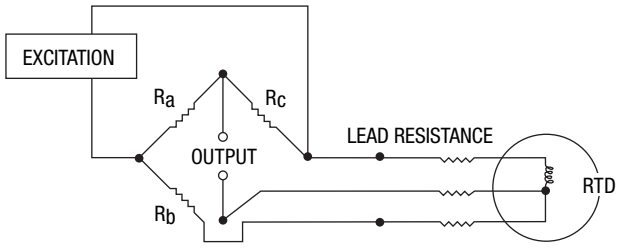
TWO WIRE RESISTANCE TEMPERATURE DEVICE

FIGURE C



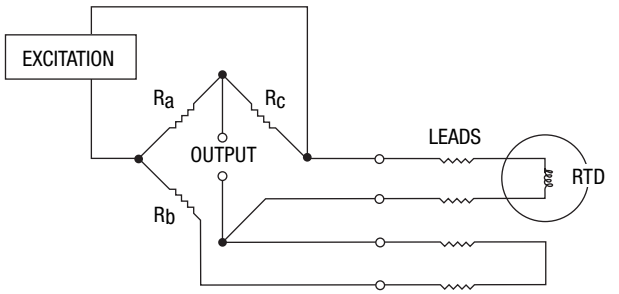
FOUR WIRE RESISTANCE TEMPERATURE DEVICE

FIGURE B



THREE WIRE RESISTANCE TEMPERATURE DEVICE

FIGURE D



FOUR WIRE RESISTANCE TEMPERATURE DEVICE

Thermocouple Wire Size and Resistance Table

AWG No	Diameter Inches	ISA Type K Chromel/ Alumel	ISA Type J Iron/ Constantan	ISA Type T Copper/ Constantan	ISA Type E Chromel/ Constantan	ISA Type N Nicrosil/ Nisil	ISA Type S PT-PT 10% RH	ISA Type R PT-PT 13%RH
8	0.1285	0.0365	0.2185	0.0186	0.0437	0.0485	0.011	0.011
12	0.0808	0.0916	0.0533	0.0455	0.1099	0.1225	0.028	0.029
14	0.0641	0.1466	0.085	0.0735	0.1752	0.1947	0.045	0.047
16	0.0508	0.2331	0.136	0.117	0.2775	0.3100	0.071	0.073
18	0.0403	0.3706	0.218	0.1874	0.4454	0.4926	0.116	0.119
20	0.0320	0.5894	0.349	0.2991	0.7030	0.7812	0.185	0.190
22	0.0253	0.9368	0.544	0.4751	1.1206	1.2498		
24	0.0201	1.4901	0.878	0.7526	1.78	1.980	0.464	0.478
26	0.0159	2.3811	1.405	1.204	2.836	3.164	0.740	0.760
28	0.0126	3.768	2.235	1.9159	4.512	5.039		
30	0.0100	5.984	3.551	3.0431	7.169	8.000	1.85	1.91

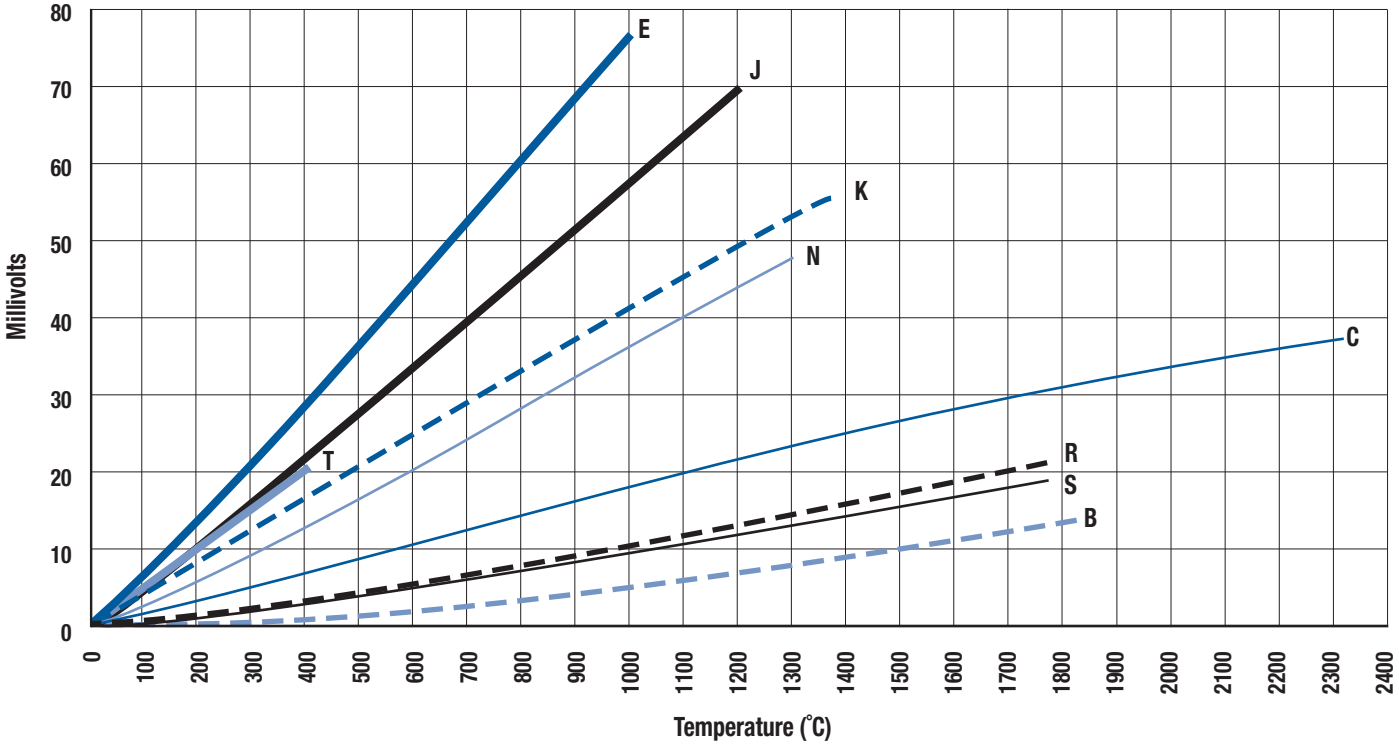
Resistance in Ohms per Double Foot at 68° F. For explanation of how to use this table, see Example:

EXAMPLE: What is the external resistance to my instrument if I use a 20 gauge Chromel/Alumel thermocouple 3 feet long and 14 gauge Chromel/Alumel lead wire 20 feet in length?

ANSWER: 3 x .5894 = 1.7682 ohms
20 x .1466 = 2.932 ohms
Total 4.7002 ohms

NOTE: Type S and R utilize extension lead wire type Copper/Copper 11. Type B utilizes extension lead wire type Copper/Copper.

Thermocouple EMF Versus Temperature



Thermocouple Characteristics Table

			Color Coding			
ANSI/ASTM	Symbol Single	Generic Names	Individual Conductor	Overall Jacket Extension Grade Wire	Magnetic Yes/No	Environment (Bare Wire)
T	TP TN	Copper Constantan, Nominal Composition: 55% Cu, 45% Ni	Blue Red	Blue	X X	Mild Oxidizing, Reducing. Vacuum or Inert. Good where moisture is present.
J	JP JN	Iron Constantan, Nominal Composition: 55% Cu, 45% Ni	White Red	Black	X X	Reducing Vacuum, Inert. Limited use in oxidizing at High Temperatures. Not recommended for low temps.
E	EP EN	Chromel®, Nominal Composition: 90% Ni, 10% Cr Constantan, Nominal Composition: 55% Cu, 45% Ni	Purple Red	Purple	X X	Oxidizing or Inert. Limited use in Vacuum or Reducing.
K	KP KN	Chromel, Nominal Composition: 90% Ni, 10% Cr Alumel®, Nominal Composition: 95% Ni, 2% Mn, 2% Al	Yellow Red	Yellow	X X	Clean Oxidizing and Inert. Limited use in Vacuum or Reducing.
N	NP NN	Nicrosil, Nominal Compositions: 84.6% Ni, 14.2% Cr, 1.4% Si Nisil, Nominal Composition: 95.5% Ni, 4.4% Si, 1% Mg	Orange Red	Orange	X X	Clean Oxidizing and Inert. Limited use in Vacuum or Reducing.
S	SP SN	Platinum 10% Rhodium Pure Platinum	Black Red	Green	X X	Oxidizing or Inert Atmospheres. Do not insert in metal tubes. Beware of contamination.
R	RP RN	Platinum 13% Rhodium Pure Platinum	Black Red	Green	X X	Oxidizing or Inert Atmospheres. Do not insert in metal tubes. Beware of contamination.
B	BP BN	Platinum 30% Rhodium Platinum 6% Rhodium	Gray Red	Gray	X X	Oxidizing or Inert Atmospheres. Do not insert in metal tubes. Beware of contamination.
C*	P N	Tungsten 5% Rhenium Tungsten 26% Rhenium	Green Red	Red	X X	Vacuum, Inert, Hydrogen Atmospheres. Beware of Embrittlement.

Thermocouple Extension Wire Characteristics				
T	TP (+) TN (-)	Copper Constantan	Blue Red	Brown
J	JP (+) JN (-)	Iron Constantan	White Red	Brown
E	EP (+) EN (-)	Chromel® Constantan	Purple Red	Brown
K	KP (+) KN (-)	Chromel® Alumel®	Yellow Red	Brown
N	NP (+) NN (-)	Nicrosil Nisil	Orange Red	Brown

**Type C was previously designated as W5.*

Tolerance of Thermocouples

	°C			°F		
ANSI/ASTM	**Temperature Range**	**Standard**	**Special**	**Temperature Range**	**Standard**	**Special**
T	-200° to -67° -67° to -62° -62° to 125° 125° to 133° 133° to 370°	± 1.5% T ± 1° ± 1° ± 1° ± 0.75% T	± 0.8% T* ± 0.8% T* ± 0.5° ± 0.4% T ± 0.4% T	-328° to -88° -88° to -80° -80° to 257° 257° to 272° 272° to 700°	± 1.5% (T-32) ± 1.8° ± 1.8° ± 1.8° ± 0.75% (T-32)	± 0.8% (T-32)* ± 0.8% (T-32)* ± 0.9° * ± 0.4% (T-32) ± 0.4% (T-32)
J	0° to 275° 275° to 293° 293° to 760°	± 2.2° ± 2.2° ± 0.75% T	± 1.1° ± 0.4% T ± 0.4% T	32° to 527° 527° to 560° 560° to 1400°	± 3.96° ± 3.96° ± 0.75% (T-32)	± 1.98° ± 0.4% (T-32) ± 0.4% (T-32)
E	-200° to -170° -170° to 250° 250° to 340° 340° to 870°	± 1% T ± 1.7° ± 1.7° ± 0.5% T	± 1°* ± 1°* ± 0.4% T ± 0.4% T	-328° to -274° -274° to 482° 482° to 644° 644° to 1600°	± 1% (T-32) ± 3.06° ± 3.06° ± 0.5% (T-32)	± 1.8°* ± 1.8°* ± 0.4% (T-32) ± 0.4% (T-32)
K	-200° to -110° -110° to 0° 0° to 275° 275° to 293° 293° to 1260°	± 2% T ± 2.2° ± 2.2° ± 2.2° ± 0.75% T	— — ± 1.1° ± 0.4% T ± 0.4% T	-328° to -166° -166° to 32° 32° to 527° 527° to 560° 560° to 2300°	± 2% (T-32) ± 3.96° ± 3.96° ± 3.96° ± 0.75% (T-32)	— — ± 1.98° ± 0.4% (T-32) ± 0.4% (T-32)
N	0° to 275° 275° to 293° 293° to 1250°	± 2.2° ± 2.2° ± 0.75% T	± 1.1° ± 0.4% T ± 0.4% T	32° to 527° 527° to 560° 560° to 2300°	± 3.96° ± 3.96° ± 0.75% (T-32)	± 1.98° ± 0.4% (T-32) ± 0.4% (T-32)
R or S	0° to 600° 600° to 1480°	± 1.5° ± 0.25% T	± 0.6° ± 0.1% T	32° to 1112° 1112° to 2700°	± 2.7° ± 0.25% (T-32)	± 1.08° ± 0.1% (T-32)
B	870° to 1700°	± 0.5% T	± 0.25%T	1600° to 3100°	± 0.5% (T-32)	± 0.25% (T-32)
C*	0° to 426° 426° to 2315°	± 4.4° ± 1% T	— —	32° to 800° 800° to 4200°	± 8° ± 1% (T-32)	— —
Tolerances of Thermocouple Extension Wire						
TX	-60 to 100	± 1.0	± 0.5	-75 to 200	± 1.8	± 0.9
JX	0 to 200	± 2.2	± 1.1	32 to 400	± 4.0	± 2.0
EX	0 to 200	± 1.7	± 1.0	32 to 400	± 3.0	± 1.8
KX	0 to 200	± 2.2	± 1.1	32 to 400	± 4.0	± 2.0
NX	0 to 200	± 2.2	± 1.1	32 to 400	± 4.0	± 2.0
SX	0 to 200	± 5.0	†	32 to 400	± 9.0	†
RX	0 to 200	± 5.0	†	32 to 400	± 9.0	†
BX[1]	0 to 200	± 4.2	†	32 to 400	± 7.6	†
B[2]	0 to 100	± 3.7	†	32 to 400	± 6.7	†
C	0 to 200	± 0.110 mV	†	32 to 400	± 0.110 mV	†

† Special tolerance grade compensating extension wires are not available.

[1] Proprietary alloy compensating extension wire is available for use over a wide temperature range.

[2] Special compensating extension wires are not necessary with Type B over the limited temperature range 0 to 50° C (32 to 125° F), where the use of non-compensated (copper/copper) conductors introduces no significant error. For a somewhat larger temperature gradient of 0 to 100° C (32 to 210° F) across the extension portion of the circuit, the use of non-compensated (copper/copper) extension wires may result in small errors, the magnitude of which will not exceed the tolerance values given in the table above for measurements above 100° C (1800° F).

**Special tolerances below 0° C (32° F) are unofficial and are provided as a basis of discussion between Conax and our customers.*

Type C was previously designated as W5.

Temperature Conversion Chart

Enter the table in the center column of bold face type marked "Temp" with the temperature either Celsius or Fahrenheit that you wish to convert into the other scale. If converting from Fahrenheit to Celsius, the equivalent temperature will be found in the column to the left, and if converting from Celsius to Fahrenheit, the equivalent temperature will be found in the column to the right.

Celsius=5/9(°F-32) Fahrenheit=9/5(°C)+32 Kelvin=°C+273.15 Rankine=°F+459.67

°C	Temp	°F	°C	Temp	°F	°C	Temp	°F
-17.8	0	32.0	7.8	46	114.8	33.3	92	197.6
-17.2	1	33.8	8.3	47	116.6	33.9	93	199.4
-16.7	2	35.6	8.9	48	118.4	34.4	94	201.2
-16.1	3	37.4	9.4	49	120.2	35.0	95	203.0
-15.6	4	39.2	10.0	50	122.0	35.6	96	204.8
-15.0	5	41.0	10.6	51	123.8	36.1	97	206.6
-14.4	6	42.8	11.1	52	125.6	36.7	98	208.4
-13.9	7	44.6	11.7	53	127.4	37.2	99	210.2
-13.3	8	46.4	12.2	54	129.2	37.8	100	212.0
-12.8	9	48.2	12.8	55	131.0	43.3	110	230.0
-12.2	10	50.0	13.3	56	132.8	48.9	120	248.0
-11.7	11	51.8	13.9	57	134.6	54.4	130	266.0
-11.1	12	53.6	14.4	58	136.4	60.0	140	284.0
-10.6	13	55.4	15.0	59	138.2	65.6	150	302.0
-10.0	14	57.2	15.6	60	140.0	71.1	160	320.0
-9.4	15	59.0	16.1	61	141.8	76.7	170	338.0
-8.9	16	60.8	16.7	62	143.6	82.2	180	356.0
-8.3	17	62.6	17.2	63	145.4	87.8	190	374.0
-7.8	18	64.4	17.8	64	147.2	93.3	200	392.0
-7.2	19	66.2	18.3	65	149.0	98.9	210	410.0
-6.7	20	68.0	18.9	66	150.8	100.0	212	413.6
-6.1	21	69.8	19.4	67	152.6	104.4	220	428.0
-5.6	22	71.6	20.0	68	154.4	110.0	230	446.0
-5.0	23	73.4	20.6	69	156.2	115.6	240	464.0
-4.4	24	75.2	21.1	70	158.0	121.1	250	482.0
-3.9	25	77.0	21.7	71	159.8	126.7	260	500.0
-3.3	26	78.8	22.2	72	161.6	132.2	270	518.0
-2.8	27	80.6	22.8	73	163.4	137.8	280	536.0
-2.2	28	82.4	23.3	74	165.2	143.3	290	554.0
-1.7	29	84.2	23.9	75	167.0	148.9	300	572.0
-1.1	30	86.0	24.4	76	168.8	154.4	310	590.0
-0.6	31	87.8	25.0	77	170.6	160.0	320	608.0
0.0	32	89.6	25.6	78	172.4	165.6	330	626.0
0.6	33	91.4	26.1	79	174.2	171.1	340	644.0
1.1	34	93.2	26.7	80	176.0	176.7	350	662.0
1.7	35	95.0	27.2	81	177.8	182.2	360	680.0
2.2	36	96.8	27.8	82	179.6	187.8	370	698.0
2.8	37	98.6	28.3	83	181.4	193.3	380	716.0
3.3	38	100.4	28.9	84	183.2	198.9	390	734.0
3.9	39	102.2	29.4	85	185.0	204.4	400	752.0
4.4	40	104.0	30.0	86	186.8	210.0	410	770.0
5.0	41	105.8	30.6	87	188.6	215.6	420	788.0
5.6	42	107.6	31.1	88	190.4	221.1	430	806.0
6.1	43	109.4	31.7	89	192.2	226.7	440	824.0
6.7	44	111.2	32.2	90	194.0	232.2	450	842.0
7.2	45	113.0	32.8	91	195.8	237.8	460	860.0

°C	Temp	°F	°C	Temp	°F	°C	Temp	°F
243.3	470	878.0	498.9	930	1706.0	971.1	1780	3236.0
248.9	480	896.0	504.4	940	1724.0	982.2	1800	3272.0
254.4	490	914.0	510.0	950	1742.0	993.3	1820	3308.0
260.0	500	932.0	515.6	960	1760.0	1004.4	1840	3344.0
265.6	510	950.0	521.1	970	1778.0	1015.6	1860	3380.0
271.1	520	968.0	526.7	980	1796.0	1026.7	1880	3416.0
276.7	530	986.0	532.2	990	1814.0	1037.8	1900	3452.0
282.2	540	1004.0	537.8	1000	1832.0	1048.9	1920	3488.0
287.8	550	1022.0	548.9	1020	1868.0	1060.0	1940	3524.0
293.3	560	1040.0	560.0	1040	1904.0	1071.1	1960	3560.0
298.9	570	1058.0	571.1	1060	1940.0	1082.2	1980	3596.0
304.4	580	1076.0	582.2	1080	1976.0	1093.3	2000	3632.0
310.0	590	1094.0	593.3	1100	2012.0	1098.9	2010	3650.0
315.6	600	1112.0	604.4	1120	2048.0	1104.4	2020	3668.0
321.1	610	1130.0	615.6	1140	2084.0	1110.0	2030	3686.0
326.7	620	1148.0	626.7	1160	2120.0	1115.6	2040	3704.0
332.2	630	1166.0	637.8	1180	2156.0	1121.1	2050	3722.0
337.8	640	1184.0	648.9	1200	2192.0	1126.7	2060	3740.0
343.3	650	1202.0	660.0	1220	2228.0	1132.2	2070	3758.0
348.9	660	1220.0	671.1	1240	2264.0	1137.8	2080	3776.0
354.4	670	1238.0	682.2	1260	2300.0	1143.3	2090	3794.0
360.0	680	1256.0	693.3	1280	2336.0	1148.9	2100	3812.0
365.6	690	1274.0	704.4	1300	2372.0	1154.4	2110	3830.0
371.1	700	1292.0	715.6	1320	2408.0	1160.0	2120	3848.0
376.7	710	1310.0	726.7	1340	2444.0	1165.6	2130	3866.0
382.2	720	1328.0	737.8	1360	2480.0	1171.1	2140	3884.0
387.8	730	1346.0	748.9	1380	2516.0	1176.7	2150	3902.0
393.3	740	1364.0	760.0	1400	2552.0	1182.2	2160	3920.0
398.9	750	1382.0	771.1	1420	2588.0	1187.8	2170	3938.0
404.4	760	1400.0	782.2	1440	2624.0	1193.3	2180	3956.0
410.0	770	1418.0	793.3	1460	2660.0	1198.9	2190	3974.0
415.6	780	1436.0	804.4	1480	2696.0	1204.4	2200	3992.0
421.1	790	1454.0	815.6	1500	2732.0	1210.0	2210	4010.0
426.7	800	1472.0	826.7	1520	2768.0	1215.6	2220	4028.0
432.2	810	1490.0	837.8	1540	2804.0	1221.1	2230	4046.0
437.8	820	1508.0	848.9	1560	2840.0	1226.7	2240	4064.0
443.3	830	1526.0	860.0	1580	2876.0	1232.2	2250	4082.0
448.9	840	1544.0	871.1	1600	2912.0	1237.8	2260	4100.0
454.4	850	1562.0	882.2	1620	2948.0	1243.3	2270	4118.0
460.0	860	1580.0	893.3	1640	2984.0	1248.9	2280	4136.0
465.6	870	1598.0	904.4	1660	3020.0	1254.4	2290	4154.0
471.1	880	1616.0	915.6	1680	3056.0	1260.0	2300	4172.0
476.7	890	1634.0	926.7	1700	3092.0	1265.6	2310	4190.0
482.2	900	1652.0	937.8	1720	3128.0	1271.1	2320	4208.0
487.8	910	1670.0	948.9	1740	3164.0			
493.3	920	1688.0	960.0	1760	3200.0			

Common Thermometry Fixed Points

Fixed Points from the Practical International Temperature Scale ITS-90

	°C	°F
Triple Point of Hydrogen	-259.35	-434.82
Boiling Point of Hydrogen	-256.15	-429.07
Triple Point of Neon	-248.59	-415.47
Triple Point of Oxygen	-218.79	-361.82
Triple Point of Argon	-189.34	-308.81
Triple Point of Mercury	-38.83	-37.90
Triple Point of Water	0.01	32.02
Melting Point of Gallium	29.76	85.57
Freezing Point of Indium	156.59	313.86
Freezing Point of Tin	231.93	449.47
Freezing Point of Zinc	419.53	787.15
Freezing Point of Aluminum	660.32	1220.58
Freezing Point of Silver	961.78	1763.20
Freezing Point of Gold	1064.18	1947.52
Freezing Point of Copper	1084.62	1984.32

NEMA Standard Definitions

TYPE 4

Type 4 enclosures are intended for indoor or outdoor use primarily to provide a degree of protection against windblown dust and rain, splashing water, hose-directed water and external ice formation.

TYPE 4X

Type 4X enclosures are intended for indoor or outdoor use primarily to provide a degree of protection against corrosion, windblown dust and rain, splashing water, hose-directed water, and external ice formation.

TYPE 7

Type 7 enclosures are intended for use indoors in locations classified as Class I, Groups A, B, C, or D as defined in the National Electrical Code.

American Wire Gauge Size To Inches

American Wire Gauge (AWG)	Size O.D Inches
6/0	0.5800
5/0	0.5165
4/0	0.4600
3/0	0.4096
2/0	0.3648
1/0	0.3249
1	0.2893
2	0.2576
3	0.2294
4	0.2043
5	0.1819
6	0.1620
7	0.1443
8	0.1285
9	0.1144
10	0.1019
11	0.0907
12	0.0808
13	0.0720
14	0.0641
15	0.0571
16	0.0508
17	0.0453
18	0.0403
19	0.0359
20	0.0320
21	0.0285
22	0.0253

American Wire Gauge (AWG)	Size O.D Inches
23	0.0226
24	0.0201
25	0.0179
26	0.0159
27	0.0142
28	0.0126
29	0.0113
30	0.0100
31	0.00893
32	0.00795
33	0.00708
34	0.00630
35	0.00561
36	0.00500
37	0.00445
38	0.00396
39	0.00353
40	0.00314
41	0.00280
42	0.00249
43	0.00222
44	0.00198
45	0.00176
46	0.00157
47	0.00140
48	0.00124
49	0.00111
50	0.00099

Factors and Prefixes for Forming Decimal Multiples and Sub-Multiples for the SI Units

Factor	Prefix	Symbol	Factor	Prefix	Symbol	Factor	Prefix	Symbol
10^{12}	tera	T	10	deka	da	10^{-9}	nano	n
10^{9}	giga	G	10^{-1}	deci	d	10^{-12}	pico	p
10^{6}	mega	M	10^{-2}	centi	c	10^{-15}	femto	f
10^{3}	kilo	k	10^{-3}	milli	m	10^{-18}	atto	a
10^{2}	hecto	h	10^{-6}	micro	m			

Corrosive Service Guide to Materials

Chemical	Condition	Material
Acetic Acid	to 50% to 212˚ F to 75% to 300˚ F to 99% to 250˚ F	316 Stainless Steel Titanium Hastelloy C
Acetic Anhydride	All conc. to B.P.	Monel 400
Acetone	All conc. to B.P.	304 SS, Aluminum
Acetylene		304 SS, Aluminum
Alcohol, Ethyl	70˚ F – 212˚ F	304 Stainless Steel
Aluminum Sulphate	to 25% and 212˚ F to 50% and 212˚ F	304 Stainless Steel 316 Stainless Steel
Ammonia gas or liquid	All concentrations	304 Stainless Steel
Ammonium Hydroxide		1100-1114 Aluminum
Ammonium Phosphate	to 25% and 212˚ F	304 Stainless Steel
Ammonium Nitrate	All conc. to 212˚ F	316 Stainless Steel
Ammonium Sulphate	All conc. to B.P. to 45% and 212˚ F	316 Stainless Steel Monel 400
Amylacetate		304 Stainless Steel
Aniline	All concentrations	
Barium Chloride	25% to B.P.	Hastelloy C
Barium Hydroxide	to 50% 212˚ F	C1018 Steel
Black Liquor		Alloy 556
Boracic Acid	All conc. to B.P.	Hastelloy C
Brines		Monel 400, Hastelloy C
Bromine Dry	to 212˚ F	Monel 400
Butane	to 250˚ F	316 Stainless Steel
Butylacetate	to 212˚ F	Monel 400
Butyl Alcohol		Copper, Aluminum
Calcium Chlorate	to 30% and 212˚ F	304 Stainless Steel
Calcium Hydroxide	to 50% and 212˚ F	Hastelloy C or Titanium
Carbonic Acid	All conc. to 300˚ F	316 Stainless Steel
Carbon Dioxide	to 1300˚ F	304 Stainless Steel
Chlorine Gas	Moist to 212˚ F	Hastelloy C or Titanium
Chromic Acid	10% at 150˚ F	Hastelloy C

Chemical	Condition	Material
Citric Acid	to 50% 212˚ F All conc. to B.P.	316 Stainless Steel Hastelloy C
Copper Nitrate	All conc. to 212˚ F	304 Stainless Steel
Copper Sulphate	All conc. to B.P.	316 Stainless Steel
Cyanogen Gas	to 212˚ F	304 Stainless Steel
Dowtherm		C1018 Steel
Ether		304 Stainless Steel
Ethyl Acetate	to 150˚ F	Monel 400
Ferric Chloride	to 50% & B.P.	Tantalum
Ferric Sulphate	to 30% & B.P.	Hastelloy C
Ferrous Sulphate	All conc. to B.C.	Hastelloy C
Formaldehyde	All conc. to 150˚ F	304 Stainless Steel
Formic Acid	All conc. to 212˚ F	304 Stainless Steel
Freon		316 Stainless Steel
Gallic Acid	to 212˚ F	Monel 400
Gasoline or Petroleum		304 Stainless Steel
Glucose	70˚ F	304 Stainless Steel
Glycerine		304 Stainless Steel
Glycerol		304 Stainless Steel
Hydrobromic Acid	40% to 65˚ F 48% to 212˚ F	Titanium Hastelloy B
Hydrochloric Acid	to 37% and 150˚ F	Hastelloy B
Hydrofluoric Acid	All conc. to B.P.	Hastelloy C
Hydrogen Peroxide	to 212˚ F	316 Stainless Steel
Hydrogen Sulphide	Dry to 1000˚ F	316 Stainless Steel
Iodine	to 70˚ F	Tantalum
Ketones	to B.P.	Aluminum, 316 SS
Kerosene		304 Stainless Steel
Lactic Acid	to 212˚ F	Tantalum
Magnesium Chloride	to 40% of 212˚ F	Monel 400
Magnesium Sulphate	to 50% 212˚ F	Monel 400

WARNING: *The corrosive service material selection information provided in this table is to be used only as a guide. Thermowell application environment variations may affect actual performance. Environment variations include process temperature, pressure, flow rate, concentration, purity and solids content. If you have questions relating to thermowell performance in a specific application, we recommend that you contact the factory.*

Corrosive Service Guide to Materials

Chemical	Condition	Material
Muriatic Acid	to 37% and 150˚ F	Hastelloy B
Naphtha	70˚ F	304 Stainless Steel
Natural Gas	to 800˚ F	304 Stainless Steel
Nickel Chloride	to 80% and 200˚ F	Hastelloy C
Nickel Sulphate	25% and 125˚ F	304 Stainless Steel
Nitric Acid	to 40% and 180˚ F All conc. to 370˚ F	304 Stainless Steel Tantalum
Nitrobenzene	to 212˚ F	Carpenter 20CB3
Oleic Acid	to 212˚ F	316 Stainless Steel
Oleum	to 70˚ F	316 Stainless Steel
Oxalic Acid	All conc. to 212˚ F	Monel 400
Oxygen	70˚ F Liquid Oxygen Elevated Temps.	C1018 Steel 304 Stainless Steel 304 Stainless Steel
Palmitic Acid	100% at 439˚ F	316 Stainless Steel
Pentane		304 Stainless Steel
Phenol	to 700˚ F	316 Stainless Steel
Phosphoric Acid	10% & 70˚ F to 90% and 215˚ F	316 Stainless Steel Hastelloy B
Picric Acid	to 212˚ F	316 Stainless Steel
Potassium Bromide	75% to 180˚ F	Hastelloy C
Potassium Carbonate	to 50% and 212˚ F All conc. to B.P.	304 Stainless Steel Hastelloy C
Potassium Chlorate	to 25% and 212˚ F	316 Stainless Steel
Potassium Hydroxide	to 50% and B.P.	316 Stainless Steel
Potassium Nitrate	to 80% and 212˚ F	304 Stainless Steel
Potassium Permanganate	to 50% and 75˚ F	Hastelloy C or Titanium
Potassium Sulphate	to 20% and 212˚ F	304 Stainless Steel
Pyrogallic Acid	All conc. to B.P.	304 Stainless Steel
Quinine Bisulphate	Dry	316 Stainless Steel
Quinine Sulphate	Dry	316 Stainless Steel
Sea Water		Monel 400

Chemical	Condition	Material
Salicylic Acid	to 250˚ F	Nickel
Sodium Bicarbonate	to 20% and 212˚ F	304 Stainless Steel
Sodium Carbonate	to 25% and 212˚ F	304 Stainless Steel
Sodium Chloride	Saturated to 212˚ F	316 Stainless Steel Alloy 556
Sodium Fluoride	10% - 70˚ F	Monel 400
Sodium Hydroxide		304 Stainless Steel
Sodium Nitrate	Fused	316 Stainless Steel
Sodium Peroxide		304 Stainless Steel
Sodium Sulphate	to 25% and 212˚ F	304 Stainless Steel
Sodium Sulphide	to 25% and 212˚ F	304 Stainless Steel
Sodium Sulphite	5% to 212˚ F	304 Stainless Steel
Sulphur Dioxide	to 800˚ F	316 Stainless Steel
Sulphur	to 850˚ F to 1600˚ F	316 Stainless Steel Alloy 556
Sulphuric Acid	1-60%, 75-100%, 176˚ F to 60% & B.P. All conc. to 370˚ F	Carpenter 20CB3 Hastelloy B Tantalum
Tannic Acid	to 212˚ F	304 Stainless Steel
Tartaric Acid	All conc. to 212˚ F	304 Stainless Steel
Toluene	to 250˚ F	304 Stainless Steel
Turpentine		304 Stainless Steel
Whiskey and Wine		316 Stainless Steel
Xylene		Copper
Zinc Chloride	to 25% and 130˚ F All conc. to B.P.	Carpenter 20CB3 Monel 400
Zinc Sulphate	to 25% to 212˚ F to 40% to B.P.	316 Stainless Steel Hastelloy C

Speed of Response

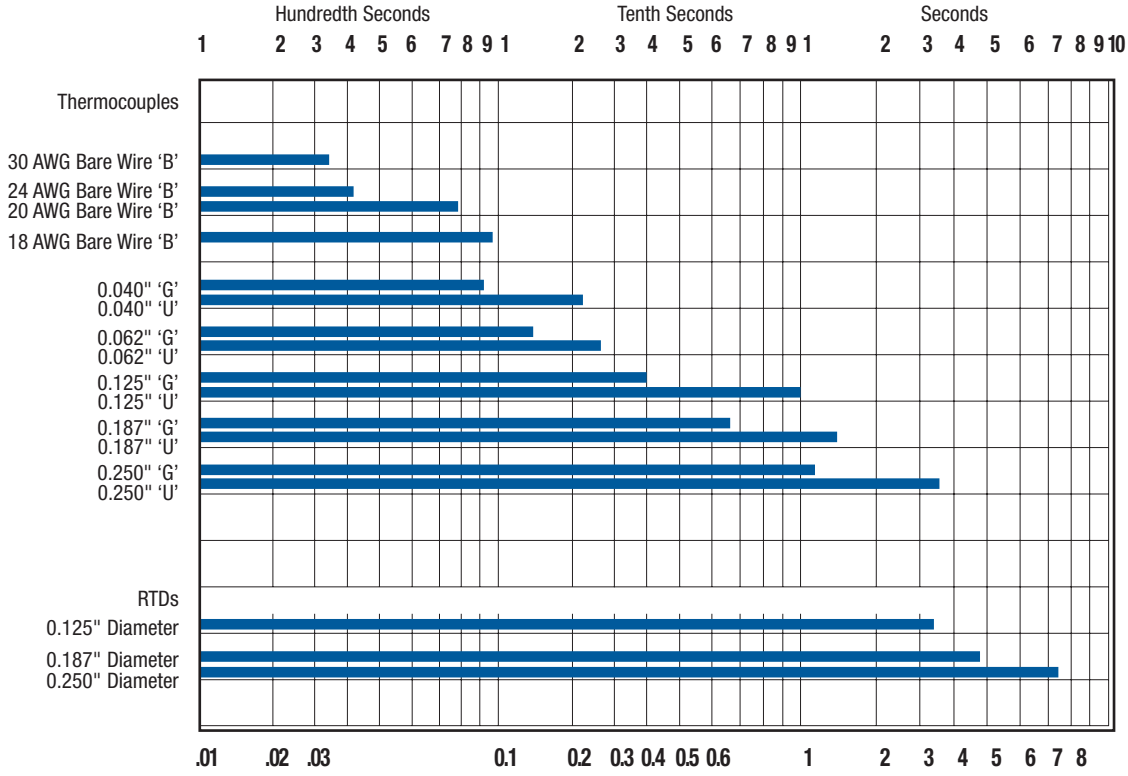
The purpose of the information on this page is to give you some general guidelines in estimating the speed of response you might expect from a thermocouple or an RTD.

In defining any transient condition such as a temperature change, it is important that a standard measuring point be established to provide a basis of comparison. In temperature transducers, the time constant is defined as the time required, in seconds, for the temperature sensor to respond through 63.2% of the total temperature change.

The factors affecting the response rate of a temperature probe in a fluid are:

a) the mass of the probe surrounding the active temperature sensitive point
b) the thermoconductivity of materials used in manufacturing the transducer
c) the mass and conductivity of the measured fluid
d) the velocity of the fluid over the probe

From the above, it is obvious that a probe of small diameter made of highly conductive materials will respond most rapidly to temperature change. Since thermocouple materials will have shorter conductive paths, a thermocouple probe will respond more rapidly than an RTD probe of equal diameter. This is verified by the bar charts:



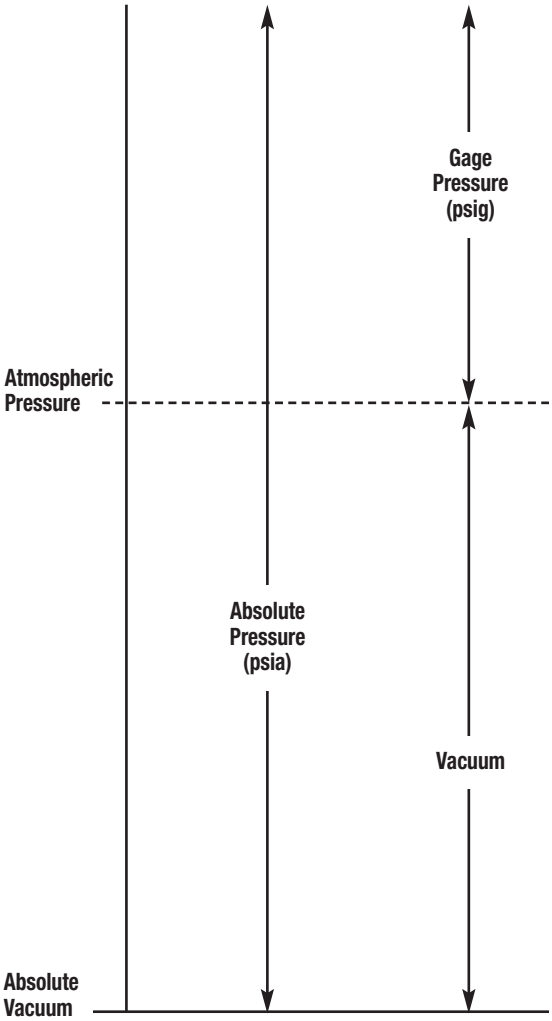
In determining time constants for the bar charts above, tests were performed in still water going through an instantaneous step change from 32˚ F to 212˚ F.

For guidelines for determining the time constant for specific probes under other conditions, multiply the time constant from the chart by the following factors:

Condition	Still Air	Air @ 10 ft/Sec.	Water @ 15 ft/Sec.
Factor	20X	4X	.25X

DIAMETER indicated in decimals refers to standard Conax Buffalo probe diameters. Letters G, U and B correspond with various styles of tip configurations.

Relative Magnitude of Pressure Differential



Vacuum Units of Measure

	Absolute Pressure			
	psia	Torr (mm Hg)	mtorr (micron)	Pa (N/m^2)
Atmospheric Pressure	14.696	760	760,000	101,292
Low Vacuum	↓	↓	↓	↓
Medium Vacuum	0.193 ↓	1 ↓	1,000 ↓	133.28 ↓
High Vacuum	$1.93x10^{-5}$ ↓	$1.00x10^{-3}$ ↓	1 ↓	0.133 ↓
Absolute Vacuum	0	0	0	0

NPT Pipe Thread Sizes

Pipe Size NPT	Pipe O.D.
1/8	0.405
1/4	0.540
3/8	0.675
1/2	0.840
3/4	1.050
1	1.315
1-1/4	1.660
1-1/2	1.900
2	2.375

Custom Design Sensor Form

Conax Buffalo can custom engineer special sensors, mountings and assemblies for virtually any application, with nearly limitless combinations of termination styles, mounting methods and sealing assemblies. Many of our original custom designs become industry standards. Our knowledgeable sales engineers welcome the opportunity to discuss your application and recommend solutions. Complete this form and fax a copy to 716-684-7433 or call 1-800-223-2389.

Name:

Company:

Phone: Fax:

E-mail: Date:

Explain your application/need or sketch your assembly:

The following information would also be helpful, but is not mandatory:

Probe Diameter: Probe Length:

Probe Material: Maximum Service Temperature:

Maximum Pressure: Mounting Method:

Termination Head Type:

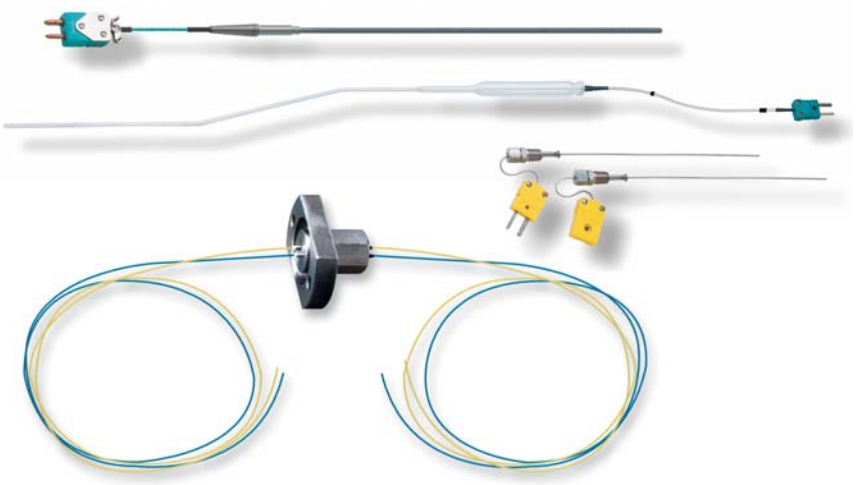
Environment in which the sensor will be used:

Conax Buffalo Technologies

For more information call: ***1-800-223-2389*** *• e-mail:* ***conaxbuf@conaxbuffalo.com*** *• visit our website:* ***www.conaxbuffalo.com***

Semiconductor Applications

Conax Buffalo meets the demanding needs of the semiconductor industry with a wide range of temperature sensors and sealing devices specifically designed for challenging process requirements and tight design constraints. Our products include thermocouples to monitor surface temperature during the manufacture of flat panel glass; multiple continuous-wire thermocouples and feedthroughs for Highly Accelerated Stress Test (HAST) chambers; fiber optic sealing devices for integrated circuit manufacturing; and a host of unique thermocouple assemblies for wafer manufacturing and calibration of epitaxial reactors. New custom designs are constantly expanding our support of this industry. For more information, request Bulletin 6003.



Power Applications

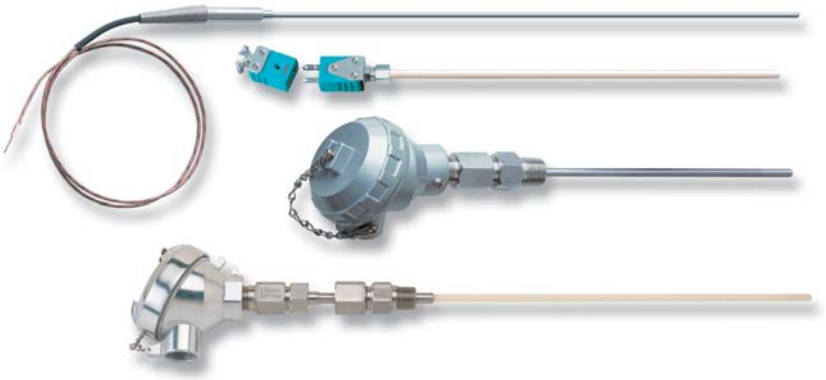
Conax Buffalo has been a key supplier to the power industry for many years. We have a long-standing relationship with GE, manufacturing both OEM and replacement parts, and also build replacement parts for most other major turbine manufacturers. In many cases, our retrofit products perform better than the original equipment. Conax temperature sensing and sealing products can be found in all areas of the power plant and include temperature sensors for both gas and steam turbine engines, thermocouples and thermowells for piping systems, miniature bearing sensors and seals, and skin or drum type sensors for heat recovery system generators (HRSG).

Conax Buffalo Technologies

Pharmaceutical Applications

A leading supplier to the pharmaceutical industry for more than 50 years, Conax Buffalo offers a variety of RTD and Type T thermocouple assemblies featuring plug-and-jack, FDA-compliant white plastic or stainless steel terminal heads, as well as environmental sealing devices. Our unique products include multiple connector feedthroughs for chamber profiling, steam autoclave sensors, sanitary flange thermowells, transmitters, wall-mount temperature sensors for process room monitoring, and specialized probes for sterilizers, freeze-dryers, lyophilization, cryogenics and other research/process equipment for the biomedical, food, drug, chemical and medical disciplines. For more information, request Bulletin 6014.

High Temperature Applications



Conax Buffalo designs high temperature thermocouple assemblies for durability and reliability in applications to 4200º F (2315º C). These applications generally involve oxidizing, reducing, inert gas or contamination atmospheres that challenge the life of the thermocouple. With more than 50 years experience in the design and manufacture of temperature sensing devices, Conax is uniquely positioned to assist you in the selection of appropriate materials and designs to maximize the life and reliability of thermocouples in these environments. For more information, request Bulletin 6008.

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