

October 2023

Temperature Assemblies

WORM & Solid Sheath Sensors



This guide to Moore Industries temperature assemblies is designed to acquaint you with the spectrum of our sensors, thermowells and accessories to help you select and configure the components you need for your unique application. Use this table of contents to find the pages that addresses the components that you need.

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Contact us at any time regarding your particular temperature assembly configuration – we'll be glad to help!

*Call Toll-free in US and Canada:
+1-800-999-2900 or +1-818-894-7111.*

*Email us at sales@miinet.com
or visit our [Ehelp page](https://www.miinet.com/contact-us-e-help)
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and complete the form.*



Temperature Assemblies WORM Sensors

Temperature Assemblies using the WORM Flexible Sensor



- The WORM includes all major types of sensors and accuracy classes.
- The foundation of the WORM design is a 2" capsule which eliminates ambient temperature errors because it is fully engulfed in the thermowell and the process temperature and the small capsule allows for much faster response times.
- Assemblies are available with a full family of our Temperature Transmitters – from simple to the most advanced.
- The key to temperature success is picking the right sensor for the application and designing the most suitable mechanics. Our application engineers are readily available to assist you.
- There is an infinite combination of materials and components so if you do not see what you are looking for contact us and we will put forth the right combination.

Note: The instructions on some of the following pages apply to retrofitting assemblies in the field. If you buy the completed assemblies all assembly is done at the factory.

All product names are registered trademarks of their respective companies.

Temperature Assemblies

WORM Sensors



General WORM Sensor Specifications

Lead Wires:

- (WS) Standard Temperature Insulation: Teflon insulated, hermetically sealed for measurements up to 232°C (450°F).
- (WH) High Temperature Insulation: Braided fiberglass for measurements ranging from 232°C (450°F) up to 427°C (800°F).
- For Inconel (INC) capsules, the insulation is a special fiberglass which withstands temperatures up to 1,093°C (2,000°F).
- Wire Size: Wire gauges range from 20 to 28 depending on the element type.

Accuracy: Pt RTDs are provided as Class B as standard; Class A with Option -.06 and Class AA with Option -.04

WORM Temperature Ranges

Stability: PT RTD: 0.2°C after 10,000 hrs. at maximum temperature (1 year, 51 days, 16 hrs. continuous)

Response Time (typical to reach a 63.2% temperature change):

RTD: <5 seconds; Grounded Thermocouples 2.0 sec.

Ungrounded Thermocouples: 4.5 sec.

Vibration Options:

-10G: provides partial protection for sensors that are exposed to higher than normal vibration levels

-30G: sensor is encapsulated in a waterproof epoxy to endure extreme vibration levels and full water immersion

Spring: 302 stainless steel

Table 1. WORM Temperature Ranges

Type		α	Temperature Range ₁	Accuracy ₂
RTDs	Platinum	0.00385	0 - 800°F (-18 - 427°C)	±0.12% at 0°C
	Nickel 120Ω	0.00672	0 - 400°F (-18 - 204°C)	
	Copper 10Ω	0.00427	0 - 400°F (-18 - 204°C)	
Wire Wound (-WW) RTD	Platinum	0.00385	For temperatures below -10°F (-23°C)	±0.12% at 0°C
	Nickel 120Ω	0.00672	-100 - 400°F (-73 - 204°C)	
	Copper 10Ω	0.00427	-50 - 400°F (-45 - 204°C)	
Thermocouple	J		-200 - 1400°F (-129 - 760°C)	2.2°C or .75% of reading, whichever is greater
	K		-200 - 2000°F (-129 - 1093°C)	2.2°C or .75% of reading, whichever is greater
	T		-200 - 750°F (-129 - 399°C)	1.0°C or .75% of reading, whichever is greater
	E		-200 - 1400°F (-129 - 760°C)	1.7°C or .5% of reading, whichever is greater

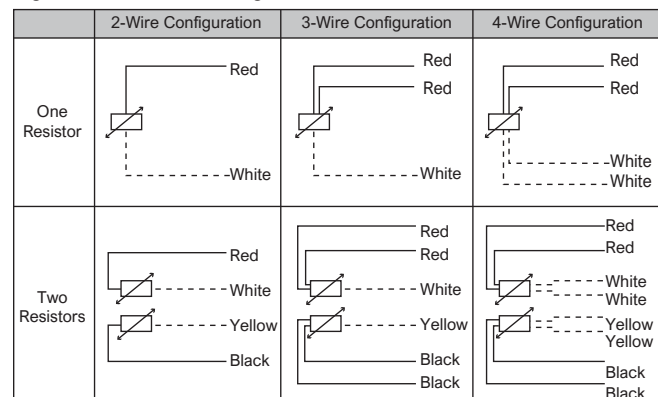
1 – Many temperature limits are controlled by the temperature limits of the wire insulation.

2 – See Options -.06 and -.04 for upgrade to Class A and Class AA Platinum RTDs.

Table 2. Thermocouple Identification

Type	Wire Color	
	+	-
J	White	Red
K	Yellow	Red
E	Purple	Red
T	Blue	Red

Figure 1. Dual RTD Configuration





Temperature Assemblies WORM Sensors

Temperature Transmitter Specifications

THZ³, TDZ³ and STZ Smart HART[®] Temperature Transmitters are advanced transmitters offering dual inputs, high resolution, accuracy and stability, math, advanced diagnostics and alarming.

Additionally the STZ Functional Safety Temperature Transmitter is designed and built from the ground up in accordance with IEC 61508 requirements. It is exida approved and certified SIL 3 capable for use in a Safety Instrumented System.

Configuration is accomplished using any HART[®] tools or PACTware. The HART[®] DDs and PACTware DTMs are easily available from our web site.

For field temperature assemblies the THZ³ and STZ are offered as a blind transmitters using the LH series connection head while the TDZ³ and STZ are offered with displays and use the BH series enclosure.

THZ³, TDZ³ and STZ Specifications are found in detail in their respective data sheets on-line. A few specs relating to temperature assemblies are offered here:

Enclosures: LH2 and BH series are Type 4X & IP66 and Explosion-proof.

Output: 4-20mA HART[®]

Power: 12-42Vdc (loop-powered)

Isolation: 500Vrms input to output continuous.

RFI/EMI Protection: 20 V/m @ 80-1000 MHz, 1kHz AM for TDZ3 and STZ [HP] and 10 V/m @ 80-1000 MHz, 1kHz AM for THZ3 and STZ HPP when tested according to IEC61000-4-3

Operating and Storage Range: -40°C to +85°C (-40°F to +185°F)

TRY, TDY & TRX PC-Configurable Temperature

Transmitters are our workhorses for those not needing HART[®]. The TRY and TDY are isolated so they can be used universally for any sensor. The TRY is blind using the LH head and the TDY is with a display using the BH enclosure. The TRX is not isolated so it is best reserved for RTDs or where your grounded thermocouples will not pick up elevated voltages. The TRX is blind and uses the LH size enclosure.

In one minute from one software window, you can configure our TRY, TDY and TRX 2-wire (loop-powered) transmitters to handle nearly every temperature application in your plant. The Intelligent PC Configuration Software that you need for set up is supplied FREE with your order.

TRY, TDY & TRX Specifications are found in detail in their respective data sheets on-line. A few specs relating to temperature assemblies are offered here:

Enclosures: LH2 and BH series are Type 4X & IP66 and Explosion-proof

Output: 4-20mA

Power: TRY: 10-42Vdc (loop-powered)

TDY: 10-42Vdc (loop-powered)

TRX: 8-42Vdc (loop-powered)

Isolation: TRY: 1500Vrms input to output to case

TDY: 500Vrms input to output to case

RFI/EMI Protection: 20V/m @20-1000MHz

Operating and Storage Range: -40°C to +85°C

(-40°F to +185°F)

The T2X has reduced functionality, however it has excellent performance in executing its intended function. It was designed to be a RTD only transmitter and does not measure thermocouples at all. It uses the same LH head as the other Blind transmitters and has full suite of certifications.

Transmitter Certifications



Approvals for Hazardous 'Classified' Areas including Explosion-Proof/Flameproof, Intrinsically-Safe, Non-Incendive Type "n" and Functional Safety IEC 61508 are available. Consult the individual temperature transmitter data sheets for specific information for each certifying agency.

NOTE: Certifications apply to the temperature transmitter and connection head combination. Sensor and sensor assembly components are not included in the certifications.

Temperature Assemblies

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Table 3. Sensor Conformance Ranges

Sensor Type ¹	Conformance Range
Pt 3850 (100 ohm)	-200 to +850°C -328 to +1562°F
Cu 427 (9.035 ohm)	-50 to +250°C -58 to +482°F
Ni 672 (120 ohm)	-80 to +320°C -112 to +608°F
Type J	-180 to +760°C -292 to 1400°F
Type K	-150 to 1370°C -238 to 2498°F
Type T	-170 to 400°C -274 to 752°F
Type E	-170 to 1000°C -274 to 1832°F

1 – Not all sensor types shown.

-RM Remote Mount Option

Remote mounts the transmitter by providing a connection head and terminal block on the sensor. Place the indicating temperature transmitter where it is convenient to operations (See Figure 3). Position your sensor in the heart of your process while keeping your transmitter in an easily accessible area with our Remote Mount (-RM) option. Add the **-RM** option to your temperature assembly

Figure 2. T2X HPP Transmitter (Electronics Only, No Housing)

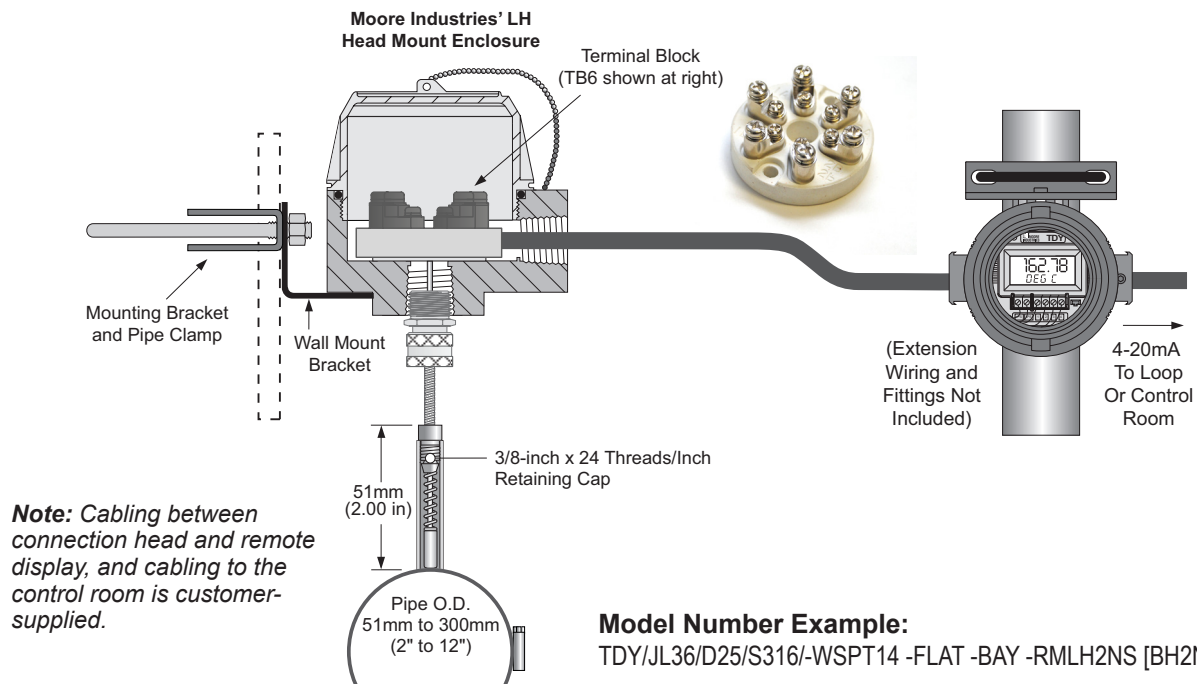


Model # and receive two housings: a transmitter in the specified connection head, and a terminal block enclosed in an additional, **-RM**, connection head with your selected sensor and fittings attached. Sensor extension wiring (not included) connects the terminal block to the transmitter.

Model Number Example:

TDY / JLFC / D25 / S316 / -WSPT14 -EXP -RMLH2NS [BH2NGP]

Figure 3. BAYONET option with remote mount connection head assembly.





Ambient Air Measurements

As simple as measuring the temperature of ambient air may be, it is sometimes hard to find ways to mechanically protect the sensor. All of the examples below use the WORM sensor and provide all the protection you can use.

Figure 4. Ambient Air Measurement Options



-PTB-P2C
Protection Tube



-NPL-WN
WORM Nose



-EXP Exposed
Well

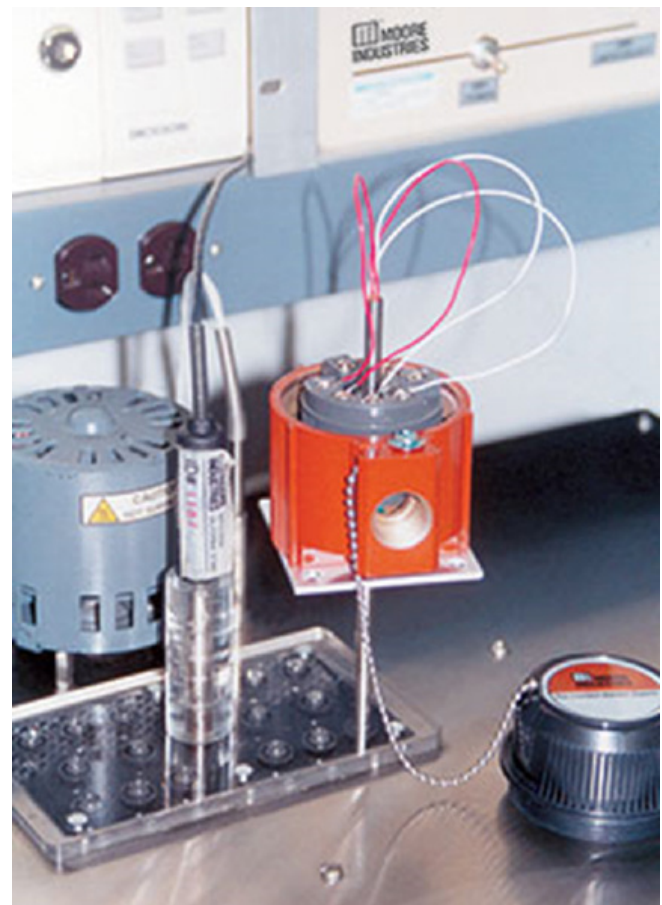
Factory Calibration Services

We offer precise factory calibration for a nominal charge. Our calibration service includes configuring microprocessor-based instruments and calibrating analog instruments with the customer's zero and span values. We deliver your unit ready-to-install with a NIST traceable calibration report for your files.

Sensor-to-Transmitter Trimming

For temperature measurement applications where exceptional accuracy is demanded, we recommend our Sensor-to-Transmitter Trimming factory calibration. Performed in our state-of-the-art Calibration Suite, this service ensures exceptional accuracy by immersing the system's sensor in a precision calibration bath, then using the transmitter to "capture" the sensor's true readings in the corresponding transmitter. This method effectively compensates for errors caused by inherent sensor inaccuracies. We perform this high accuracy service only on Class A, or better, Platinum RTDs. The system is delivered configured, calibrated, and ready for installation. NIST traceable test report is supplied with each system. To request this service, just specify option -VTB in the model number of your order.

Figure 5. Precise Calibration of a Microprocessor-based Field Transmitter



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NIST Traceable Test Report

When you choose this option, we will configure your temperature transmitter or calibrate analog instruments to your supplied zero and span values using a precision simulated sensor input. NIST traceable test report indicating actual recorded values is supplied with each instrument. To request this service, just specify option **-VTD** in the model number of your order.

Sensor Comparison Data

It is often helpful to compare any sensor to a known standard as a measure of its accuracy. We place the subject sensor in our baths with our Primary Temperature Standard and document the readings from both. The temperatures used for the comparison is provided by the customer. Specify option **-CTD3** for a 3-point comparison or option **-CTD5** for a 5-point comparison. NIST traceable test report is supplied with each system.

Figure 6. Temperature Transmitter Undergoes Bath Calibration



Intrinsically Safe Options

If the temperature assembly will be installed as Intrinsically Safe, add one of the following Option Codes to the Model # for the appropriate Transmitter and Country or Certification. This Option Code will place the correct IS label on the transmitter.

Table 4. Intrinsic Safety Option Code Selection Chart

Model	USA	Canada	China	ATEX	ANZEx	IECEX
TRX	-ISF	-ISC	-ISCN	-ISE	-ISA	—
TRY	-ISF	-ISC	-ISCN	-ISE	-ISA	—
T2X	-ISF	-ISC	—	-ISE	—	—
THZ ³	-IS	-IS	—	-IS	—	-IS
TDZ ³	-IS	-IS	—	-IS	—	-IS
TDY	-IS	-IS	—	-IS	—	-IS
STZ	-IS	-IS	—	-IS	—	-IS

— indicates: Not Applicable



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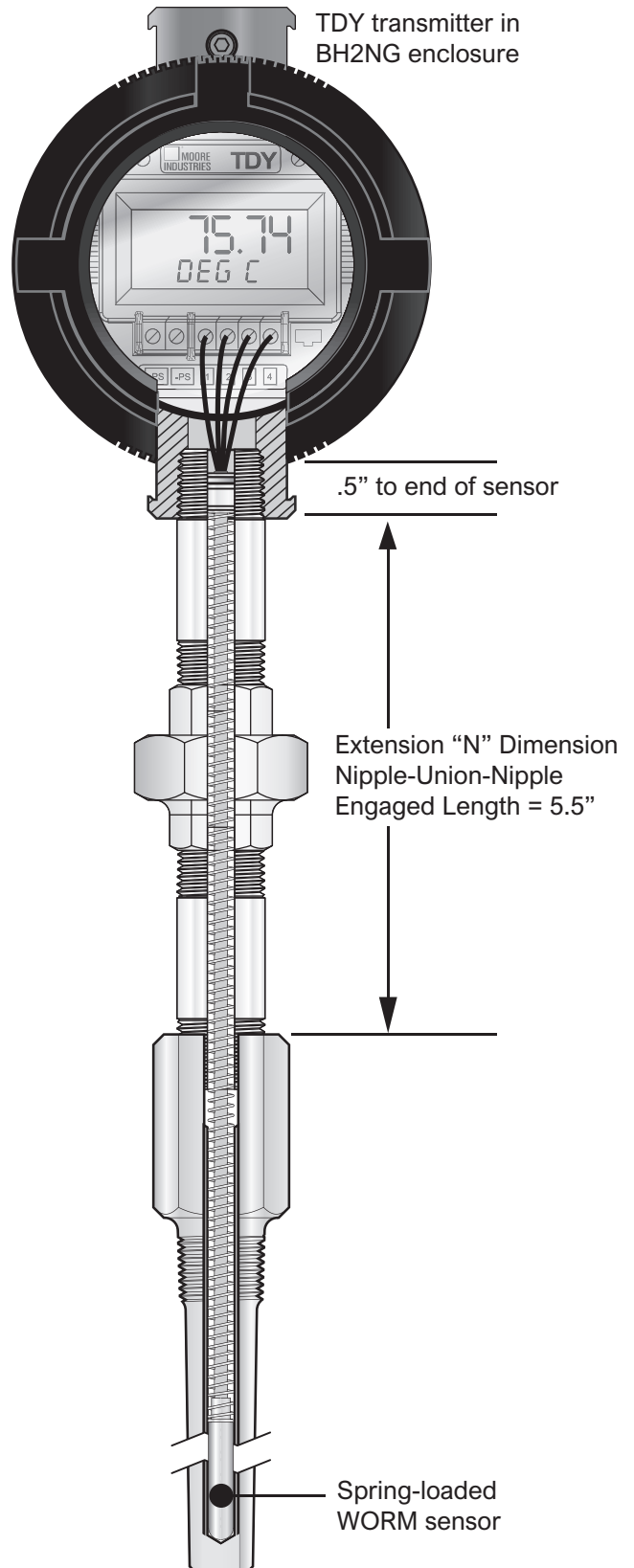
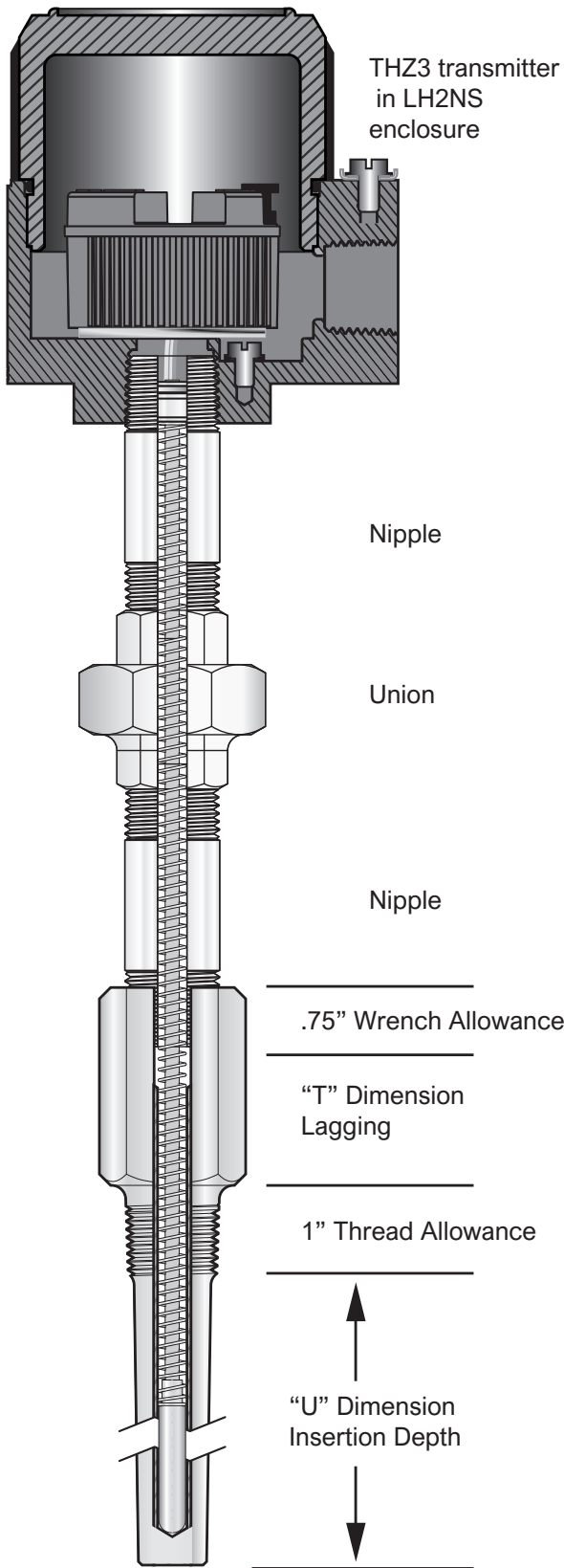


Ready to Install Thermowell Temperature Assemblies

- One stop temperature shop gives you one Model # and one complete assembly ready for installation.
- Perform your own specifying or utilize our experienced engineers to discuss applications and optional approaches to the measurement.
- 4-wire RTDs are always our first choice when measuring temperature assuming the process temperature permits, but we offer a full line of sensors.
- The unique design of the WORM sensor, with its capsule only 2" long, insures that the sensor is fully engulfed in the thermowell and process temperature, eliminating ambient temperature errors.
- The WORM, as a field cuttable, spring-loaded replacement sensor minimizes inventories, availability and maintenance costs.
- We can source almost any thermowell style and material that may be required.
- Need help with Wake Frequency Calculations?
- We have a very complete line of temperature transmitters – 4-20mA only or HART; simple transmitter or one with advanced functions and diagnostics; Process or Functional Safety applications.
- Transmitters are certified for Division 1 explosion-proof/Flameproof or Intrinsically Safe installations or Division 2 hazardous areas.
- Should there be many data acquisition temperature points and individual transmitters do not fit the budget let us point you to our cost effective Remote I/O Systems.
- Factory calibration service options provide pre-configured transmitters; NIST traceable bath comparison data; NIST bath trimming the sensor to the transmitter for the ultimate in accuracy.

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Figure 7. Heavy-Duty Threaded, Tapered Thermowells (with 0.26" ID) are convenient to install and replace. Being heavy-duty, they will withstand a high force and high velocity factor from process fluid flow.

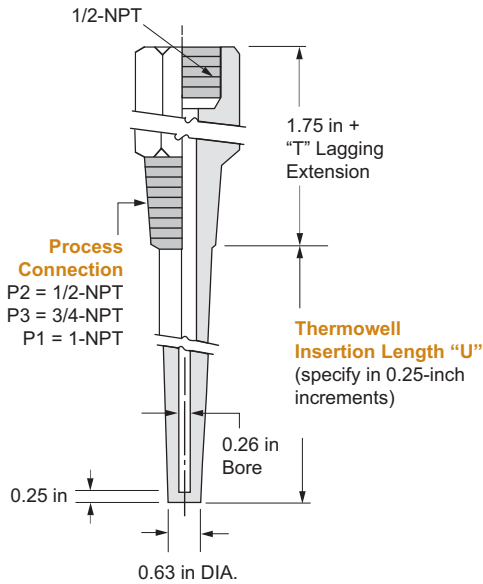


Figure 8. Standard-Duty Threaded, Stepped Thermowells (with 0.26" ID), convenient to install and replace, deliver a faster response time than tapered or straight wells, but less strength and capability to withstand high force and high velocity from the process fluid flow.

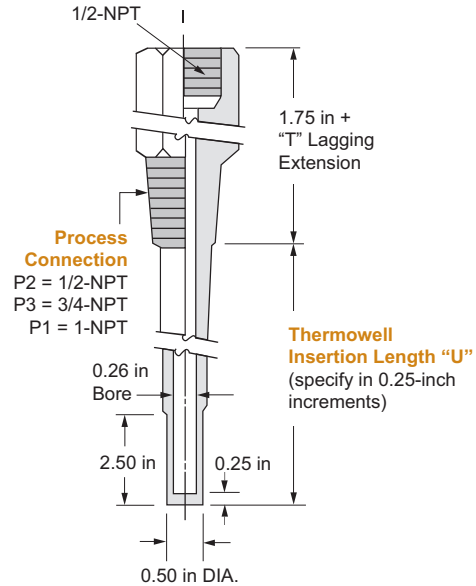


Figure 9. Standard-Duty Threaded, Straight Thermowells (with 0.26" ID), convenient to install and replace, will withstand a high force and high velocity factor from the process fluid flow, but less than that of the heavy duty well.

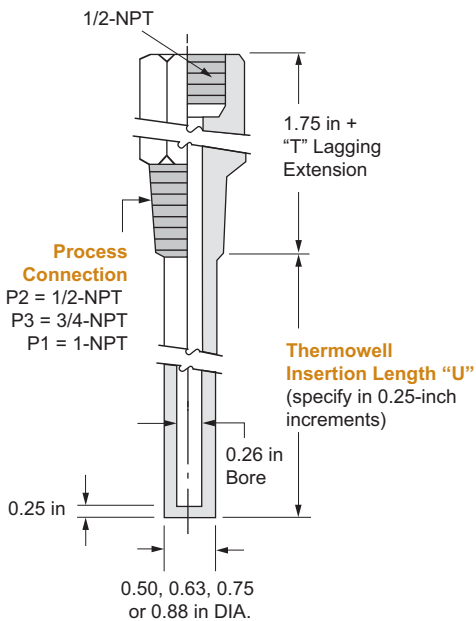
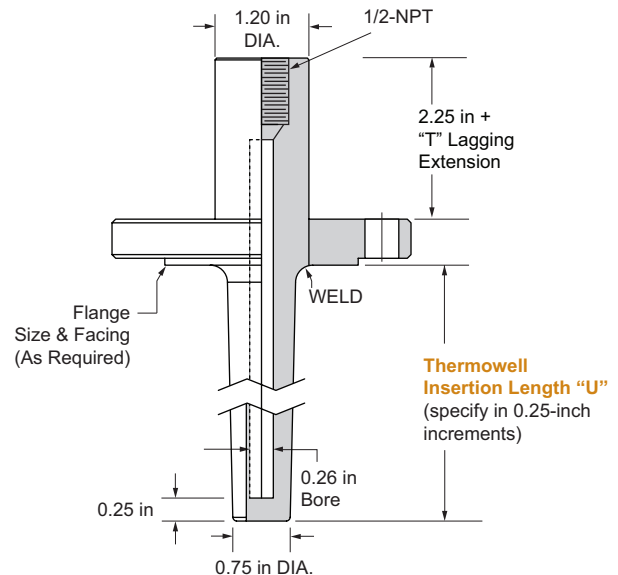


Figure 10. Flanged Thermowells (with 0.26" ID) provide easy removal and high pressure resistance (shown with a Straight Thermowell). Tapered and Stepped Thermowell can also be ordered as Flanged Wells. See Table 5 for available process connection flange sizes.



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Figure 11. PTB-P2, P1, P3 Heavy Duty Protection Tube (with 0.26" ID) - for heavy wall construction applications.

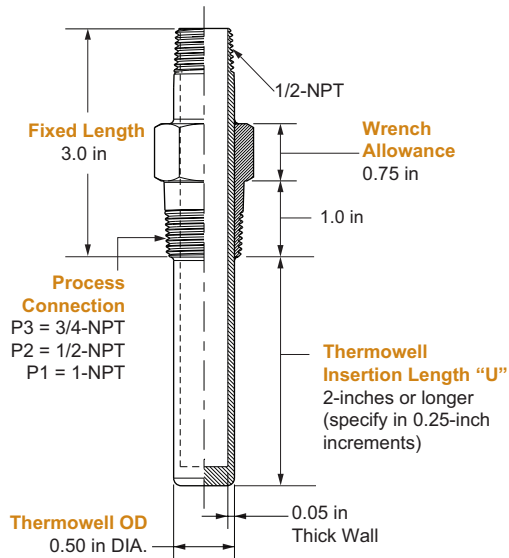


Figure 12. PTB-P2C, P1C, P3C WORM Sensor Protection Tube (with 0.26" ID) - for use in light duty applications with standing liquid or slow-moving gas.

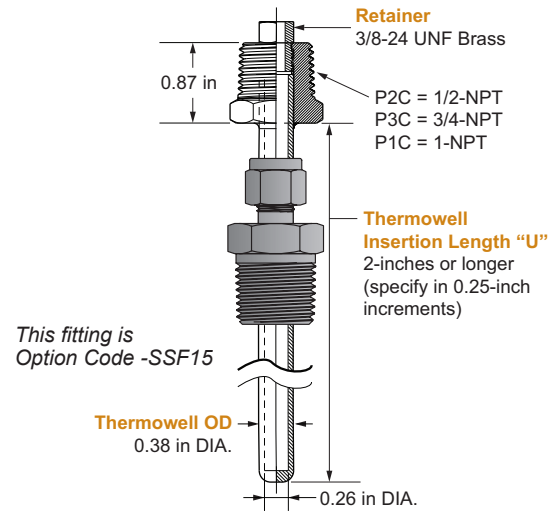


Figure 13. SW2, SW3, SW1 & SW4 Socket Weld style Thermowells. Straight Stem, Tapered or Stepped.

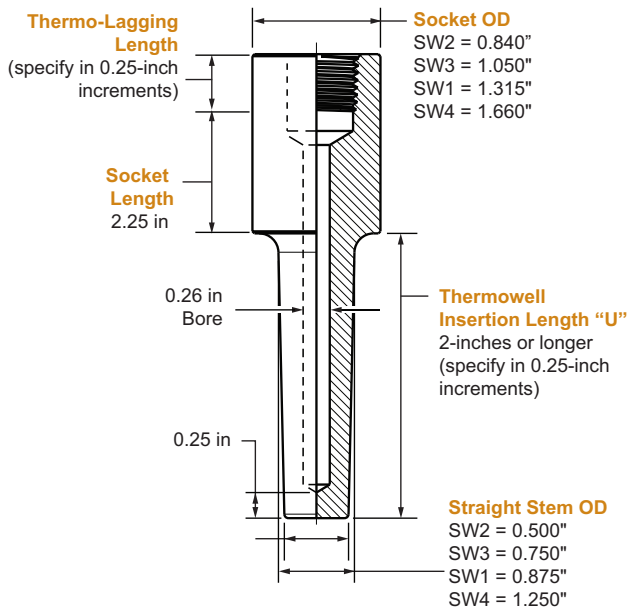
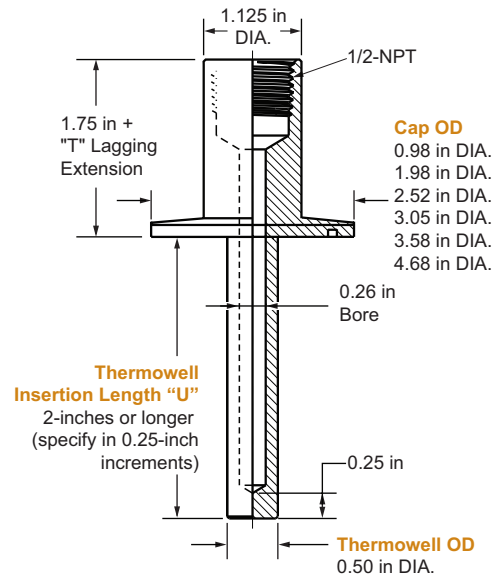


Figure 14. Sanitary Wells (with 0.26" ID)- Cap sizes D.5 through D4; SS316 low carbon material with a high polish.





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Table 5. Flange size order codes.

Ordering Code	Flange Size
F1	1-inch, 150 Class, Flat Facing
F2	1-inch, 150 Class, Raised Facing
F3	1-inch, 150 Class, Ring Type Joint
F4	1 1/2-inch, 150 Class, Flat Facing
F5	1 1/2-inch, 150 Class, Raised Facing
F6	1 1/2-inch, 150 Class, Ring Type Joint
F7	2-inch, 150 Class, Flat Facing
F8	2-inch, 150 Class, Raised Facing
F9	2-inch, 150 Class, Ring Type Joint
F10	1-inch, 300 Class, Flat Facing
F11	1-inch, 300 Class, Raised Facing
F12	1-inch, 300 Class, Ring Type Joint
F13	1 1/2-inch, 300 Class, Flat Facing
F14	1 1/2-inch, 300 Class, Raised Facing
F15	1 1/2-inch, 300 Class, Ring Type Joint
F16	2-inch, 300 Class, Flat Facing
F17	2-inch, 300 Class, Raised Facing
F18	2-inch, 300 Class, Ring Type Joint
F19	1-inch, 400-600 Class, Flat Facing
F20	1-inch, 400-600 Class, Raised Facing
F21	1-inch, 400-600 Class, Ring Type Joint
F22	1 1/2-inch, 400-600 Class, Flat Facing
F23	1 1/2-inch, 400-600 Class, Raised Facing
F24	1 1/2-inch, 400-600 Class, Ring Type Joint
F25	2-inch, 400-600 Class, Flat Facing
F26	2-inch, 400-600 Class, Raised Facing
F27	2-inch, 400-600 Class, Ring Type Joint
F28	1-inch, 900-1500 Class, Flat Facing
F29	1-inch, 900-1500 Class, Raised Facing
F30	1-inch, 900-1500 Class, Ring Type Joint
F31	1 1/2-inch, 900-1500 Class, Flat Facing
F32	1 1/2-inch, 900-1500 Class, Raised Facing
F33	1 1/2-inch, 900-1500 Class, Ring Type Joint

Figure 18. Temperature Assembly using BH3 Enclosure.



Extension Selection

Figure 15. -NUN, SS Nipple-Union-Nipple, makes it easy to rotate the Connection Head relative to the Sensor to better position the Transmitter Display or head conduit port.

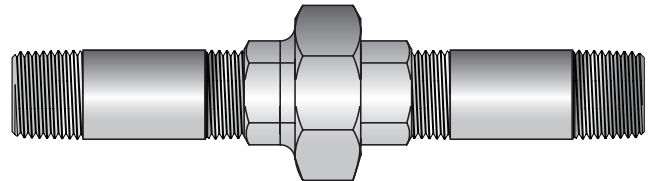
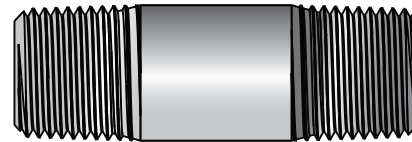


Figure 16. -NPL or NPL3 are simple SS extensions that simply attach the thermowell to the connection head.

-NPL, overall 2.5", has an engaged thread length of 2"



-NPL3, overall 3", has an engaged thread length of 2.5"



Figure 17. Terminal Block – When a connection head is specified without a transmitter, a Terminal Block, TB, will be supplied suitable for the sensor.



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Full Thermowell Assemblies Model Codes

Universal Temperature Transmitter (See TDY, THZ³/TDZ³, STZ and TRY/TRX Data Sheets for Specifications)

TDY	Isolated, PC-Configurable Temperature Transmitter with Display (Specify with BH2NG or D2LC Housing)
TDZ ³	Isolated, Dual Input Smart HART [®] Temperature Transmitter with Display (Specify with BH2NG or D2LC Housing)
STZ	Isolated, Functional Safety Dual Input Smart HART [®] Temperature Transmitter (Specify with LH2NS or BH2NG Housings Only)
THZ ³	Isolated, Dual Input Smart HART [®] Temperature Transmitter (Specify with LH1NS or LH2NS Housing)
TRY	Isolated, PC-Configurable Temperature Transmitter (Specify with LH1NS or LH2NS Housing)
TRX	Non-Isolated, PC-Configurable Temperature Transmitter (Specify with LH1NS or LH2NS Housing)
T2X	Non-Isolated, PC-Configurable RTD Only Temperature Transmitter (Specify with LH1NS or LH2NS Housing)
WEL	Well Assembly without a Temperature Transmitter; Terminal Block provided with connection head

Thermowell Type (See Pages 10 and 11 for Descriptions and Dimensions)

A	Heavy-Duty Threaded, Tapered Well
B	Standard-Duty Threaded, Straight Well
C	Standard-Duty Threaded, Stepped Well
S	Sanitary Tri Clamp Style Well
PTB	Protection Well and Tube (Available in SS316) -Heavy Duty Protection Tube - Select (-P2, -P3, -P1) Process Threads -Light Duty Protection Well - Select (-P2C, -P3C, -P1C) No Process Thread

Thermowell Process Connection Size (See Page 12)

P2	Threaded, ½-NPT (A, B, C, PTB Heavy Duty Well)
P3	Threaded, ¾-NPT (A, B, C, PTB Heavy Duty Well)
P1	Threaded, 1-NPT (A, B, C, PTB Heavy Duty Well)
F?	Flanged Well, Replace "?" with Ordering Code from Table 5 on Page 13
SW?	Socket Weld, Replace ? with Nominal Pipe Size: 2 = 1/2", 3 = 3/4", 1 = 1", 4 = 1-1/4"
D?	Sanitary Well Cap Diameter, Replace "?" with Cap Diameter, (D.5=0.984-inch, D.75=0.984-inch, D1=1.984-inch, D1.5=1.984-inch, D2=2.516-inch, D2.5=3.047-inch, D3=3.579-inch, D4=4.682-inch)
P2C	Straight 3/8" O.D. Protection Tube. Light Duty. ½-NPT male thread on cold side only. No Process Threads
P3C	Straight 3/8" O.D. Protection Tube. Light Duty. ¾-NPT male thread on cold side only. No Process Threads
P1C	Straight 3/8" O.D. Protection Tube. Light Duty. 1-NPT male thread on cold side only. No Process Threads

Thermowell Insertion Length ("U" Dimension) (See Pages 10, 11 and 12)

U?	Replace "?" with any Insertion Length in 0.25-inch Increments
----	---

Lagging Extension Length ("T" Dimension) (See Pages 10, 11 and 12)

T0	No Lagging, 0-inches (Standard)
T2	2" Lag (Standard)
T?	Replace "?" with Length in 0.25-inch Increments
D38	Tube is 3/8"OD (Use only with PTB-P2C, PTB-P1C, PTB-P3C)
D50	Tube is 1/2"OD (Use only with PTB-P2, PTB-P1, PTB-P3)

Thermowell Material

S304	SS304 (Standard)
S316	SS316 (Standard; PTB in S316)
S316L	Low carbon 316 stainless (for Sanitary wells)
CS	Carbon Steel
BR	Brass
S310	Stainless Steel 310 for Thermowell Temperatures of 1093°C (2000°F)
S446	Stainless Steel 446 for Thermowell Temperatures of 1093°C (2000°F) (Other Materials Available - Consult Factory)

Thermowell Internal Bore

-26	0.26" ID
-----	----------

Extension Fitting Type ("N" Dimension) (Nominal Length)

-NUN	Nipple-Union-Nipple (6")
-NPL	Nipple (2.5")
-NPL3	Nipple (3")
-UNN	Union-Nipple for PTB (not for PTB-P1C nor PTB-P3C) (4")



Full Thermowell Assemblies Model Codes

Sensor Type (See Page 4 for Specifications)

RTD SENSORS:

- WSPT14 Low Temp. Jacket, Pt 3850 RTD; 4-Wire; 100 ohm (450°F maximum)
- WSPT104 Low Temp. Jacket, Pt 3850 RTD; 4-Wire; 1000 ohm (450°F maximum)
- WSN4 Low Temp. Jacket, Nickel RTD; 4-Wire; 120 ohm (450°F maximum)
- WSCU4 Low Temp. Jacket, Copper RTD; 4-Wire; 10 ohm (450°F maximum)
- WHPT14 High Temp. Jacket, Pt 3850 RTD; 4-Wire; 100 ohm (800°F maximum)
- WHPT104 High Temp. Jacket, Pt 3850 RTD; 4-Wire; 1000 ohm (800°F maximum)
- WS2PT14 Dual Sensor; Low Temp. Jacket, Pt 3850 RTD; 4-Wire; 100 ohm (450°F maximum)
- WS2PT104 Dual Sensor; Low Temp. Jacket, Pt 3850 RTD; 4-Wire; 1000 ohm (450°F maximum)
- WH2PT13 Dual Sensor; High Temp. Jacket, Pt 3850 RTD; 3-Wire; 100 ohm (800°F maximum)
- WH2PT103 Dual Sensor; High Temp. Jacket, Pt 3850 RTD; 3-Wire; 1000 ohm (800°F maximum)

THERMOCOUPLE SENSORS:

- WSTC?G Low Temp. Jacket, Replace "?" with J, K, T or E T/C, Grounded (450°F maximum)
- WSTC?U Low Temp. Jacket, Replace "?" with J, K, T or E T/C, Ungrounded (450°F maximum)
- WHTC?G High Temp. Jacket, Replace "?" with J, K, T or E T/C, Grounded
- WHTC?U High Temp. Jacket, Replace "?" with J, K, T or E T/C, Ungrounded
- WS2TC?G Dual Sensor, Low Temp. Jacket, Replace "?" with J, K, T or E T/C, Grounded (450°F maximum)
- WS2TC?U Dual Sensor, Low Temp. Jacket, Replace "?" with J, K, T or E T/C, Ungrounded (450°F maximum)
- WH2TC?G Dual Sensor, High Temp. Jacket, Replace "?" with J, K, T or E T/C, Grounded
- WH2TC?U Dual Sensor, High Temp. Jacket, Replace "?" with J, K, T or E T/C, Ungrounded

Sensor Options

- .04 Class AA High Accuracy RTD Sensor
- .06 Class A High Accuracy RTD Sensor
- 10G Low-Intensity Vibration Sensor
- 30G High-Intensity Vibration Sensor
- WW Wire Wound Sensor; Use with RTDs below -23°C (-10°F)
- VTB Bath calibrate the sensor to the transmitter with Assembly NIST Test Data Report (Not for T2X)
- VTD Configure the transmitter to the User's range with Transmitter NIST Test Data Report
- CTD? Comparison Temperature Data Report. Using the bath at the User's specified temperature, report sensor data vs. Primary Standard data. Replace ? with 3 for 3 data points and 5 for 5 data points

Assembly Options

- CL? Internal Sensor or WORM Length. To be calculated by MII if not provided
- IS? Intrinsic Safety Label on Transmitter. Select Option Code from Table 4 on page 8
- SSF15 SS Compression Fitting. Process connection for PTB-P2C, PTB-P3C & PTB-P1C
- .75NPT 1/2-NPT x 3/4-NPT conduit adapter for LH
- FS Functional Safety (Yellow) LH2 Housing. Only for STZ and Safety Sensor Assemblies
- 1ST 1 Chained SS Tag for customer use
- 2ST 2 Chained SS Tags for customer use
- TB6 6 Terminal Block. Provided automatically. Option code not required
- TB8 8 Terminal Block. Provided automatically. Option code not required

Remote Mount Options

- RMLH2NS Remote mount the TT. The LH2NS w/TB6 or TB8 will be coupled to the assembly
- RMLH2NSP Remote mount the TT. The LH2NSP w/TB6 or TB8 will be coupled to the assembly
- RMLH2MS Remote mount the TT. The LH2MS w/TB6 or TB8 will be coupled to the assembly
- RMLH2MSP Remote mount the TT. The LH2MSP w/TB6 or TB8 will be coupled to the assembly
- RMLH1NS Remote mount the TT. The LH1NS w/TB6 or TB8 will be coupled to the assembly
- RMLH1NSP Remote mount the TT. The LH1NSP w/TB6 or TB8 will be coupled to the assembly
- RMLH1MS Remote mount the TT. The LH1MS w/TB6 or TB8 will be coupled to the assembly
- RMLH1MSP Remote mount the TT. The LH1MSP w/TB6 or TB8 will be coupled to the assembly
- RMCH19 Remote mount the TT. The CH19 w/TB6 or TB8 will be coupled to the assembly

Connection Head / Enclosure (TB = Terminal Block)

- CH0 Temperature Assembly with No Head/Enclosure, TB, Transmitter
- CH? See full housing selection on page 16
- LH? See full housing selection on page 16
- BH? See full housing selection on page 16
- SB? See full housing selection on page 16
- D2? See full housing selection on page 16

Temperature Assemblies

WORM Sensors



Full List of Housing Codes

Connection Head / Enclosure (TB = Terminal Block)

For Blind TTs (HPP) and TB

CH6	Black Polypropylene Body and Cap, Type 4X & IP166
CH6W	White Polypropylene Body and Cap, Type 4X & IP166
CH19	316SS Body and Cap, Type 4X & IP166
LH1NS‡	Aluminum Body with Black Polycarbonate Cap, Type 4X & IP166 Two 1/2-NPT Conduit Ports
LH1NB‡	Aluminum Body with Blue Polycarbonate Cap, Type 4X & IP166, Two 1/2-NPT Conduit Ports
LH1MS‡	Aluminum Body with Black Polycarbonate Cap, Type 4X, IP66, Two Conduit Ports 1/2-NPT & M20
LH1MB‡	Aluminum Body with Blue Polycarbonate Cap, Type 4X, IP66, Two Conduit Ports 1/2-NPT & M20
LH2NS‡	Aluminum Body and Cap, Type 4X, IP66, Two 1/2-NPT Conduit Ports
LH2MS‡	Aluminum Body and Cap, Type 4X, IP66, Two Conduit Ports 1/2-NPT & M20

*Note: If a stainless steel U-bolt is required for pipe mounting, replace ‡ with "P" in the LH housing code.

Connection Head / Enclosure (TB = Terminal Block)

For Blind TTs (HPP) and TB

D2LS	Aluminum Body, Opaque Polycarbonate Cover, Type 4X & IP166, Two 1/2-NPT Conduit Ports
D2LSP	Aluminum Body, Opaque Polycarbonate Cover, Type 4X & IP166, Two 1/2-NPT Conduit Ports, SS Pipe Mount Hardware

Enclosures for Indicating TTs

BH2NG‡	Aluminum Body and Cover with Glass, Type 4X & IP166, Two 1/2-NPT Conduit Ports
BH2NGA	Aluminum Body and Cover with Glass, Type 4X & IP166, Two 1/2-NPT Conduit Ports, SS Pipe Mount Hardware
BH2NGE	Aluminum Body and Cover with Glass, Type 4X & IP166, Two 1/2-NPT Conduit Ports, SS Pipe Mount Hardware
BH3NG‡	Aluminum Body and Cover with Glass, Type 4X & IP166, Three 1/2-NPT Conduit Ports
BH3NGA	Aluminum Body and Cover with Glass, Type 4X & IP166, Three 1/2-NPT Conduit Ports, SS Pipe Mount Hardware
BH3NGE	Aluminum Body and Cover with Glass, Type 4X & IP166, Three 1/2-NPT Conduit Ports, SS Pipe Mount Hardware
BH3MG‡	Aluminum Body and Cover with Glass, Type 4X & IP166, Two M20 Conduit Ports, One 1/2-NPT Port
BH3MGA	Aluminum Body and Cover with Glass, Type 4X & IP166, Two M20 Conduit Ports, One 1/2-NPT Port, SS Pipe Mount Hardware
BH3MGE	Aluminum Body and Cover with Glass, Type 4X & IP166, Two M20 Conduit Ports, One 1/2-NPT Port, SS Pipe Mount Hardware
BH3TG‡	Aluminum Body and Cover with Glass, Type 4X & IP166, Two 3/4-NPT Conduit Ports, One 1/2-NPT Port
BH3TGA	Aluminum Body and Cover with Glass, Type 4X & IP166, Two 3/4-NPT Conduit Ports, One 1/2-NPT Port, SS Pipe Mount Hardware
BH3TGE	Aluminum Body and Cover with Glass, Type 4X & IP166, Two 3/4-NPT Conduit Ports, One 1/2-NPT Port, SS Pipe Mount Hardware

*Note: If a stainless steel U-bolt is required for pipe mounting, replace ‡ with "P" in the BH housing code.

Enclosures for Indicating TTs

SB2NG‡	316SS Body and Cover with Glass, Type 4X & IP166, Two 1/2-NPT Conduit Ports
SB2NGA	316SS Body and Cover with Glass, Type 4X & IP166, Two 1/2-NPT Conduit Ports, SS Pipe Mount Hardware
SB2NGE	316SS Body and Cover with Glass, Type 4X & IP166, Two 1/2-NPT Conduit Ports, SS Pipe Mount Hardware

*Note: If a stainless steel U-bolt is required for pipe mounting, replace ‡ with "P" in the SB housing code.

Enclosures for Indicating TTs

D2LC	Aluminum Body, Clear Polycarbonate Cover, Type 4X & IP166, Two 1/2-NPT Conduit Ports
D2LCP	Aluminum Body, Clear Polycarbonate Cover, Type 4X & IP166, Two 1/2-NPT Conduit Ports, SS Pipe Mount Hardware

Model Number Example: TRY / A-P2 / U6-T2 / S316 / -26 -NUN -WSPT14 -CTD3 [LH2NS]



WORM Surface Mount Temperature Assemblies

Featuring Moore Industries' innovative WORM Flexible Sensor, these versatile temperature assemblies mount directly to tanks, pipes, motors, compressors, valves, reactors, wellheads or anywhere else a temperature measurement is needed, and eliminates errors caused by influences external to the process. Precise engineering and solid, sturdy construction allow these assemblies to endure the harshest plant conditions and field environments.

Reasons to use Surface-Mount Temperature Measurements:

- The process pipe is under extreme pressure and another process penetration is less than ideal;
- You are troubleshooting process or process equipment problems and you need a quick or temporary solution;
- The flow stream cannot tolerate the obstruction that would be caused by the thermowell;
- Some process areas are simply physically too tight to install a thermowell;
- Temperature measurement is simply being used to indicate that there is process flow thru the pipe;
- Surface measurements should be insulated well, upstream and downstream of the mounting, to minimize the ambient temperature influence on the measurement;

► Features

- Multiple mounting possibilities. Clamp, bolt or weld in place or use our magnetic MPAD anywhere a skin (surface) temperature measurement is needed.
- Universal temperature transmitter options. Ready-to-install assemblies come with a choice of our universal PC-Programmable or Smart HART® Temperature Transmitters (assemblies without transmitters are also available).
- Reliable measurements. These temperature assemblies keep the sensor in place to maintain good thermoconductance.
- Solid, sturdy construction. High-impact connection heads (sensors without connection heads also available) combined with stainless steel mounting accessories allow our temperature assemblies to withstand the most rigid plant environment.
- Protect lead wire. Options include using the standard spring to provide some mechanical protection for the lead wire or choose Stainless Steel Braid or Flex Armor;
- Faster response time. The WORM delivers step response times 13% faster than solid sheath sensors.

Temperature Assemblies

WORM Sensors



PAD Mount (-PAD), MPAD (-MPAD) and Clamp Mount (-CLAMP)

The PAD completely surrounds the WORM, shielding it from external interference, while providing maximum heat transfer to the sensor. Weld, bolt, magnetically attach or clamp the appropriate PAD into place, securing the sensor directly against the surface in which the temperature measurement is needed (12" band is included when you order the CLAMP option).

Installation

1. Clear any insulation or paint and clean area of surface in which contact with the sensor will occur
2. Affix the Mounting:
 - A. When welding a PAD**, position the plate against the surface to which it will be welded. Allowing enough room for the sensor to slide under the PAD, lay a steady, even weld along the outside perimeter at the base, being careful not to weld across the sensor insertion slot.
 - B. When bolting a PAD**, position PAD and insert machine screw through provided hole and tighten so that the mounting plate rests securely against the surface to be measured. **MPAD:** When you are using an MPAD, you simply position the magnetic pad where you want it in a receptive surface.
 - C. When attaching a Clamp PAD**, open the clamp band and wrap it around the prepped section of the pipe. Close and tighten the clamp band, causing the mounting plate to rest firmly against the pipe surface.
3. Slide the WORM sensor tip under the PAD's insertion slot, positioning it firmly between skin surface and mounting plate. With an MPAD, tighten the set screw on the sensor to secure it.
4. Distribute sensor leads up to the mounted connection head and thread the leads through the conduit entry port.
5. Connect each sensor wire to the appropriate temperature transmitter terminal and re-insulate as necessary.

Figure 22. Dimensions for PAD option.

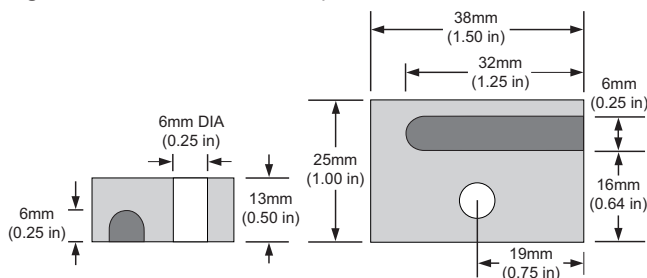


Figure 19. Dimensions for MPAD option.

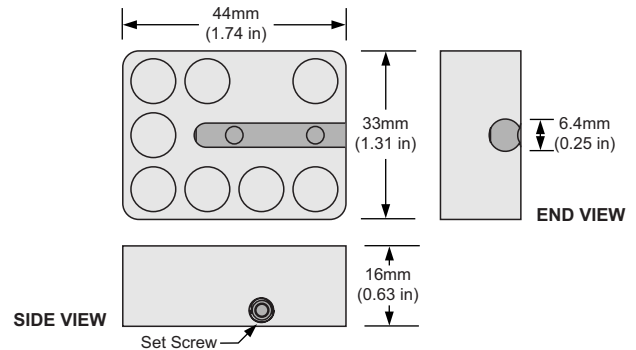


Figure 20. Dimensions for CLAMP option mounting pad.

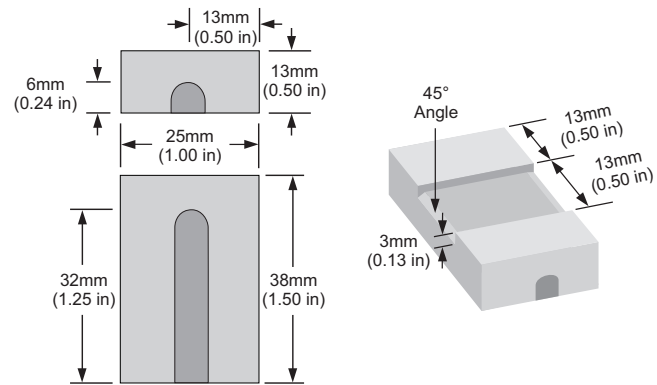
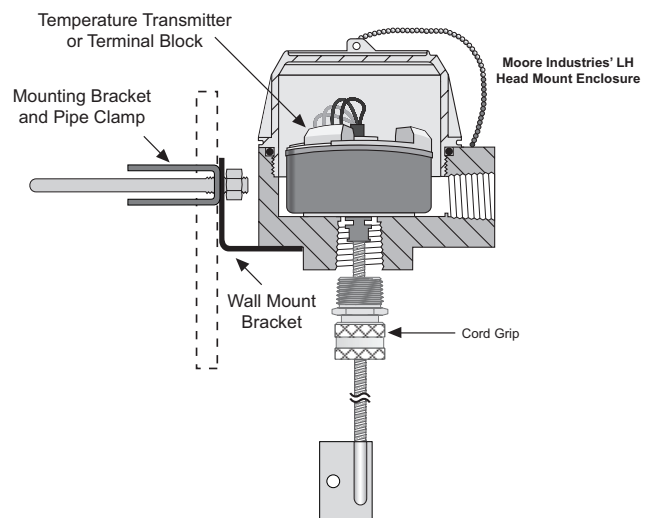


Figure 21. PAD option with remote mount connection head assembly.



PAD, MPAD, Clamp PAD Assemblies Model Number Examples:

- TRY / JL17 / D25 / S316 / -WSTCTG -CLAMP [LH2NSP]
- TRY / JL32 / D25 / S316 / -WSPT104 -.06 -MPAD -30G [LH1MBP]
- TRY / JL36 / D25 / S316 / -WSPT14 -PAD [CH0]

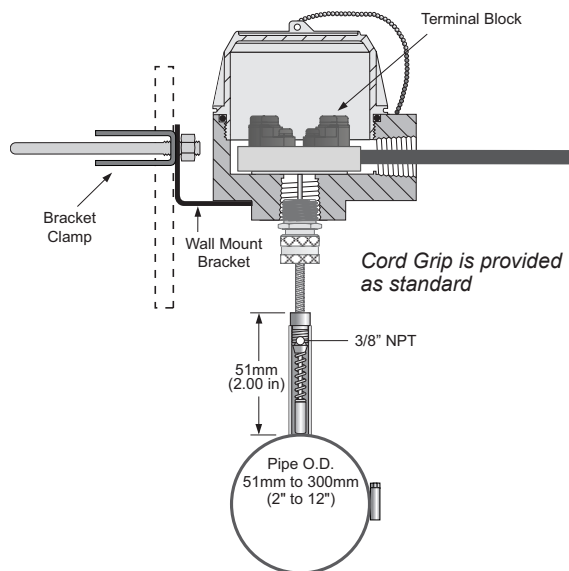


BAYONET Pipe Mount (-BAY)

The BAYONET option is a clamp-on pipe band mount designed to accommodate heavily insulated applications.

The sensor extension allows for installation where the insulation is up to two inches thick. This clamp-style mount will fit all pipes from 51mm (2-inches) to 300mm (12-inches) in diameter (extra band clamps are available for larger diameter pipes). The spring loaded WORM features a flat tip, and rests securely in the BAYONET allowing for maximum heat transfer to the sensor. This assembly provides a direct contact between the pipe and sensor tip, while protecting against any outside interference. The solid stainless steel construction is corrosion resistant and will withstand the harshest industrial conditions.

Figure 23. Field mount transmitter fitted with a -BAY Bayonet Pipe Mount.



Installation

1. Cut away the insulation exposing the pipe's surface, forming a channel around the circumference of the pipe large enough for the BAYONET clamp.
2. Open BAYONET clamp and wrap around prepped section of pipe.
3. Close and tighten the clamp so that it stays securely against the desired surface.
4. Cut the WORM's spring to a length between 1 and 1½" longer than the BAYONET shaft.
5. Slide the screw-on retaining cap (threaded portion facing sensor probe) over the sensor wires until it rests against the open side of the spring.
6. Insert sensor assembly (sensor tip first) into top of BAYONET mount and screw down retaining cap.
7. Distribute sensor leads up to the mounted connection head and thread the leads through the conduit entry port.
8. Connect each sensor wire to the appropriate temperature transmitter or TB terminal.

Model Example:

TRY/JL48/D25/S316/-WSPT14-BAY [LH2NSP]

Temperature Assemblies

WORM Sensors



Surface Mount Model Codes for CLAMP, PAD, MPAD & BAY

Universal Temperature Transmitter (See TDY, THZ³/TDZ³, STZ and TRY/TRX Data Sheets for Specifications)

TDY	Isolated, PC-Configurable Temperature Transmitter with Display (Specify with BH2NG or D2LC Housing)
TDZ ³	Isolated, Dual Input Smart HART [®] Temperature Transmitter with Display (Specify with BH2NG or D2LC Housing)
THZ ³	Isolated, Dual Input Smart HART [®] Temperature Transmitter (Specify with LH1NS or LH2NS Housing)
TRY	Isolated, PC-Configurable Temperature Transmitter (Specify with LH1NS or LH2NS Housing)
TRX	Non-Isolated, PC-Configurable Temperature Transmitter (Specify with LH1NS or LH2NS Housing)
SENW	Sensor & Fitting; No Transmitter

Jacket Length (Overall wire insulation jacket)

JL? Insulation jacket length Replace ? with jacket length in inches (1" increments). 6-8" of flying leads is provided beyond the jacket.

Capsule Diameter

D25 Appropriate for 0.25" and 6mm Diameter Applications

Capsule Material

S316 Stainless Steel 316

Sensor Type (See Page 4 for Specifications)

RTD SENSORS:

-WSPT14	Low Temp. Jacket, Pt 3850 RTD; 4-Wire; 100 ohm (450°F maximum)
-WSPT104	Low Temp. Jacket, Pt 3850 RTD; 4-Wire; 1000 ohm (450°F maximum)
-WSN4	Low Temp. Jacket, Nickel RTD; 4-Wire; 120 ohm (450°F maximum)
-WSCU4	Low Temp. Jacket, Copper RTD; 4-Wire; 10 ohm (450°F maximum)
-WHPT14	High Temp. Jacket, Pt 3850 RTD; 4-Wire; 100 ohm (800°F maximum)
-WHPT104	High Temp. Jacket, Pt 3850 RTD; 4-Wire; 1000 ohm (800°F maximum)
-WS2PT14	Dual Sensor; Low Temp. Jacket, Pt 3850 RTD; 4-Wire; 100 ohm (450°F maximum)
-WS2PT104	Dual Sensor; Low Temp. Jacket, Pt 3850 RTD; 4-Wire; 1000 ohm (450°F maximum)
-WH2PT13	Dual Sensor; High Temp. Jacket, Pt 3850 RTD; 3-Wire; 100 ohm (800°F maximum)
-WH2PT103	Dual Sensor; High Temp. Jacket, Pt 3850 RTD; 3-Wire; 1000 ohm (800°F maximum)

THERMOCOUPLE SENSORS:

-WSTC?G	Low Temp. Jacket, Replace "?" with J, K, T or E T/C, Grounded (450°F maximum)
-WSTC?U	Low Temp. Jacket, Replace "?" with J, K, T or E T/C, Ungrounded (450°F maximum)
-WHTC?G	High Temp. Jacket, Replace "?" with J, K, T or E T/C, Grounded
-WHTC?U	High Temp. Jacket, Replace "?" with J, K, T or E T/C, Ungrounded
-WS2TC?G	Dual Sensor, Low Temp. Jacket, Replace "?" with J, K, T or E T/C, Grounded (450°F maximum)
-WS2TC?U	Dual Sensor, Low Temp. Jacket, Replace "?" with J, K, T or E T/C, Ungrounded (450°F maximum)
-WH2TC?G	Dual Sensor, High Temp. Jacket, Replace "?" with J, K, T or E T/C, Grounded
-WH2TC?U	Dual Sensor, High Temp. Jacket, Replace "?" with J, K, T or E T/C, Ungrounded

Sensor Options

-.04	Class AA High Accuracy RTD Sensor
-.06	Class A High Accuracy RTD Sensor
-10G	Low-Intensity Vibration Sensor
-30G	High-Intensity Vibration Sensor
-WW	Wire Wound Sensor; Use with RTDs below -23°C (-10°F)
-VTB	Bath calibrate the sensor to the transmitter with NIST Test Data Report (Not for T2X)
-VTD	Calibrate the transmitter to the User's range with NIST Test Data Report
-CTD?	Comparison Temperature Data Report. Using the bath at the User's specified temperatures, report sensor data vs. Primary Standard data. Replace ? with 3 for 3 data points and 5 for 5 data points



Surface Mount Model Codes for CLAMP, PAD, MPAD & BAY

Surface Mount Fitting Options

- PAD Mounting Plate
- CLAMP Mounting Plate with Pipe Clamp (includes one band clamp for 12" OD pipe)
- MPAD Magnetic Protective Surface Mounting PAD for Metal Surfaces
- BAY-FLAT Bayonet Pipe Mounting Clamp. Uses flat-tipped sensor

Assembly Options

- SPR? For JL>36", use this option to order a Spring (? = length in inches)
- IS? Intrinsic Safety Label on Transmitter. Select Option Code from Table 4 on page 8
- .75NPT 1/2-NPT x 3/4-NPT conduit adapter for LH
- FS Functional Safety (Yellow) LH2 Housing. Only for STZ and Safety Sensor Assemblies
- 1ST 1 Chained SS Tag for customer use
- 2ST 2 Chained SS Tags for customer use
- TB6 6 Terminal Block. Provided automatically. Option code not required
- TB8 8 Terminal Block. Provided automatically. Option code not required
- TB4 4 Terminal Block
- TS4 4 position Terminal Strip. [LH] Only
- TS8 8 position Terminal Strip. [LH] Only
- GRIP Cord Grip is standard. -GRIP option code is not required

Connection Head / Enclosure (TB = Terminal Block) (See page 16 for detail list of enclosures)

- SEN Temperature Assembly with No Head/Enclosure, TB, Transmitter
- CH? See full housing selection on page 16
- LH? See full housing selection on page 16
- BH? See full housing selection on page 16
- SB? See full housing selection on page 16
- D2? See full housing selection on page 16

Model Number Example: THZ³ / JL72 / D25 / S316 / -WSPT14 -CLAMP -GRIP [LH2NSP]

Temperature Assemblies

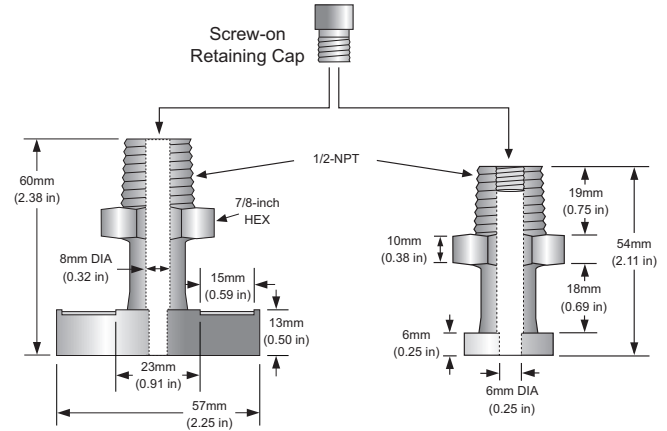
WORM Sensors



PIPE Mount (-PIPE) and TANK Mount (-TANK) Options

The PIPE Mount option quickly clamps onto most pipes (two band clamps are included when you order the -PIPE option). The TANK Mount option (S316) welds into place, securing the spring loaded sensor tip directly against the surface in which the temperature measurement is needed. In both options the spring loaded sensor is completely encased and features a flat tip, creating the best environment for maximum heat transfer to the probe. Both mounts are heavy duty stainless steel construction is corrosion-resistant and suitable for use in any field environment. The top portion is equipped with a 1/2-NPT connection for mounting a transmitter and field-mount enclosure.

Figure 24. Dimensions for PIPE option (left) and TANK option dimensions (right).



Installation

1. Clear any insulation and clean surface area where installation will occur.

For PIPE Mount:

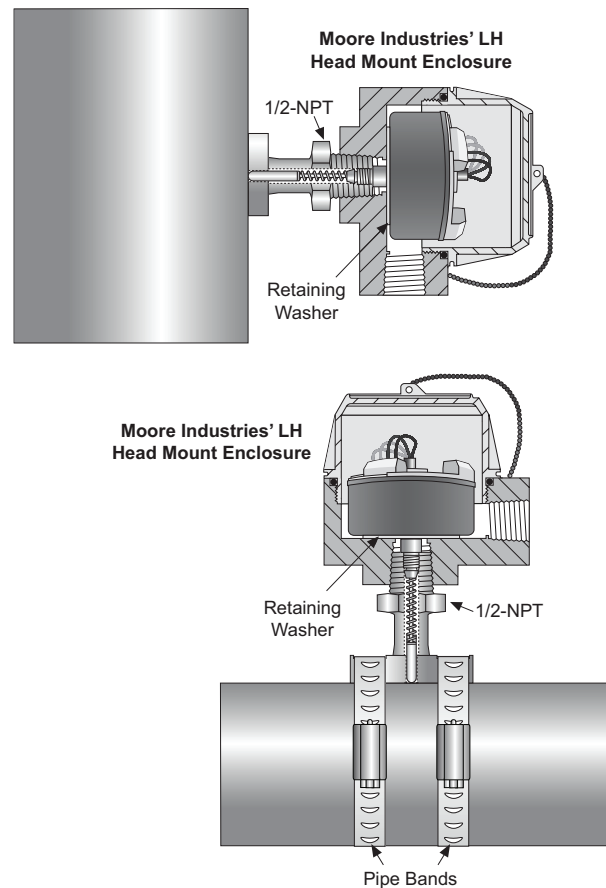
A. Open and wrap both clamp bands around a section of pipe. Place the mounting plate between the clamps and pipe, ensuring that the clamps rest in the provided channels on the top of the PIPE Mount's base.

B. Close and tighten the clamp bands, forcing the PIPE Mount to rest firmly against the pipe surface. Screw the connection head onto the 1/2-NPT threads at the top of PIPE Mount.

C. When ordered new, all components are fully assembled. If you are replacing the sensor follow these steps:

1. Cut the WORM's spring to 1/2" (this will provide the necessary pressure to securely hold the sensor probe against the skin surface).
2. Insert the sensor assembly (sensor tip first) through the connection head and into the top of the PIPE Mount or TANK Mount and secure it with the thread nut. Install the transmitter and head.
3. Connect each sensor wire to the appropriate temperature transmitter terminal. Re-insulate if necessary.

Figure 25. TANK option with connection head assembly and PIPE option with connection head assembly.



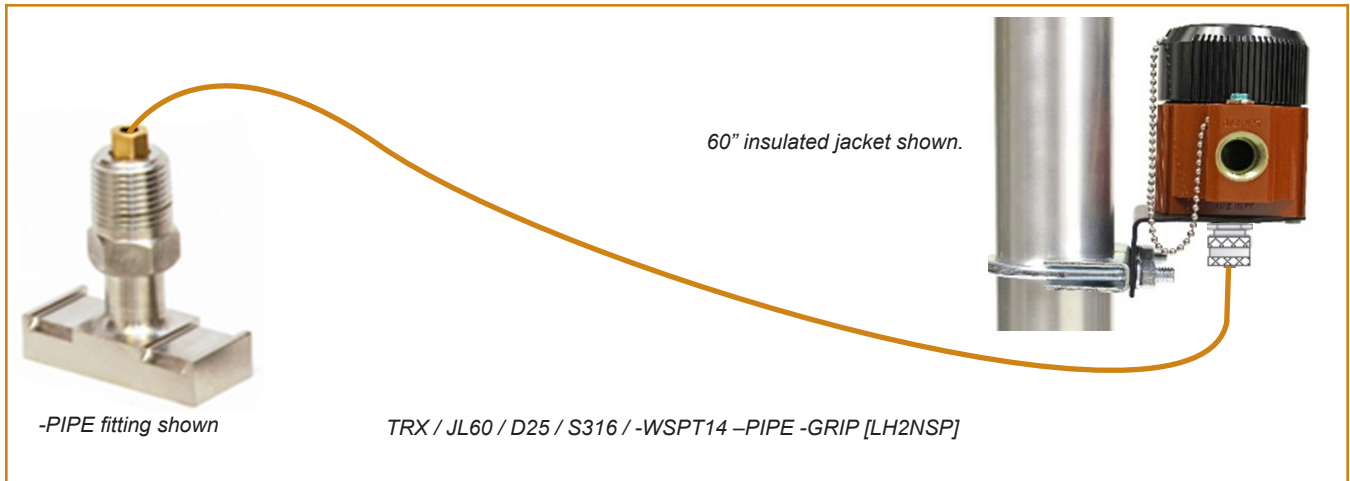
Model Number Examples:

TRY / JLFC / D25 / S316 / -WSPT14 -PIPE [LH1NS]
 TRY / JLFC / D25 / S316 / -WSPT14 -TANK [LH1NS]



Installation options for fittings

Figure 26. TRX in [LH2NSP] shown.



Installation options for TANK & PIPE fittings

The -TANK and -PIPE can all be configured with a connection head enclosing a TB, terminal block, or one of the temperature transmitters, like the TRX. Use JLFC, Jacket Length Factory Configured. Since everything is "enclosed" we will cut the jacket and spring to the appropriate lengths.

Figure 27. -PIPE fitting, LH2 head with TRX shown.



TRX / JLFC / D25 / S316 / -WSPT14 -PIPE [LH2NSP]
TRX / JLFC / D25 / S316 / -WSPT14 -TANK [LH2NSP]

Use the **-RMLH2NS** option to remote mount the transmitter (see page 6 for an explanation of the Remote Mount option).

Figure 28. -PIPE fitting, LH2 head with TB shown.



Customer supplied wire between TB and TRX.

TRX / JLFC / D25 / S316 / -WSPT14 -PIPE -RMLH2NS [LH2NSP]

Figure 29. TRX in [LH2NSP] shown.



Temperature Assemblies

WORM Sensors



Exposed Air Thermowell (-EXP)

The **Exposed Air Thermowell (-EXP)** option is perfect for measuring both indoor and outdoor ambient temperatures. The perforated tube allows the sensor to have access to the open air while reducing the unwanted measurement fluctuations caused by air circulation. The top is equipped with a 1/2-NPT connection for mounting to a transmitter, field-mount enclosure or pipe.

The spring loaded WORM Flexible Sensor can be easily installed and removed without the enclosure, making calibration quick and painless. The Exposed Air Thermowell's durable, stainless steel construction is corrosion-resistant and can weather the harshest plant conditions while delivering fast response.

Installation

A new assembly is prebuilt at the factory. If you are replacing a sensor, follow these steps:

1. Cut the WORM's spring to 1" (this will provide the necessary pressure to securely hold the sensor probe against the skin surface).
2. Ensuring that the uncut portion of the spring is facing the sensor probe, slide the spring over the sensor wires and onto the end of the sensor probe.
3. Then slide the screw-on retaining cap over the sensor leads and onto the top of the spring.
4. Insert sensor assembly (sensor tip first) through the top of the EXP mount. Screw on the retaining cap. Screw the connection head onto the 1/2-NPT threads at top of the Exposed Air Thermowell. Install the transmitter into place.
5. Connect each sensor wire to the appropriate temperature transmitter terminal. Re-insulate if necessary.

-EXP Model Number Examples:

TRX / JLFC / D25 / S316 / -WSPT14 - EXP [LH1NS]

Figure 30. Dimensions for Exposed Air Thermowell

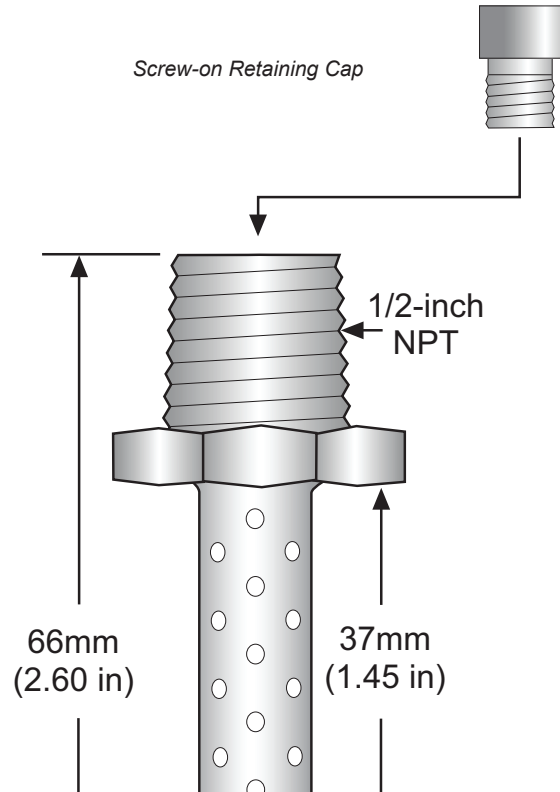


Figure 31. -EXP Exposed Well



Temperature Assemblies WORM Sensors



WORM Nose

If you have a 40' tank and want to measure the product temperature near the bottom of the tank, you can obtain a 40' sensor a couple of ways. We could build a 40' assembly, but the shipping costs for that size container are quite high. The alternative is to employ the WORM Nose and build the assembly on site. Here is how you could put together your assembly:

Figure 32. WORM Nose mounted on a pipe with 1/2-NPT threads.



1. Specify and purchase these components:

A. WORM Nose (1/2-NPT)
(P/N 231-201-31)



B. Connection Head,
Model [LH2NS]:



C. TB6 Terminal Block
(P/N 803-821-27)



D. WORM Sensor
SENW / JL492 / D25 / S316 / -WSPT14 -30G [SEN]

2. Build or assemble a 40' pipe with 1/2-NPT threads on both ends. Be sure your pipe material is suitable for the product in the tank (like SS, PVC, galvanized).

3. Feed the WORM temperature sensor down the pipe until it comes out the other end. Insert the sensor into the WORM Nose and then thread the Nose onto the pipe. You may want to seal this fitting appropriately. The sensor will be a snug fit in the Nose.

4. At the lead wire end of the pipe, pass the lead wire into the bottom of the LH head and thru the center of the terminal block. Thread the LH head onto the end of the pipe. Land the wires on the terminal block.

5. Drop the pipe assembly into the tank and attach to your holder.

Temperature Assemblies

WORM Sensors



Model Codes for PIPE & TANK & Ambient Temperature

Universal Temperature Transmitter (See TDY, THZ³/TDZ³, STZ and TRY/TRX Data Sheets for Specifications)

- TDY** Isolated, PC-Configurable Temperature Transmitter with Display (Specify with BH2NG or D2LC Housing)
- TDZ³** Isolated, Dual Input Smart HART[®] Temperature Transmitter with Display (Specify with BH2NG or D2LC Housing)
- THZ³** Isolated, Dual Input Smart HART[®] Temperature Transmitter (Specify with LH1NS or LH2NS Housing)
- TRY** Isolated, PC-Configurable Temperature Transmitter (Specify with LH1NS or LH2NS Housing)
- TRX** Non-Isolated, PC-Configurable Temperature Transmitter (Specify with LH1NS or LH2NS Housing)
- SENW** Sensor & Fitting; No Transmitter

Jacket Length (Overall wire insulation jacket)

- JLFC** Jacket Length Factory Configured (specify only when you want a Connection Head mounted on -TANK or -PIPE)

Capsule Diameter

- D25** Appropriate for 0.25" and 6mm Diameter Applications

Capsule Material

- S316** Stainless Steel 316

Sensor Type (See Page 4 for Specifications)

RTD SENSORS:

- WSPT14** Low Temp. Jacket, Pt 3850 RTD; 4-Wire; 100 ohm (450°F maximum)
- WSPT104** Low Temp. Jacket, Pt 3850 RTD; 4-Wire; 1000 ohm (450°F maximum)
- WSN4** Low Temp. Jacket, Nickel RTD; 4-Wire; 120 ohm (450°F maximum)
- WSCU4** Low Temp. Jacket, Copper RTD; 4-Wire; 10 ohm (450°F maximum)
- WHPT14** High Temp. Jacket, Pt 3850 RTD; 4-Wire; 100 ohm (800°F maximum)
- WHPT104** High Temp. Jacket, Pt 3850 RTD; 4-Wire; 1000 ohm (800°F maximum)
- WS2PT14** Dual Sensor; Low Temp. Jacket, Pt 3850 RTD; 4-Wire; 100 ohm (450°F maximum)
- WS2PT104** Dual Sensor; Low Temp. Jacket, Pt 3850 RTD; 4-Wire; 1000 ohm (450°F maximum)
- WH2PT13** Dual Sensor; High Temp. Jacket, Pt 3850 RTD; 3-Wire; 100 ohm (800°F maximum)
- WH2PT103** Dual Sensor; High Temp. Jacket, Pt 3850 RTD; 3-Wire; 1000 ohm (800°F maximum)

THERMOCOUPLE SENSORS:

- WSTC?G** Low Temp. Jacket, Replace "?" with J, K, T or E T/C, Grounded (450°F maximum)
- WSTC?U** Low Temp. Jacket, Replace "?" with J, K, T or E T/C, Ungrounded (450°F maximum)
- WHTC?G** High Temp. Jacket, Replace "?" with J, K, T or E T/C, Grounded
- WHTC?U** High Temp. Jacket, Replace "?" with J, K, T or E T/C, Ungrounded
- WS2TC?G** Dual Sensor, Low Temp. Jacket, Replace "?" with J, K, T or E T/C, Grounded (450°F maximum)
- WS2TC?U** Dual Sensor, Low Temp. Jacket, Replace "?" with J, K, T or E T/C, Ungrounded (450°F maximum)
- WH2TC?G** Dual Sensor, High Temp. Jacket, Replace "?" with J, K, T or E T/C, Grounded
- WH2TC?U** Dual Sensor, High Temp. Jacket, Replace "?" with J, K, T or E T/C Ungrounded

Sensor Options

- .04** Class AA High Accuracy RTD Sensor
- .06** Class A High Accuracy RTD Sensor
- 10G** Low-Intensity Vibration Sensor
- 30G** High-Intensity Vibration Sensor
- WW** Wire Wound Sensor; Use with RTDs below -23°C (-10°F)
- VTB** Bath calibrate the sensor to the transmitter with NIST Test Data Report (Not for T2X)
- VTD** Calibrate the transmitter to the User's range with NIST Test Data Report
- CTD?** Comparison Temperature Data Report. Using the bath at the User's specified temperatures, report sensor data vs. Primary Standard data. Replace ? with 3 for 3 data points and 5 for 5 data points



Temperature Assemblies WORM Sensors

Surface Mount Model Codes for PIPE, TANK & Ambient Temperature

Fitting Options

- FLAT -PIPE PIPE Mount Fitting with 2 Band Clamps (uses Flat-tipped capsule)
- FLAT -TANK TANK Mount Fitting (uses Flat-tipped capsule)
- EXP Exposed thermowell for Ambient Temperature
- WN Worm Nose requires -NPL, -NPL3 or -NUN

Extension Options

- NPL Nipple (2" length with threads engaged)
- NPL3 Nipple (2.5" length with threads engaged)
- NUN Nipple-Union-Nipple (5.5" length with threads engaged)
- UNN Nipple-Union for -TANK, -PIPE or -EXP

Assembly Options

- IS? Intrinsic Safety Label on Transmitter. Select Option Code from Table 4 on page 8.
- 75NPT 1/2-NPT x 3/4-NPT conduit adapter for LH.
- FS Functional Safety (Yellow) LH2 Housing. Only for STZ and Safety Sensor Assemblies.
- 1ST 1 Chained SS Tag for customer use.
- 2ST 2 Chained SS Tags for customer use.
- TB6 6 Terminal Block. Provided automatically. Option code not required.
- TB8 8 Terminal Block. Provided automatically. Option code not required.
- TB4 4 Terminal Block
- TS4 4 position Terminal Strip. [LH] Only
- TS8 8 position Terminal Strip. [LH] Only

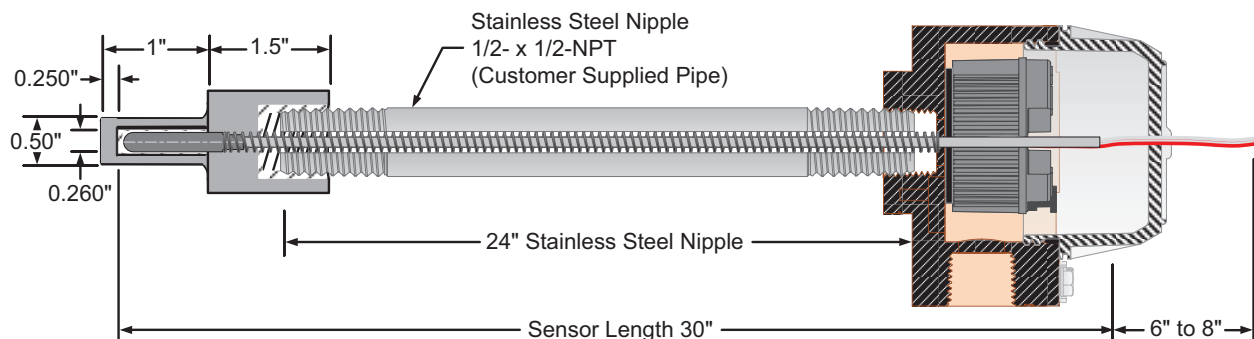
Remote Mount Options

- RMLH2NS Remote mount the TT. The LH2NS w/TB6 or TB8 will be coupled to the assembly
- RMLH2NSP Remote mount the TT. The LH2NSP w/TB6 or TB8 will be coupled to the assembly
- RMLH2MS Remote mount the TT. The LH2MS w/TB6 or TB8 will be coupled to the assembly
- RMLH2MSP Remote mount the TT. The LH2MSP w/TB6 or TB8 will be coupled to the assembly
- RMLH1NS Remote mount the TT. The LH1NS w/TB6 or TB8 will be coupled to the assembly
- RMLH1NSP Remote mount the TT. The LH1NSP w/TB6 or TB8 will be coupled to the assembly
- RMLH1MS Remote mount the TT. The LH1MS w/TB6 or TB8 will be coupled to the assembly
- RMLH1MSP Remote mount the TT. The LH1MSP w/TB6 or TB8 will be coupled to the assembly
- RMCH19 Remote mount the TT. The CH19 w/TB6 or TB8 will be coupled to the assembly

Connection Head / Enclosure (TB = Terminal Block) see page 15 for detailed list of enclosures

- CH? See full housing selection on page 15
- LH? See full housing selection on page 15
- BH? See full housing selection on page 15
- SB? See full housing selection on page 15
- D2? See full housing selection on page 15

Model Number Example: TDY / JLFC / D25 / S316 / -FLAT -WSPT14 -PIPE -RMLH2NS [BH2NGP]



Temperature Assemblies

WORM Sensors



WORM Upstream Flex-Armor Assembly



This sensor received its nickname “upstream” from its initial acceptance for the upstream metering run application.

- The spring can be ordered any length and cut in the field to fit any length thermowell; one assembly fits all.
- The 1/2-NPT fitting holds the spring in compression so the capsule stays in contact with the bottom of the thermowell for good thermal conductance.
- The 2” capsule is fully engulfed in the thermowell; not extending out into ambient air. As a result, there is no error caused by ambient temperature wicking.
- The Flex Armor discourages cows and other animals from chewing on the lead wires.
- The flexible assembly coils compactly for easy and safe storage in the truck or drawer.
- The sensor, with long lead wire, can be replaced while reusing the more expensive Flex Armor with Fitting; the Flex Armor simply slides off the wires.
- Option -30G provides a high vibration tolerant version of the sensor, which has proven to have a long life even in the worst of compressors.

“Upstream” Temperature Sensor

Base Model

SENW Sensor Assembly Only; No Transmitter

Jacket Length

JL? Insulation Jacket Length; Replace ? with length in 1” increments

Capsule Diameter

D25 Appropriate for 1/4” and 6mm diameter applications

Capsule Material

S316 Stainless Steel 316



Temperature Assemblies WORM Sensors

Sensor Type

RTD Sensors

-WSPT14	Low Temp. Jacket, Pt 3850 RTD; 4-Wire; 100 ohm (450°F maximum)
-WSPT104	Low Temp. Jacket, Pt 3850 RTD; 4-Wire; 1000 ohm (450°F maximum)
-WSN4	Low Temp. Jacket, Nickel RTD; 4-Wire; 120 ohm (450°F maximum)
-WSCU4	Low Temp. Jacket, Copper RTD; 4-Wire; 10 ohm (450°F maximum)
-WHPT14	High Temp. Jacket, Pt 3850 RTD; 4-Wire; 100 ohm (800°F maximum)
-WHPT104	High Temp. Jacket, Pt 3850 RTD; 4-Wire; 1000 ohm (800°F maximum)
-WS2PT14	Dual Sensor; Low Temp. Jacket, Pt 3850 RTD; 4-Wire; 100 ohm (450°F maximum)
-WS2PT104	Dual Sensor; Low Temp. Jacket, Pt 3850 RTD; 4-Wire; 1000 ohm (450°F maximum)
-WH2PT13	Dual Sensor; High Temp. Jacket, Pt 3850 RTD; 3-Wire; 100 ohm (800°F maximum)
-WH2PT103	Dual Sensor; High Temp. Jacket, Pt 3850 RTD; 3-Wire; 1000 ohm (800°F maximum)

Thermocouple Sensors

-WSTC?G	Low Temp. Jacket, Replace "?" with J, K, T or E T/C, Grounded (450°F maximum)
-WSTC?U	Low Temp. Jacket, Replace "?" with J, K, T or E T/C, Ungrounded (450°F maximum)
-WHTC?G	High Temp. Jacket, Replace "?" with J, K, T or E T/C, Grounded
-WHTC?U	High Temp. Jacket, Replace "?" with J, K, T or E T/C, Ungrounded
-WS2TC?G	Dual Sensor, Low Temp. Jacket, Replace "?" with J, K, T or E T/C, Grounded (450°F maximum)
-WS2TC?U	Dual Sensor, Low Temp. Jacket, Replace "?" with J, K, T or E T/C, Ungrounded (450°F maximum)
-WH2TC?G	Dual Sensor, High Temp. Jacket, Replace "?" with J, K, T or E T/C, Grounded
-WH2TC?U	Dual Sensor, High Temp. Jacket, Replace "?" with J, K, T or E T/C Ungrounded

Sensor Options

-.04	Class AA High Accuracy RTD Sensor
-.06	Class A High Accuracy RTD Sensor
-10G	Low-Intensity Vibration Sensor
-30G	High-Intensity Vibration Sensor
-WW	Wire Wound Sensor; Use with RTDs below -23°C (-10°F)
-CTD?	Comparison Temperature Data Report. Using the bath at the User's specified temperatures, report Sensor Data vs Primary Standard data. Replace ? with 3 for 3 data points and 5 for 5 data points

Assembly Definition - Required

-SPR?	WORM Spring Length; replace ? with length in 1" increments
-.5NPT	1/2-NPT Fitting
-FLEX?	Flex Armor Length; replace ? with length in 1" increments

Assembly Options

-1ST	1 SS Tag for customer use
-2ST	2 SS Tags for customer use

Housing

[SEN] No Enclosure; No Terminal Block

Upstream Sensor Installation

The WORM sensor with Flex Armor cable cover and fittings mounts easily into a standard threaded thermowell, providing both flexibility and protection for the wiring.

1. Pull the wire out of the Flex Armor and remove the spring.
2. Insert only the spring into the well.
3. Cut the spring just as it exits the thermowell.
4. Discard the excess spring.
5. Re-assemble it by putting the spring back onto the lead wires.
6. Insert the lead wires into the 1/2-NPT fitting attached to the Flex Armor.
7. Insert the sensor tip into the well and thread the 1/2-NPT fitting into the well, compressing the spring and securing the sensor.

Temperature Assemblies WORM Sensors

Flexible, Spring-loaded, Cutable WORM Sensor Replacement Kits

In both new and retrofit applications, the WORM® Flexible Sensors for Thermowell Temperature Assemblies replace restrictive straight sensor probes with a universal sensor strategy that will save you time and money.

Unique Flexible Design Installs in Minutes

With straight sensors, you have to remove the connection head, and sometimes thermowell assembly components, to get the sensor into the thermowell. The WORM bends right through the top or face of the enclosure. It slides through the enclosure's conduit port, and into (or out of) the thermowell without having to remove the enclosure or any assembly components (Figure 34).

Figure 34. The WORM lets you replace a sensor without removing the enclosure or disassembling the thermowell.

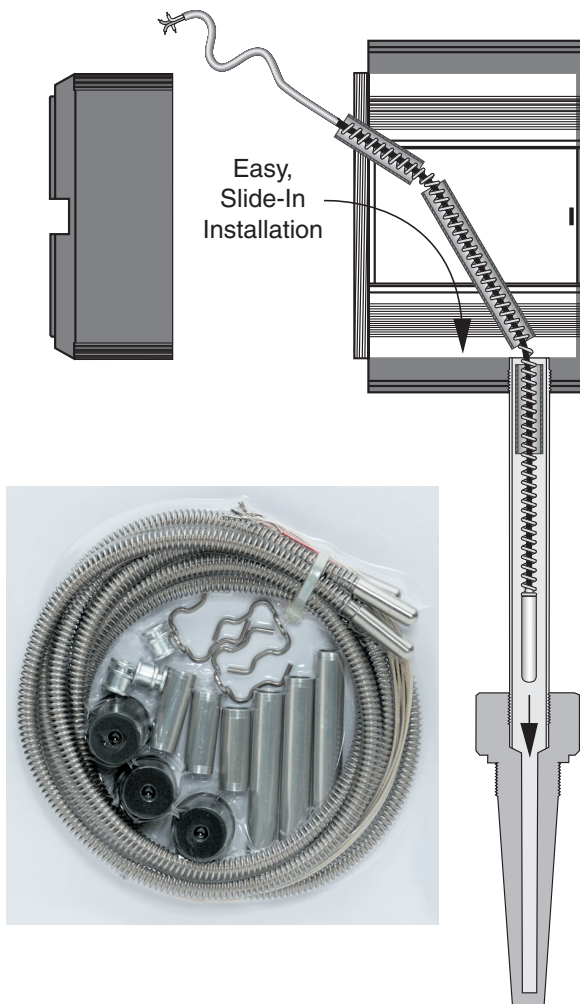


Figure 33. WORM spring-loaded field-cutable sensor replacement; can be slipped into any thermowell.



► Features

- **Universal, trims to thermowell length.** There's no need to stock an expensive array of different sensor lengths. With a quick measurement and a simple trim-to-length, the WORM handles nearly every thermowell assembly.
- **Ideal for hockey-puck, connection head and dual-sided enclosures.** The innovative WORM provides cost and time advantages for all types of temperature transmitter enclosures.
- **Popular RTD and thermocouples.** Standard sensor types include 100 and 1000 ohm platinum, nickel and copper RTDs; plus J-, K-, T-, E- type thermocouples.
- **Faster response time.** The WORM delivers step response times 13% faster than standard sensors.



Temperature Assemblies WORM Sensors

Installs in Minutes

Each of the three installation options uses different parts from the installation kit; expect to have parts left over after installation. Read through all steps for the enclosure type prior to beginning installation.



- Heat Shrink Tubing**—(2" nom.) Can be used to cover the cut end of the high temperature fiberglass insulation and prevent it from unraveling
- Spring**—for pushing the sensor probe against the base of the thermowell
- 2-Inch & 1-Inch Spacers**—keeps the WORM straight inside the lag
- Cap**—for use in Head-Mount and Field Enclosure Installations, holds the WORM assembly inside of the thermowell assembly
- Clip**—in Field Enclosure Installations, holds the cap in place
- Stopper**—for use in Generic Installations, holds the WORM assembly inside of the thermowell
- Washer**—if using the terminal block or temperature transmitter in the head to hold the Cap and spring in compression, the washer may be used between the Cap and TB or TT to bridge the diameter differences.

Field Enclosure Installation

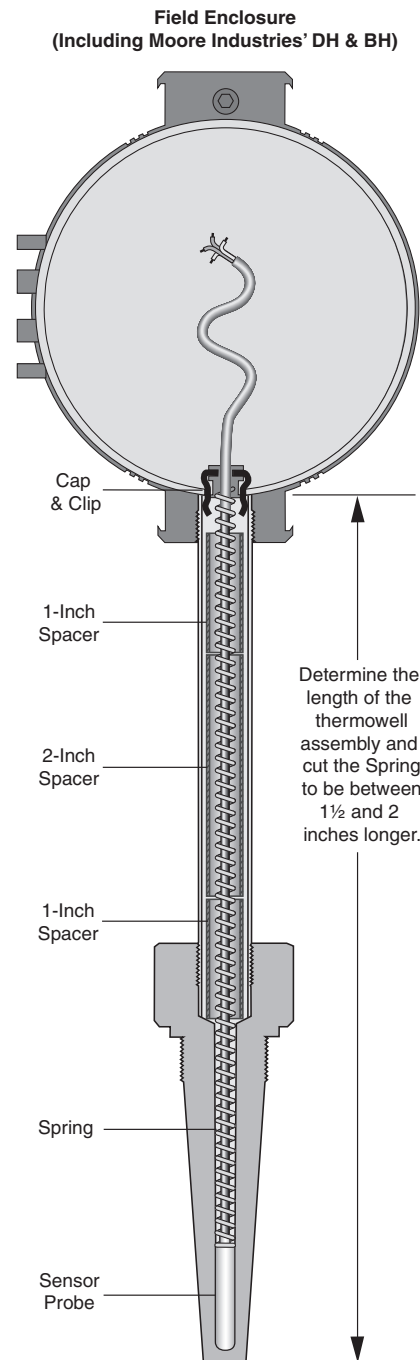
(Including Moore Industries' DH & BH enclosures)

Installation Components: Sensor, Spring, Cap, Clip, Stopper, Washer, Tubing and Spacer(s).

1. Determine the length of the thermowell assembly (see the illustration to the right). Cut the WORM Spring to be between 1½ and 2 inches longer than the length of the assembly (this is necessary so that the Spring's compression securely holds the sensor probe to the bottom of the thermowell).
2. Ensuring that the uncut portion of the Spring faces down towards the Sensor Probe, slide the Spring over the sensor wires and onto the end of the Sensor Probe.
3. Snap the Clip onto the Cap. Then slide the Cap/Clip combination over the sensor wires onto the top of the Spring.
4. Remove the instrument from the enclosure (if necessary). Insert the WORM sensor into the thermowell. Slide the appropriate length(s) and number of Spacers to keep the WORM Spring straight inside the thermowell assembly lag (Spacers may not be required).

5. Using pliers, grasp the Cap/Clip combination by the niche at the top of the Cap, and insert it into the enclosure's sensor entry port to compress the WORM Spring into the thermowell. Reinstall the instrument into the enclosure. Connect the sensor wires.

Figure 35. Field Enclosure - including Moore Industries' BH and D-BOX - enables you to replace a sensor without removing the enclosure or disassembling the thermowell.



Temperature Assemblies

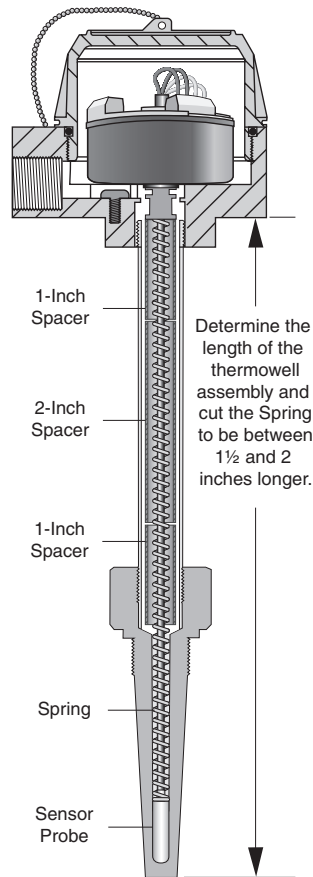
WORM Sensors



Head-Mount Enclosure Installation (Including Moore Industries' LH enclosure)

Installation Components: Sensor, Spring, Cap, Clip, Stopper, Washer, Tubing and Spacer(s).

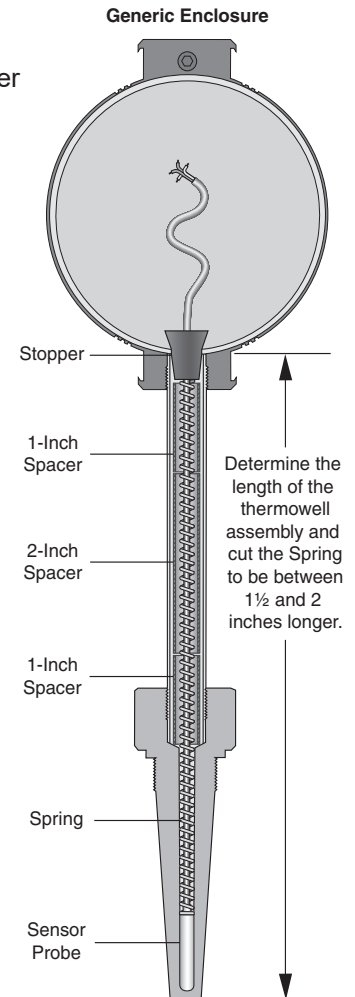
- Determine the length of the thermowell assembly (see the illustration to the left). Cut the WORM Spring to be between 1½ and 2 inches longer than the length of the assembly (this is necessary so that the Spring's compression securely holds the Sensor Probe to the bottom of the thermowell).
- Ensuring that the uncut portion of the Spring faces down towards the Sensor Probe, slide the Spring over the sensor wires and onto the end of the Sensor Probe.
- Slide the Cap & washer over the sensor wires onto the top of the Spring.
- Remove the instrument from the enclosure. Insert the WORM sensor into the thermowell. Slide the appropriate length(s) and number of Spacers to keep the WORM Spring straight inside the thermowell assembly lag (Spacers may not be required).
- Reinstall the instrument into the enclosure, compressing the WORM Spring into the thermowell with the bottom of the instrument. Cut the wire to its final length. If using fiberglass insulation, WH, shrink the tubing over the cut end of the fiberglass insulation to prevent it from fraying. Connect the sensor wires.



Generic Enclosure Installation

Installation Components: Sensor, Spring, Cap, Clip, Stopper, Washer, Tubing and Spacer(s).

- Determine the length of the thermowell assembly (see the illustration to the right). Cut the WORM Spring to be between 1½ and 2 inches longer than the length of the assembly (this is necessary so that the Spring's compression securely holds the Sensor Probe to the bottom of the thermowell).
- Ensuring that the uncut portion of the Spring faces down towards the Sensor Probe, slide the Spring over the sensor wires and onto the end of the Sensor Probe.
- Remove the instrument from the enclosure (if necessary). Insert the WORM sensor into the thermowell. Slide the appropriate length(s) and number of Spacers to keep the WORM Spring straight inside the thermowell assembly lag (Spacers may not be required).
- Slide the Stopper over the sensor wires onto the top of the Spring. Push the Stopper firmly into the thermowell entry port to compress the WORM Spring into the thermowell.
- Reinstall the instrument into the enclosure and cut the wire to its final length. If using fiberglass insulation, WH, shrink the tubing over the cut end of the fiberglass insulation to prevent it from fraying. Connect the sensor wires.





Temperature Assemblies WORM Sensors

WORM Replacement Kits Model Codes

- SEN1** Sensor Kit includes one complete “the WORM” Sensor plus one installation parts kit
SEN3 Sensor Kit includes three complete “the WORM” Sensors plus three installation parts kits
SEN10 Can of WORMs: Sensor Kit includes ten complete “the WORM” Sensors plus ten installation parts kits

Jacket Length (Overall wire insulation jacket)

- JL24** 24” Wire Jacket and Spring Length plus 6-8” of flying leads (use where the compressed spring is required to be 22” or less)
JL36 36” Wire Jacket and Spring Length plus 6-8” of flying leads (use where the compressed spring is required to be 34” or less)

Capsule Diameter

- D25** Appropriate for 0.25” and 6mm Diameter Applications

Capsule Material

- S316** Stainless Steel 316

Sensor Type (See Page 4 for Specifications)

RTD SENSORS:

- WSPT14** Low Temp. Jacket, Pt 3850 RTD; 4-Wire; 100 ohm (450°F maximum)
-WSPT104 Low Temp. Jacket, Pt 3850 RTD; 4-Wire; 1000 ohm (450°F maximum)
-WSN4 Low Temp. Jacket, Nickel RTD; 4-Wire; 120 ohm (450°F maximum)
-WSCU4 Low Temp. Jacket, Copper RTD; 4-Wire; 10 ohm (450°F maximum)
-WHPT14 High Temp. Jacket, Pt 3850 RTD; 4-Wire; 100 ohm (800°F maximum)
-WHPT104 High Temp. Jacket, Pt 3850 RTD; 4-Wire; 1000 ohm (800°F maximum)
-WS2PT14 Dual Sensor; Low Temp. Jacket, Pt 3850 RTD; 4-Wire; 100 ohm (450°F maximum)
-WS2PT104 Dual Sensor; Low Temp. Jacket, Pt 3850 RTD; 4-Wire; 1000 ohm (450°F maximum)
-WH2PT13 Dual Sensor; High Temp. Jacket, Pt 3850 RTD; 3-Wire; 100 ohm (800°F maximum)
-WH2PT103 Dual Sensor; High Temp. Jacket, Pt 3850 RTD; 3-Wire; 1000 ohm (800°F maximum)

THERMOCOUPLE SENSORS:

- WSTC?G** Low Temp. Jacket, Replace “?” with J, K, T or E T/C, Grounded (450°F maximum)
-WSTC?U Low Temp. Jacket, Replace “?” with J, K, T or E T/C, Ungrounded (450°F maximum)
-WHTC?G High Temp. Jacket, Replace “?” with J, K, T or E T/C, Grounded
-WHTC?U High Temp. Jacket, Replace “?” with J, K, T or E T/C, Ungrounded
-WS2TC?G Dual Sensor, Low Temp. Jacket, Replace “?” with J, K, T or E T/C, Grounded (450°F maximum)
-WS2TC?U Dual Sensor, Low Temp. Jacket, Replace “?” with J, K, T or E T/C, Ungrounded (450°F maximum)
-WH2TC?G Dual Sensor, High Temp. Jacket, Replace “?” with J, K, T or E T/C, Grounded
-WH2TC?U Dual Sensor, High Temp. Jacket, Replace “?” with J, K, T or E T/C, Ungrounded

Sensor Options

- .04** Class AA High Accuracy PT RTD Sensor
-.06 Class A High Accuracy PT RTD Sensor
-10G Low-Intensity Vibration Sensor
-30G High-Intensity Vibration Sensor
-WW Wire Wound Sensor; Use with RTDs below -23°C (-10°F)

Connection Head / Enclosure (TB = Terminal Block)

- [SEN]** Sensor Only; No Enclosure; No Transmitter; No TB

Table 6. WORM Spare Parts Numbers

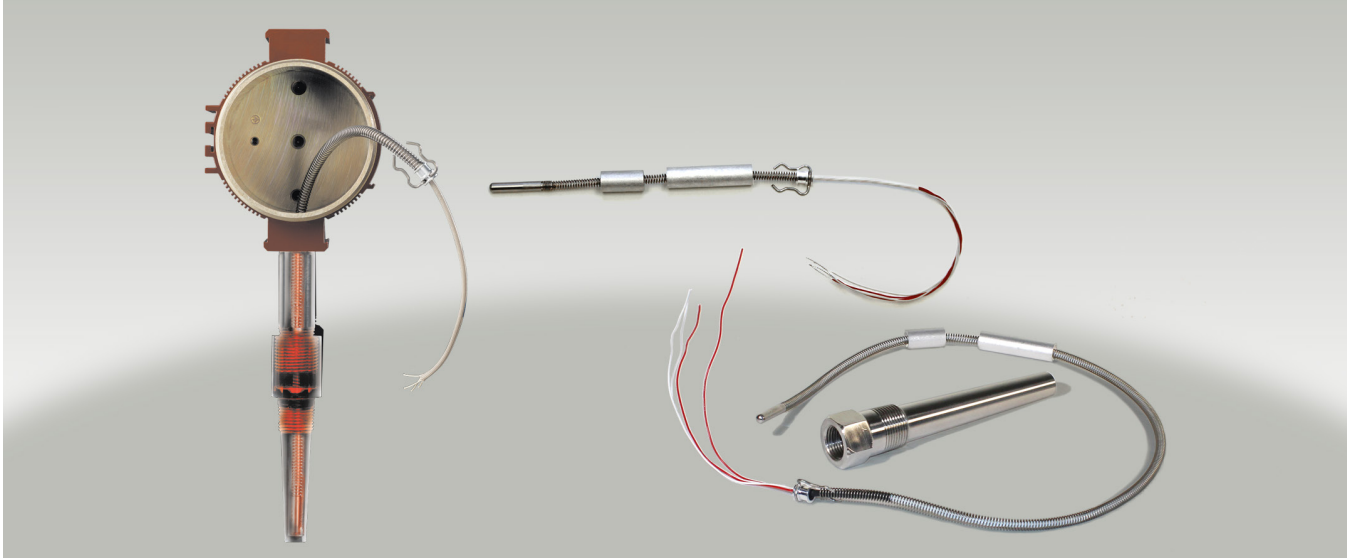
Part Number	Description
231-849-00	Spare Parts Kit includes three each: Spare Spring; Clip; Cap; 1” Spacer; 2” Spacer; stopper; washer; heat shrink tubing
802-179-24	Combination Pliers/Wire Stripper facilitates installation of the WORM components and sensor connection

Temperature Assemblies

WORM Sensors



Build Your Own Replacement WORM Sensor



You can build your own replacement WORM sensor by combining the various components and options available with the WORM. The variety of components combined with the ability to make them almost any length mean that you can create just the right flexible sensor solution to meet your unique application.

Figure 36. Standard WORM Sensor; Lead Length with Overall Jacket* and Cord Grip.

Model Number Example: **SENW / JL120 / D25 / S316 / -WSPT14 -GRIP [SEN]**

Uses: Replacement sensor or surface measurements where lead wire protection is not needed. Non-abrasive environment.

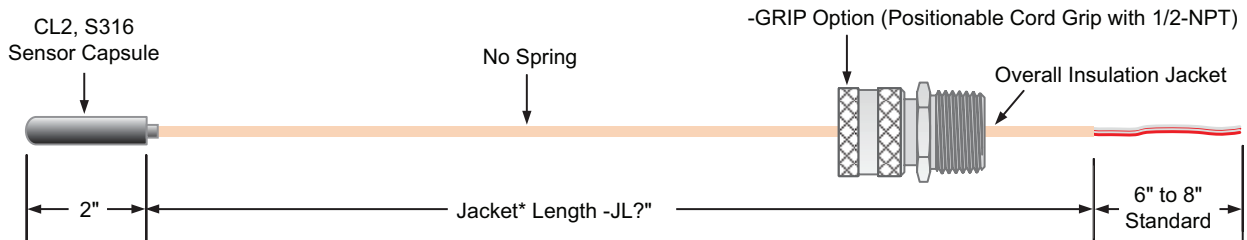
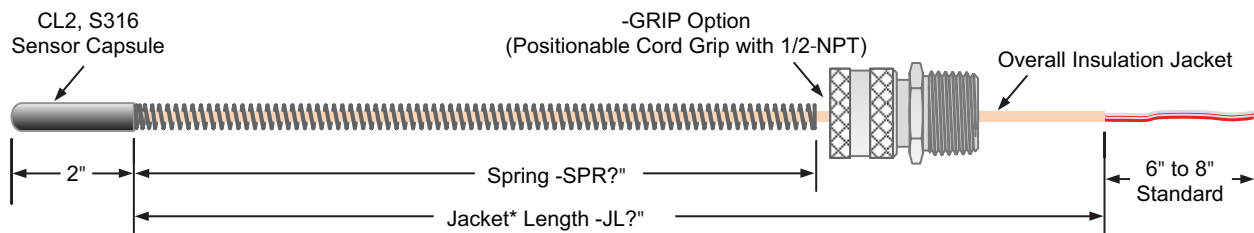


Figure 37. Standard WORM Sensor; Lead Length with Overall Jacket* and Spring and Cord Grip.

Model Number Example: **SENW / JL46 / D25 / S316 / -WSPT14 -SPR32 -GRIP [SEN]**

Uses: Anytime you want the compressed spring to keep the sensor in contact with the well or hot surface. When used with the WORM Nose the spring adds weight to keep the sensor in the Nose. Increased protection of the lead wire against abrasion.





Temperature Assemblies WORM Sensors

Build Your Own WORM Model Codes

Universal Temperature Transmitter (See TDY, THZ³/TDZ³, STZ and TRY/TRX Data Sheets for Specifications)

SENW Sensor Only; No Transmitter

Jacket Length (Overall wire insulation jacket)

JL? Insulation jacket length Replace ? with jacket length in inches (1" increments). 6-8" of flying leads is provided beyond the jacket. Spring is ordered separately using -SPR? Option.

Capsule Diameter

D25 Appropriate for 0.25" and 6mm Diameter Applications

D18 0.187" (4.75mm) Diameter

Capsule Material

S316 Stainless Steel 316

INC Inconel 600; Only with WHTCK* Sensor up to 1093°C (2000°F)

Sensor Type (See Page 4 for Specifications)

RTD SENSORS:

- WSPT14 Low Temp. Jacket, Pt 3850 RTD; 4-Wire; 100 ohm (450°F maximum)
- WSPT104 Low Temp. Jacket, Pt 3850 RTD; 4-Wire; 1000 ohm (450°F maximum)
- WSN4 Low Temp. Jacket, Nickel RTD; 4-Wire; 120 ohm (450°F maximum)
- WSCU4 Low Temp. Jacket, Copper RTD; 4-Wire; 10 ohm (450°F maximum)
- WHPT14 High Temp. Jacket, Pt 3850 RTD; 4-Wire; 100 ohm (800°F maximum)
- WHPT104 High Temp. Jacket, Pt 3850 RTD; 4-Wire; 1000 ohm (800°F maximum)
- WS2PT14 Dual Sensor; Low Temp. Jacket, Pt 3850 RTD; 4-Wire; 100 ohm (450°F maximum)
- WS2PT104 Dual Sensor; Low Temp. Jacket, Pt 3850 RTD; 4-Wire; 1000 ohm (450°F maximum)
- WH2PT13 Dual Sensor; High Temp. Jacket, Pt 3850 RTD; 3-Wire; 100 ohm (800°F maximum)
- WH2PT103 Dual Sensor; High Temp. Jacket, Pt 3850 RTD; 3-Wire; 1000 ohm (800°F maximum)

THERMOCOUPLE SENSORS:

- WSTC?G Low Temp. Jacket, Replace "?" with J, K, T or E T/C, Grounded (450°F maximum)
- WSTC?U Low Temp. Jacket, Replace "?" with J, K, T or E T/C, Ungrounded (450°F maximum)
- WHTC?G High Temp. Jacket, Replace "?" with J, K, T or E T/C, Grounded
- WHTC?U High Temp. Jacket, Replace "?" with J, K, T or E T/C, Ungrounded
- WS2TC?G Dual Sensor, Low Temp. Jacket, Replace "?" with J, K, T or E T/C, Grounded (450°F maximum)
- WS2TC?U Dual Sensor, Low Temp. Jacket, Replace "?" with J, K, T or E T/C, Ungrounded (450°F maximum)
- WH2TC?G Dual Sensor, High Temp. Jacket, Replace "?" with J, K, T or E T/C, Grounded
- WH2TC?U Dual Sensor, High Temp. Jacket, Replace "?" with J, K, T or E T/C, Ungrounded

Sensor Options

- .04 Class AA High Accuracy RTD Sensor
- .06 Class A High Accuracy RTD Sensor
- 10G Low-Intensity Vibration Sensor
- 30G High-Intensity Vibration Sensor
- WW Wire Wound Sensor; Use with RTDs below -23°C (-10°F)
- CTD? Comparison Temperature Data Report. Using the bath at the User's specified temperatures, report sensor data vs. Primary Standard data. Replace ? with 3 for 3 data points and 5 for 5 data points.

Temperature Assemblies WORM Sensors



Build Your Own WORM Model Codes

Assembly Options

-SPR? Spring Length - Replace "?" with Length up to 120"

-FLAT Sensor Capsule is 1.5" long with a flat tip. Use with replacement sensors for -TANK, -BAY & -PIPE

Connection Head / Enclosure (TB = Terminal Block)

SEN Sensor Only; No Enclosure; No Transmitter; No TB



Thermowells Only



WEL Well Assembly without a Temperature Transmitter; Terminal Block provided with connection head

Thermowell Type (See Pages 11 and 12 for Descriptions and Dimensions)

- A** Heavy-Duty Threaded, Tapered Well
- B** Standard-Duty Threaded, Straight Well
- C** Standard-Duty Threaded, Stepped Well
- S** Sanitary Tri Clamp Style Well
- PTB** Protection Well and Tube (Available in SS316)
 - Heavy Duty Protection Tube - Select (-P2, -P3, -P1) Process Threads
 - Light Duty Protection Well - Select (-P2C, -P3C, -P1C) No Process Thread

Thermowell Process Connection Size (See Page 11 and 12)

- P2** Threaded, 1/2-NPT (A, B, C, PTB Heavy Duty Well)
- P3** Threaded, 3/4-NPT (A, B, C, PTB Heavy Duty Well)
- P1** Threaded, 1-NPT (A, B, C, PTB Heavy Duty Well)
- F?** Flanged Well, Replace "?" with Ordering Code from Table 5 on Page 13
- SW?** Socket Weld, Replace ? with Nominal Pipe Size: 2 = 1/2", 3 = 3/4", 1 = 1", 4 = 1-1/4"
- D?** Sanitary Well Cap Diameter, Replace "?" with Cap Diameter, (D.5 = 0.984-inch, D.75 = 0.984-inch, D1 = 1.984-inch, D1.5 = 1.984-inch, D2 = 2.516-inch, D2.5 = 3.047-inch, D3 = 3.579-inch, D4=4.682-inch)
- P2C** Straight 3/8" O.D. Protection Tube. Light Duty. 1/2-NPT male thread on cold side only. No Process Threads
- P3C** Straight 3/8" O.D. Protection Tube. Light Duty. 3/4-NPT male thread on cold side only. No Process Threads
- P1C** Straight 3/8" O.D. Protection Tube. Light Duty. 1-NPT male thread on cold side only. No Process Threads

Thermowell Insertion Length ("U" Dimension) (See Pages 10,11 and 12)

- U?** Replace "?" with any Insertion Length in 0.25-inch Increments (1-inch or longer)

Lagging Extension Length ("T" Dimension) (See Pages 10 and 11)

- T0** No Lagging, 0-inches (Standard)
- T2** 2" Lag (Standard)
- T?** Replace "?" with Length in 0.25-inch Increments
- D38** Tube is 3/8"OD (Use only with PTB-P2C, PTB-P1C, PTB-P3C)
- D50** Tube is 1/2"OD (Use only with PTB-P2, PTB-P1, PTB-P3)

Thermowell Material

- S304** SS304 (Standard)
- S316** SS316 (Standard; PTB in S316)
- S316L** Low carbon 316 stainless (for Sanitary wells)
- CS** Carbon Steel
- BR** Brass
- S310** Stainless Steel 310 for Thermowell Temperatures of 1093°C (2000°F)
- S446** Stainless Steel 446 for Thermowell Temperatures of 1093°C (2000°F) (Other Materials Available - Consult Factory)

Thermowell Internal Bore

- 26** 0.26" ID

Temperature Assemblies

WORM Sensors



Need Help With Specifying Replacement Sensors?

Of course, our Application Specialists can help with your specific needs, but some of the following examples may also help.

Should you ever need to calculate the appropriate WORM Spring Length, using the drawings on page 9 as an example and starting at the bottom of the well: Spring Length = (U + 1" + T + .75" + 5.5" + .5") + 2" overage.

Full Assemblies Replacement Sensors

Model T2X / C-P2 / U2-T0 / S316 / -26 -NPL -WSPT14 [LH1NS]

Replacement sensor: SEN1 / JL24 / D25 / S316 / -WSPT14 [SEN] (page 33)

Model WEL / B-P3 / U12-T0 / S446 / -26 -WHTCKU -NPL3 [LH2NS]

Replacement sensor: SENW / JL20 / D25 / INC / -WHTCKU -SPR20 [SEN] (page 35)

Model TDZ³ / B-P2 / U3.5-T0 / S316 / -26 -NUN -WSPT14 [BH2NG]

Replacement sensor: SEN1 / JL24 / D25 / S316 / -WSPT14 [SEN] (page 33)

Model TRX / A-P3 / U2-T4 / S316 / -26 -NPL -WSPT104 -.06 -VTB [LH1NS]

Replacement sensor: SENW / JL12 / D25 / S316 / -WSPT104 -.06 -CTD3 [SEN] (page 35)

Surface Mount Assemblies Replacement Sensors

Model SENW / JLFC / D25 / S316 / -FLAT -WSPT14 -PIPE -.75NPT [LH2NS]

Replacement Sensor: SENW / JL6 / D25 / S316 / -FLAT -WSPT14 [SEN] (page 35)

Model SENW / JL72 / D25 / S316 / -WSPT14 -30G -CLAMP [SEN]

Replacement Sensor: SENW / JL72 / D25 / S316 / -WSPT14 -30G [SEN] (page 35)

Model SENW / JL120 / D25 / S316 / -WHTCKU -MPAD [SEN]

Replacement Sensor: SENW / JL120 / D25 / S316 / -WHTCKU [SEN] (page 35)

Model TRY / JLFC / D25 / S316 / -FLAT -WSPT14 -PIPE [CH19]

Replacement Sensor: SENW / JL6 / D25 / S316 / -FLAT -WSPT14 [SEN] (page 35)

Build Your Own Replacement Sensors

Model SENW / JL139 / D25 / S316 / -WSPT14 -30G -SPR18 -.5NPT -FLEX120 -GRIP [SEN]

Replacement Sensor: SENW / JL139 / D25 / S316 / -WSPT14 -30G [SEN] (page 35)

Model SENW / JL200 / D25 / S316 / -WHTCKU [SEN]

Replacement Sensor: SENW / JL200 / D25 / S316 / -WHTCKU [SEN] (page 35)

Model SENW / JL144 / D25 / S316 / -WSPT104 -.06 [LH1NSP]

Replacement Sensor: SENW / JL144 / D25 / S316 / -WSPT104 -.06 [SEN] (page 35)

Model SENW / JL600 / D25 / S316 / -WSPT14 -30G -SPR18 -.5NPT -FLEX552 [SEN]

Replacement Sensor: SENW / JL600 / D25 / S316 / -WSPT14 -30G [SEN] (page 35)



Temperature Assemblies WORM Sensors

Table 7. Spare or Replacement Components

	Model # Code	Moore P/N	Description
Extensions	NUN	233-806-00	Nipple, Union, Nipple
	UNN	233-806-01	Nipple, Union
	NPL	801-904-24	2.5-In. Nipple Only
	NPL1	801-901-24	1-In. Nipple Only
	NPL1.5	801-902-24	1.5-In. Nipple Only
	NPL2	802-238-24	2-In. Nipple Only
	NPL3	801-905-24	3-In. Nipple Only
	NPL4	801-907-24	4-In. Nipple Only
	NPL6	801-911-24	6-In. Nipple Only
Wells or Surface Mounts	WN	231-201-31	Worm Nose Fitting
	CLAMP	233-227-01	Allows PAD Mounting Option to Be Clamped onto any Pipe
	Pipe Band	233-227-02	Fits up to 12" inch pipe for PAD, CLAMP, PIPE mounts
	PAD	233-226-01	Protective Mounting PAD Welds or Bolts onto a Metal Surface
	MPAD	803-986-24	Magnetic Mounting PAD for Mounting on a Metal Surface
	EXP	233-231-01	Exposed Air Thermowell for Measurements Indoor or Outdoors
	PIPE	233-230-01	Thermowell Mount with Pipe Clamps. Requires two Pipe Bands
	BAY	233-228-01	Bayonet Pipe Mount Clamp for Heavily Insulated Applications
	TANK	233-229-01	Protective Mount with 1/2-NPT Conn. Welds onto a Surface
Terminal Blocks	TB4	805-989-27	4-Position Ceramic Terminal Block
	TB6	803-821-27	6-Position Ceramic Terminal Block
	TB8	804-918-27	8-Position Ceramic Terminal Block
	TS4	234-807-00	4-Position Removable Terminal Strip (for LH Enclosures)
	TS8	234-807-01	8-Position Removable Terminal Strip (for LH Enclosures)
Connection Heads	CH6	800-803-19	Black Polypropylene Body and Cap, Type 4X & IP166
	CH6W	800-804-19	White Polypropylene Body and Cap, Type 4X & IP166
	CH19	800-860-18	Stainless Steel 316 Body and Cap, Type 4X & IP166

Temperature Assemblies Solid Sheath Sensors



Solid Sheath Temperature Assemblies

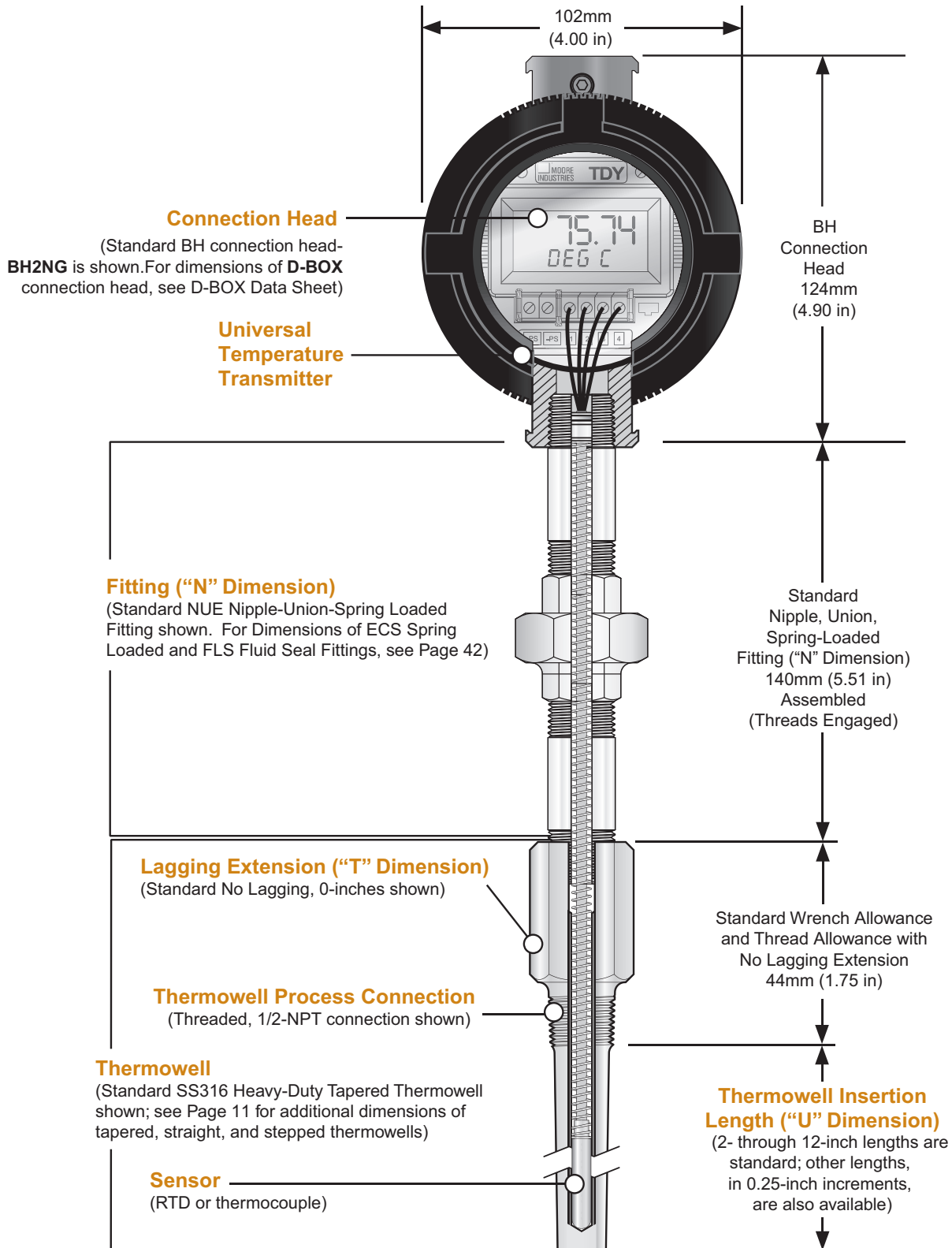


- Using more traditional Solid Sheath sensors inside your temperature assemblies comes with trade-offs:
 - A solid sheath eliminates the need to consider insulation temperature limitations.
 - The ability to field cut replacement sensors to length is lost.
 - Response speed is slower than that of WORM.
 - Ambient temperature influence is normally more pronounced with solid sheath sensors.
- Universal TRX, TRY, & TDY PC-Programmable, THZ³ & TDZ³ Smart HART and STZ Functional Safety Temperature Transmitters.
- Build your assembly with the thermowell style and material of choice.
- The solid sheath sensors are spring-loaded so the sensor maintains contact with the thermowell.
- Complete NIST-traceable calibration reports are available.



Temperature Assemblies Solid Sheath Sensors

Standard Temperature Assemblies with Sensor and Thermowell



Temperature Assemblies

Solid Sheath Sensors



Transmitter Descriptions:

See page 5.

Thermowell Descriptions:

See pages 11 and 12.

Enclosure Descriptions:

See page 16.

Extension Selection:

Figure 38. -ECS or -RES: Economy Spring-Load Fitting or Removable Spring-Load Fitting. Use -RES when you intend to remove the sensor and transmitter while they are still wired together. Most often used when bath calibrating (-VTB).
Stainless Steel
Length: 2.5"; 2" with engaged threads.



Figure 40. -SPR2: 2" Spring Fitting, 316 SS Bar Stock. Excellent strength.

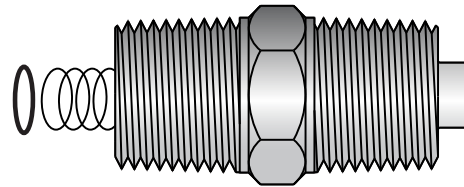


Figure 39. -NUE or -NUR: Nipple-Union-ECS or Nipple-Union-RES

We are just adding a Nipple and Union to the above fittings.
Stainless Steel
Length: 6"; 5.5" with engaged threads.

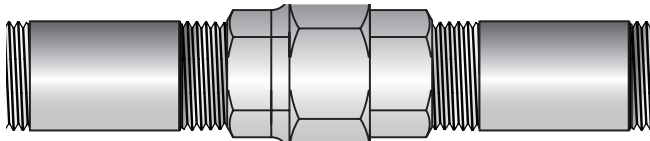
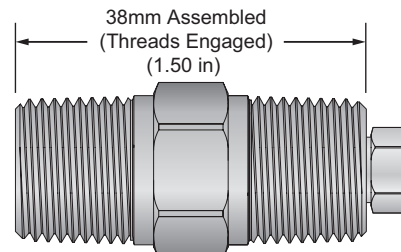


Figure 41. FLS Fluid Seal Fitting and OS Spring-Loaded Oil Seal
Use for transmitter assemblies with thermowells and assemblies with fixed immersion sensors (it is not used with WORM sensors). It prevents fluid leak along the sensor sheath so it's ideal for using temperature sensitive paste or heat transfer fluid in the thermowell. It can also be used in air ducts and other applications. Although the FLS provides adjustment precision, it crimps the sensor sheath, and can therefore be adjusted only once (up to 0.50 in).





Full Thermowell Assemblies Model Codes

Universal Temperature Transmitter (See TDY, THZ³/TDZ³, STZ and TRY/TRX Data Sheets for Specifications)

TDY	Isolated, PC-Configurable Temperature Transmitter with Display (Specify with BH2NG or D2LC Housing)
TDZ³	Isolated, Dual Input Smart HART [®] Temperature Transmitter with Display (Specify with BH2NG or D2LC Housing)
STZ	Isolated, Functional Safety Dual Input Smart HART [®] Temperature Transmitter (Specify with LH2NS or BH2NG Housings Only)
THZ³	Isolated, Dual Input Smart HART [®] Temperature Transmitter (Specify with LH1NS or LH2NS Housing)
TRY	Isolated, PC-Configurable Temperature Transmitter (Specify with LH1NS or LH2NS Housing)
TRX	Non-Isolated, PC-Configurable Temperature Transmitter (Specify with LH1NS or LH2NS Housing)
T2X	Non-Isolated, PC-Configurable RTD Only Transmitter (Specify with LH1NS or LH2NS Housing)
WEL	No Transmitter; Terminal Block in Housing

Thermowell Type (See Pages 11 and 12 for Descriptions and Dimensions)

A	Heavy-Duty Threaded, Tapered Well
B	Standard-Duty Threaded, Straight Well
C	Standard-Duty Threaded, Stepped Well
S	Sanitary Tri Clamp Style Well

Thermowell Process Connection Size (See Page 12)

P2	Threaded, ½-NPT (A, B, C, PTB Heavy Duty Well)
P3	Threaded, ¾-NPT (A, B, C, PTB Heavy Duty Well)
P1	Threaded, 1-NPT (A, B, C, PTB Heavy Duty Well)
F?	Flanged Well, Replace “?” with Ordering Code from Table 5 on Page 13
SW?	Socket Weld, Replace ? with Nominal Pipe Size: 2 = 1/2”, 3 = 3/4”, 1 = 1”, 4 = 1-1/4”
D?	Sanitary Well Cap Diameter, Replace “?” with Cap Diameter, (D.5 = 0.984-inch, D.75 = 0.984-inch, D1 = 1.984-inch, D1.5 = 1.984-inch, D2 = 2.516-inch, D2.5 = 3.047-inch, D3 = 3.579-inch, D4=4.682-inch)

Thermowell Insertion Length (“U” Dimension) (See Pages 10, 11 and 12)

U?	Replace “?” with any Insertion Length in 0.25-inch Increments
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Lagging Extension Length (“T” Dimension) (See Pages 10 and 11)

T0	No Lagging, 0-inches (Standard)
T2	2” Lagging (Standard)
T?	Replace “?” with Length in 0.25-inch Increments

Thermowell Material

S304	SS304 (Standard)
S316	SS316 (Standard; PTB in S316)
S316L	Low carbon 316 stainless (for Sanitary wells)
CS	Carbon Steel
BR	Brass
S310	Stainless Steel 310 for Thermowell Temperatures of 1093°C (2000°F)
S446	Stainless Steel 446 for Thermowell Temperatures of 1093°C (2000°F) (Other Materials Available - Consult Factory)

Thermowell Internal Bore; Extension Fitting

-26-ECS	0.26” ID; Spring-Load Fitting
-26-FLS	0.26” ID; Fluid Seal Fitting
-26-RES	0.26” ID; Removable Spring-Load Fitting (Specify when ordering option -VTB)
-26-SPR2	0.26” ID; Spring-Load Fitting; 316SS Bar Stock
-26-NUE	0.26” ID; Nipple-Union-Spring-Load Fitting
-26-NUR	0.26” ID; Nipple-Union-Removable Spring-Load Fitting (Specify when ordering option -VTB)

Sensor Type

	RTDs
-PT14	Platinum 3850 RTD; 4-Wire; 100 ohm
-PT13	Platinum 3850 RTD; 3-Wire; 100 ohm
-PT104	Platinum 3850 RTD; 4-Wire; 1000 ohm
-PT103	Platinum 3850 RTD; 3-Wire; 1000 ohm

Temperature Assemblies

Solid Sheath Sensors



RTDs continued...

- CU4 Copper RTD; 4-Wire; 10 ohm
- CU3 Copper RTD; 3-Wire; 10 ohm
- N4 Nickel RTD; 4-Wire; 120 ohm
- N3 Nickel RTD; 3-Wire; 120 ohm
- 2PT14 Dual Element Pt 3850 RTD; 4-Wire; 100 ohm
- 2PT13 Dual Element Pt 3850 RTD; 3-Wire; 100 ohm
- 2PT104 Dual Element Pt 3850 RTD; 4-Wire; 1000 ohm
- 2PT103 Dual Element Pt 3850 RTD; 3-Wire; 1000 ohm

Thermocouples (Not Available with T2X)

- TCJG J-Type Thermocouple; Grounded
 - TCJU J-Type Thermocouple; Ungrounded
 - TCKG K-Type Thermocouple; Grounded
 - TCKU K-Type Thermocouple; Ungrounded
 - TC?G Replace “?” with other T/C type E, N or T; Grounded
 - TC?U Replace “?” with other T/C type E, N or T; Ungrounded
 - 2TC?G Replace “?” with E, J, K, N or T T/C, Grounded (Dual Sensor)
 - 2TC?U Replace “?” with E, J, K, N or T T/C, Ungrounded (Dual Sensor)
- *Note: Other RTD and T/C types are also available. Consult factory for details.

Sensor Options

- .04 Class AA High Accuracy Platinum RTD Sensor
- .06 Class A High Accuracy Platinum RTD Sensor
- WW Wire wound RTD sensor
- 10G Low Intensity Vibration Sensor
- 30G High Intensity Vibration Sensor
- CTD? Bath Comparison Data for Sensor - Unknown vs Primary Standard
- VTB Bath Trim the Transmitter; Provide Assembly NIST Test Report
- VTD Configure Transmitter; Provide Transmitter NIST Test Report

Assembly Options

- CL? Internal Sensor or WORM Length. To be calculated by MII if not provided
- IS? Intrinsic Safety Label on Transmitter. Select Option Code from Table 4 on page 8
- .75NPT 1/2-NPT x 3/4-NPT conduit adapter for LH
- FS Functional Safety (Yellow) LH2 Housing. Only for STZ and Safety Sensor Assemblies
- 1ST 1 Chained SS Tag for customer use
- 2ST 2 Chained SS Tags for customer use
- TB6 6 Terminal Block. Provided automatically. Option code not required
- TB8 8 Terminal Block. Provided automatically. Option code not required

Remote Mount Options

- RMLH2NS Remote mount the TT. The LH2NS w/TB6 or TB8 will be coupled to the assembly
- RMLH2NSP Remote mount the TT. The LH2NSP w/TB6 or TB8 will be coupled to the assembly
- RMLH2MS Remote mount the TT. The LH2MS w/TB6 or TB8 will be coupled to the assembly
- RMLH2MSP Remote mount the TT. The LH2MSP w/TB6 or TB8 will be coupled to the assembly
- RMLH1NS Remote mount the TT. The LH1NS w/TB6 or TB8 will be coupled to the assembly
- RMLH1NSP Remote mount the TT. The LH1NSP w/TB6 or TB8 will be coupled to the assembly
- RMLH1MS Remote mount the TT. The LH1MS w/TB6 or TB8 will be coupled to the assembly
- RMLH1MSP Remote mount the TT. The LH1MSP w/TB6 or TB8 will be coupled to the assembly
- RMCH19 Remote mount the TT. The CH19 w/TB6 or TB8 will be coupled to the assembly

Connection Head / Enclosure (TB = Terminal Block)

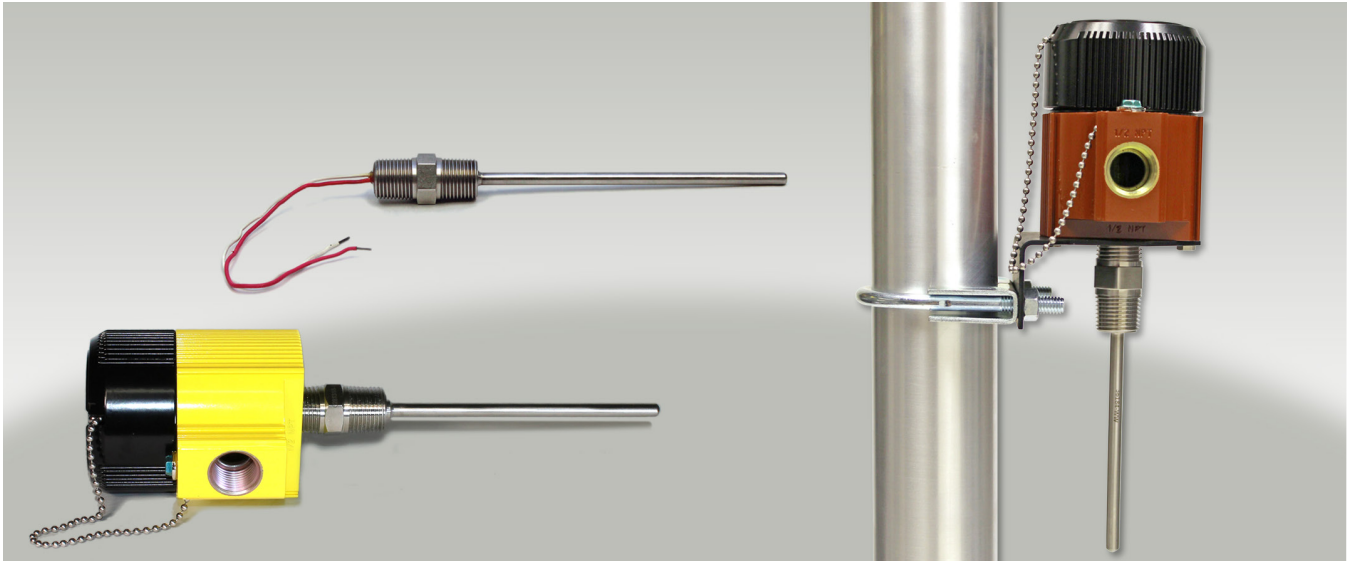
- CH0 Temperature Assembly with No Head/Enclosure, TB, Transmitter.
- CH? See full housing selection on page 16
- LH? See full housing selection on page 16
- BH? See full housing selection on page 16
- SB? See full housing selection on page 16
- D2? See full housing selection on page 16



Temperature Assemblies Solid Sheath Sensors

Fixed Immersion Assemblies

Universal Temperature Transmitter (See TDY, THZ³/TDZ³, STZ and TRY/TRX Data Sheets for Specifications)

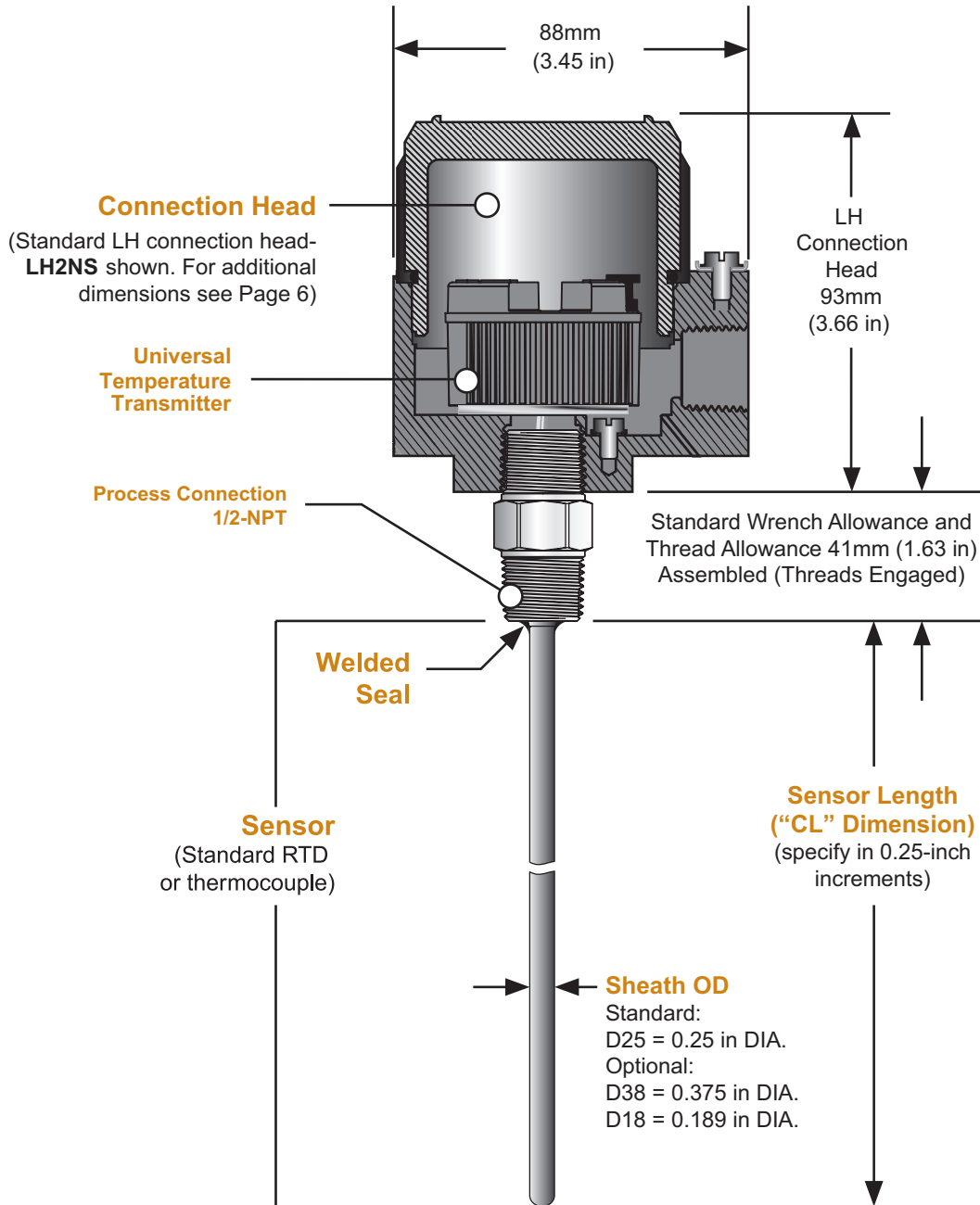


- A fixed immersion sensor is welded to the stainless steel fitting.
- The weld is liquid tight but not designed for high pressures.
- Fitting is 1/2-NPT on both sides, providing for the process connection, as well as, a head connection for a transmitter or terminal block.
- This style sensor is often used in air or gas streams and oven type applications.
- This style sensor is not as strong as a thermowell based assembly, but it has a faster response time.
- Because the sensor is not spring-loaded, fixed immersion sensors are not suitable for applications requiring sensor movement.
- Fixed immersion sensors can be used in light duty liquid flows where the flow rate is not excessive.

Temperature Assemblies Solid Sheath Sensors



Standard Temperature Assemblies with Fixed Immersion Sensor





Temperature Assemblies Solid Sheath Sensors

Fixed Immersion Assemblies Model Codes

Universal Temperature Transmitter (See TDY, THZ³/TDZ³, STZ and TRY/TRX Data Sheets for Specifications)

TDY	Isolated, PC-Configurable Temperature Transmitter with Display (Specify with BH2NG or D2LC Housing)
TDZ³	Isolated, Dual Input Smart HART [®] Temperature Transmitter with Display (Specify with BH2NG or D2LC Housing)
STZ	Isolated, Functional Safety Dual Input Smart HART [®] Temperature Transmitter (Specify with LH2NS or BH2NG Housings Only)
THZ³	Isolated, Dual Input Smart HART [®] Temperature Transmitter (Specify with LH1NS or LH2NS Housing)
TRY	Isolated, PC-Configurable Temperature Transmitter (Specify with LH1NS or LH2NS Housing)
TRX	Non-Isolated, PC-Configurable Temperature Transmitter (Specify with LH1NS or LH2NS Housing)
T2X	Non-Isolated, PC-Configurable RTD Only Transmitter (Specify with LH1NS or LH2NS Housing)
SEN	No Transmitter; Terminal Block in Housing

Sensor Sheath Length

CL? Sensor length - Replace "?" with the length in inches below the fitting

Sensor Sheath Diameter

D25	O.D. = 0.250" (6.35mm)
D12	O.D. = 0.125" (3.18mm)
D18	O.D. = 0.188" (4.78mm)
D38	O.D. = 0.375" (9.53mm)

Sensor Sheath Material

S316	316 Stainless Steel
INC	Inconel 600

Sensor Type with 1/2-NPT x 1/2-NPT Fitting

RTDs

-PT1C4	Platinum 3850 RTD; 4-Wire; 100 ohm
-PT1C3	Platinum 3850 RTD; 3-Wire; 100 ohm
-PT10C4	Platinum 3850 RTD; 4-Wire; 1000 ohm
-PT10C3	Platinum 3850 RTD; 3-Wire; 1000 ohm
-CUC4	Copper RTD; 4-Wire; 10 ohm
-CUC3	Copper RTD; 3-Wire; 10 ohm
-NC4	Nickel RTD; 4-Wire; 120 ohm
-NC3	Nickel RTD; 3-Wire; 120 ohm
-2PT1C4	Dual Element Pt 3850 RTD; 4-Wire; 100 ohm
-2PT1C3	Dual Element Pt 3850 RTD; 3-Wire; 100 ohm
-2PT10C4	Dual Element Pt 3850 RTD; 4-Wire; 1000 ohm
-2PT10C3	Dual Element Pt 3850 RTD; 3-Wire; 1000 ohm

Thermocouples (Not Available with T2X)

-TCCJG	J-Type Thermocouple; Grounded
-TCCJU	J-Type Thermocouple; Ungrounded
-TCCKG	K-Type Thermocouple; Grounded
-TCCKU	K-Type Thermocouple; Ungrounded
-TCC?G	Replace "?" with other T/C type E, N or T; Grounded
-TCC?U	Replace "?" with other T/C type E, N or T; Ungrounded
-2TCC?G	Replace "?" with E, J, K, N or T T/C, Grounded (Dual Sensor)
-2TCC?U	Replace "?" with E, J, K, N or T T/C, Ungrounded (Dual Sensor)

***Note:** Other RTD and T/C types are also available. Consult factory for details.

Temperature Assemblies

Solid Sheath Sensors



Sensor Options

- 04 Class AA High Accuracy Platinum RTD Sensor
- 06 Class A High Accuracy Platinum RTD Sensor
- WW Wire wound RTD sensor
- 10G Low Intensity Vibration Sensor
- 30G High Intensity Vibration Sensor
- CTD? Bath Comparison Data for Sensor - Unknown vs Primary Standard
- VTB Bath Trim the Transmitter; Provide Assembly NIST Test Report
- VTD Configure Transmitter; Provide Transmitter NIST Test Report
- JL? Jacket Length (? Length in inches) - For Model SEN, additional insulated wire beyond the fitting
- FG Fiberglass insulation on wires

Assembly Options

- IS? Intrinsic Safety Label on Transmitter. Select Option Code from Table 4 on page 8
- SSF11 SS Compression Fitting for D25 sheath
- SSF15 SS Compression Fitting for D38 sheath
- .75NPT 1/2-NPT x 3/4-NPT conduit adapter for LH
- FS Functional Safety (Yellow) LH2 Housing. Only for STZ and Safety Sensor Assemblies
- 1ST 1 Chained SS Tag for customer use
- 2ST 2 Chained SS Tags for customer use
- TB6 6 Terminal Block, Provided automatically. Option code not required. For Model SEN
- TB8 8 Terminal Block. Provided automatically. Option code not required. For Model SEN

Remote Mount Options

- RMLH2NS Remote mount the TT. The LH2NS w/TB6 or TB8 will be coupled to the assembly
- RMLH2NSP Remote mount the TT. The LH2NSP w/TB6 or TB8 will be coupled to the assembly
- RMLH2MS Remote mount the TT. The LH2MS w/TB6 or TB8 will be coupled to the assembly
- RMLH2MSP Remote mount the TT. The LH2MSP w/TB6 or TB8 will be coupled to the assembly
- RMLH1NS Remote mount the TT. The LH1NS w/TB6 or TB8 will be coupled to the assembly
- RMLH1NSP Remote mount the TT. The LH1NSP w/TB6 or TB8 will be coupled to the assembly
- RMLH1MS Remote mount the TT. The LH1MS w/TB6 or TB8 will be coupled to the assembly
- RMLH1MSP Remote mount the TT. The LH1MSP w/TB6 or TB8 will be coupled to the assembly
- RMCH19 Remote mount the TT. The CH19 w/TB6 or TB8 will be coupled to the assembly

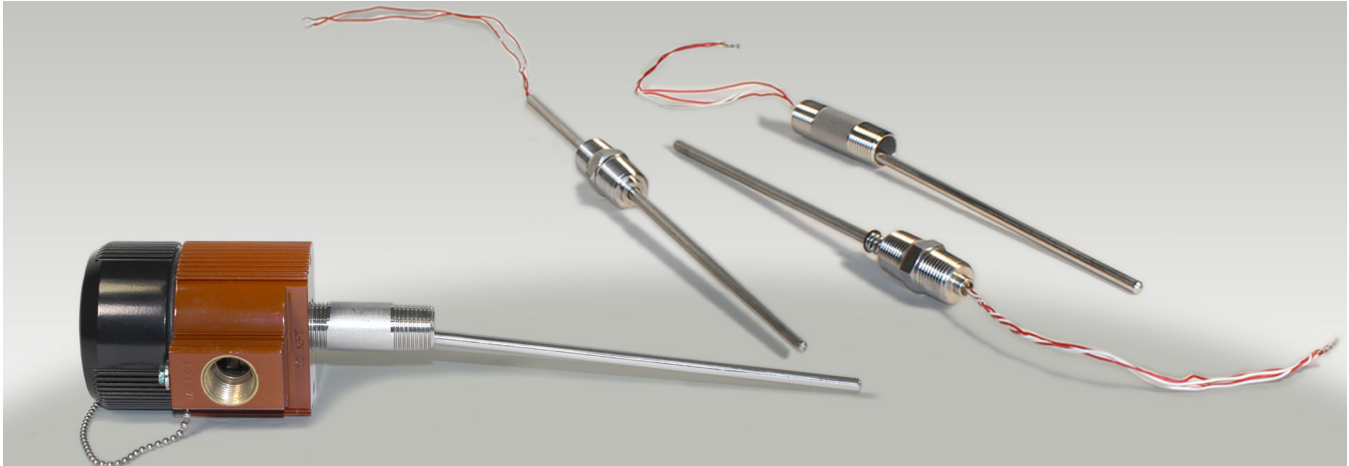
Connection Head / Enclosure (TB = Terminal Block)

- SEN Temperature Assembly with No Head/Enclosure, TB, Transmitter
- CH? See full housing selection on page 16
- LH? See full housing selection on page 16
- BH? See full housing selection on page 16
- SB? See full housing selection on page 16
- D2? See full housing selection on page 16



Sensor Assemblies using Existing Thermowells

When you already have a thermowell installed and you need everything else, build your Model # from the following section.



Universal Temperature Transmitter (See TDY, THZ³/TDZ³, STZ and TRY/TRX Data Sheets for Specifications)

TDY	Isolated, PC-Configurable Temperature Transmitter with Display (Specify with BH2NG or D2LC Housing)
TDZ³	Isolated, Dual Input Smart HART [®] Temperature Transmitter with Display (Specify with BH2NG or D2LC Housing)
STZ	Isolated, Functional Safety Dual Input Smart HART [®] Temperature Transmitter (Specify with LH2NS or BH2NG Housings Only)
THZ³	Isolated, Dual Input Smart HART [®] Temperature Transmitter (Specify with LH1NS or LH2NS Housing)
TRY	Isolated, PC-Configurable Temperature Transmitter (Specify with LH1NS or LH2NS Housing)
TRX	Non-Isolated, PC-Configurable Temperature Transmitter (Specify with LH1NS or LH2NS Housing)
T2X	Non-Isolated, PC-Configurable RTD Only Transmitter (Specify with LH1NS or LH2NS Housing)
SEN	No Transmitter; Terminal Block in Housing

Sensor Sheath Length

CL? Sensor length - Replace "?" with the length in inches below the fitting
(CL = U Length + Process Connection + T Length + Extension Length)

Sensor Sheath Diameter

D25	O.D. = 0.250" (6.35mm)
D12	O.D. = 0.125" (3.18mm)
D18	O.D. = 0.188" (4.78mm)
D38	O.D. = 0.375" (9.53mm)

Sensor Sheath Material

S316	316 Stainless Steel
INC	Inconel 600

Sensor Type

RTDs

-PT14	Platinum 3850 RTD; 4-Wire; 100 ohm
-PT13	Platinum 3850 RTD; 3-Wire; 100 ohm
-PT104	Platinum 3850 RTD; 4-Wire; 1000 ohm
-PT103	Platinum 3850 RTD; 3-Wire; 1000 ohm
-CU4	Copper RTD; 4-Wire; 10 ohm
-CU3	Copper RTD; 3-Wire; 10 ohm
-N4	Nickel RTD; 4-Wire; 120 ohm
-N3	Nickel RTD; 3-Wire; 120 ohm
-2PT14	Dual Element Pt 3850 RTD; 4-Wire; 100 ohm
-2PT13	Dual Element Pt 3850 RTD; 3-Wire; 100 ohm
-2PT104	Dual Element Pt 3850 RTD; 4-Wire; 1000 ohm
-2PT103	Dual Element Pt 3850 RTD; 3-Wire; 1000 ohm

Temperature Assemblies

Solid Sheath Sensors



Sensor Type (continued)

Thermocouples (Not Available with T2X)

-TCJG	J-Type Thermocouple; Grounded
-TCJU	J-Type Thermocouple; Ungrounded
-TCKG	K-Type Thermocouple; Grounded
-TCKU	K-Type Thermocouple; Ungrounded
-TC?G	Replace “?” with other T/C type E, N or T; Grounded
-TC?U	Replace “?” with other T/C type E, N or T; Ungrounded
-2TC?G	Replace “?” with E, J, K, N or T T/C, Grounded (Dual Sensor)
-2TC?U	Replace “?” with E, J, K, N or T T/C, Ungrounded (Dual Sensor)

*Note: Other RTD and T/C types are also available. Consult factory for details.

Sensor Options

-.04	Class AA High Accuracy Platinum RTD Sensor
-.06	Class A High Accuracy Platinum RTD Sensor
-WW	Wire wound RTD sensor
-10G	Low Intensity Vibration Sensor
-30G	High Intensity Vibration Sensor
-CTD?	Bath Comparison Data for Sensor - Unknown vs Primary Standard
-VTB	Bath Trim the Transmitter; Provide Assembly NIST Test Report
-VTD	Configure Transmitter; Provide Transmitter NIST Test Report
-JL?	Jacket Length (? Length in inches) - For Model SEN, additional insulated wire beyond the fitting
-FG	Fiberglass insulation on wires

Spring-Loaded Extension Fitting

-ECS	Spring-Load Fitting
-FLS	Fluid Seal Fitting
-RES	Removable Spring-Load Fitting (Specify when ordering option -VTB)
-SPR2	Spring-Load Fitting; 316SS Bar Stock
-NUE	Nipple-Union-Spring-Load Fitting
-NUR	Nipple-Union-Removable Spring-Load Fitting (Specify when ordering option -VTB)

Assembly Options

-IS?	Intrinsic Safety Label on Transmitter. Select Option Code from Table 4 on page 8
-SSF11	SS Compression Fitting for D25 sheath
-SSF15	SS Compression Fitting for D38 sheath
-.75NPT	1/2-NPT x 3/4-NPT conduit adapter for LH
-FS	Functional Safety (Yellow) LH2 Housing. Only for STZ and Safety Sensor Assemblies
-1ST	1 Chained SS Tag for customer use
-2ST	2 Chained SS Tags for customer use
-TB6	6 Terminal Block. Provided automatically. Option code not required
-TB8	8 Terminal Block. Provided automatically. Option code not required
-TB4	4 Terminal Block. (-TB6 with two posts removed)
-TS4	4 position terminal strip. [LH] Only
-TS8	8 position terminal strip. [LH] Only
-GRIP	Cord Grip is standard. -GRIP option code is not required
-BOOT	Shrink tubing under grip is standard. -BOOT option code is not required

Remote Mount Options

-RMLH2NS	Remote mount the TT. The LH2NS w/TB6 or TB8 will be coupled to the assembly
-RMLH2NSP	Remote mount the TT. The LH2NSP w/TB6 or TB8 will be coupled to the assembly
-RMLH2MS	Remote mount the TT. The LH2MS w/TB6 or TB8 will be coupled to the assembly
-RMLH2MSP	Remote mount the TT. The LH2MSP w/TB6 or TB8 will be coupled to the assembly
-RMLH1NS	Remote mount the TT. The LH1NS w/TB6 or TB8 will be coupled to the assembly
-RMLH1NSP	Remote mount the TT. The LH1NSP w/TB6 or TB8 will be coupled to the assembly
-RMLH1MS	Remote mount the TT. The LH1MS w/TB6 or TB8 will be coupled to the assembly
-RMLH1MSP	Remote mount the TT. The LH1MSP w/TB6 or TB8 will be coupled to the assembly
-RMCH19	Remote mount the TT. The CH19 w/TB6 or TB8 will be coupled to the assembly

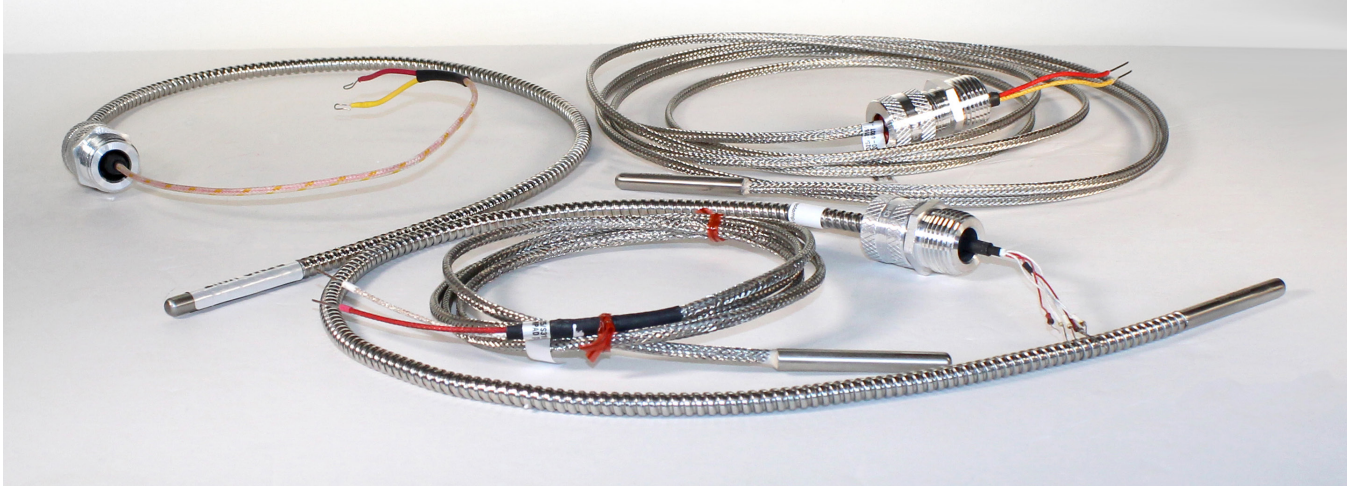
Connection Head / Enclosure (TB = Terminal Block)

CH0	Temperature Assembly with No Head/Enclosure, TB, Transmitter
CH?	See full housing selection on page 16
LH?	See full housing selection on page 16
BH?	See full housing selection on page 16
SB?	See full housing selection on page 16
D2?	See full housing selection on page 16



Temperature Assemblies Solid Sheath Sensors

Sensors with Flex Armor or Stainless Steel Braid Covering the Insulating Jacket



Model Codes for Sensors with -FLEX or -SSB

Base Model

SEN No Transmitter; Terminal Block in Housing

Sensor Sheath Length

CL? Sensor length - Replace "?" with the length in inches below the fitting

Sensor Sheath Diameter

D25 O.D. = 0.250" (6.35mm)
D12 O.D. = 0.125" (3.18mm)
D18 O.D. = 0.188" (4.78mm)
D38 O.D. = 0.375" (9.53mm)

Sensor Sheath Material

S316 316 Stainless Steel
INC Inconel 600

Sensor Type

RTDs

-PT14 Platinum 3850 RTD; 4-Wire; 100 ohm
-PT13 Platinum 3850 RTD; 3-Wire; 100 ohm
-PT104 Platinum 3850 RTD; 4-Wire; 1000 ohm
-PT103 Platinum 3850 RTD; 3-Wire; 1000 ohm
-CU4 Copper RTD; 4-Wire; 10 ohm
-CU3 Copper RTD; 3-Wire; 10 ohm
-N4 Nickel RTD; 4-Wire; 120 ohm
-N3 Nickel RTD; 3-Wire; 120 ohm
-2PT14 Dual Element Pt 3850 RTD; 4-Wire; 100 ohm
-2PT13 Dual Element Pt 3850 RTD; 3-Wire; 100 ohm
-2PT104 Dual Element Pt 3850 RTD; 4-Wire; 1000 ohm
-2PT103 Dual Element Pt 3850 RTD; 3-Wire; 1000 ohm

Thermocouples

-TCJG J-Type Thermocouple; Grounded
-TCJU J-Type Thermocouple; Ungrounded
-TCKG K-Type Thermocouple; Grounded
-TCKU K-Type Thermocouple; Ungrounded
-TC?G Replace "?" with other T/C type E, N or T; Grounded
-TC?U Replace "?" with other T/C type E, N or T; Ungrounded
-2TC?G Replace "?" with E, J, K, N or T T/C, Grounded (Dual Sensor)
-2TC?U Replace "?" with E, J, K, N or T T/C, Ungrounded (Dual Sensor)
***Note:** Other RTD and T/C types are also available. Consult factory for details.

Temperature Assemblies

Solid Sheath Sensors



Sensor Options

- 04 Class AA High Accuracy Platinum RTD Sensor
- 06 Class A High Accuracy Platinum RTD Sensor
- WW Wire wound RTD sensor
- 10G Low Intensity Vibration Sensor
- 30G High Intensity Vibration Sensor
- CTD? Bath Comparison Data for Sensor - Unknown vs Primary Standard
- JL? Jacket Length (? Length in inches) - For Model SEN, additional insulated wire beyond the fitting
- FG Fiberglass insulation on wires

Assembly Definition - Choose -SSB or -FLEX

- SSB SS Protective Braid on JL jacket (JL? defines the length)
- FLEX? Flex Armor protection on the JL jacket (? = length in inches)

Assembly Options

- SSF11 SS Compression Fitting for D25 sheath
- SSF15 SS Compression Fitting for D38 sheath
- .75NPT 1/2-NPT x 3/4-NPT conduit adapter for LH
- FS Functional Safety (Yellow) LH2 Housing. Only for STZ and Safety Sensor Assemblies
- 1ST 1 Chained SS Tag for customer use
- 2ST 2 Chained SS Tags for customer use
- TB6 6 Terminal Block, Provided automatically. Option code not required. For Model SEN++++
- TB8 8 Terminal Block. Provided automatically. Option code not required. For Model SEN
- TB4 4 Terminal Block. (-TB6 with two posts removed)
- TS4 4 position terminal strip. [LH] Only
- TS8 8 position terminal strip. [LH] Only

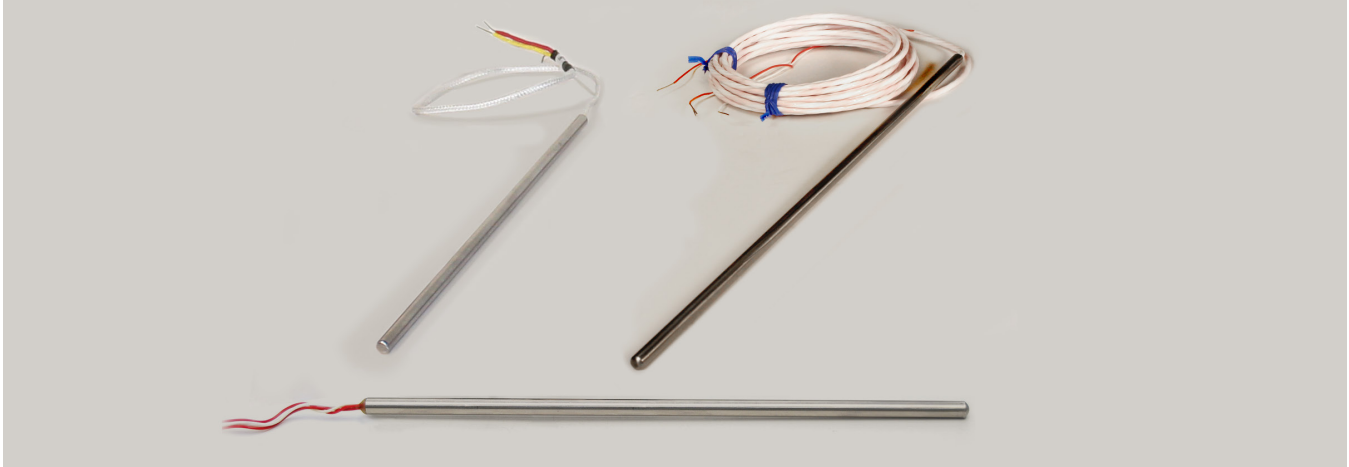
Optional Surface Mount Fittings

- CLAMP Mounting Plate with Pipe Clamp
- MPAD Magnetic mounting plate
- PAD Mounting plate - Bolt-on

Connection Head / Enclosure (TB = Terminal Block)

- SEN Sensor Assembly with No Head/Enclosure or TB
- CH? See full housing selection on page 16
- LH? See full housing selection on page 16

Replacement Sensors



Solid Sheath Replacement Sensors Model Codes

Universal Temperature Transmitter (See TDY, THZ³/TDZ³, STZ and TRY/TRX Data Sheets for Specifications)

SEN Sensor Only; No Transmitter; Terminal Block in Housing

Sensor Sheath Length

CL? Sensor length - Replace "?" with the length in inches below the fitting

Sensor Sheath Diameter

D25 O.D. = 0.250" (6.35mm)
D12 O.D. = 0.125" (3.18mm)
D18 O.D. = 0.188" (4.78mm)
D38 O.D. = 0.375" (9.53mm)

Sensor Sheath Material

S316 316 Stainless Steel
INC Inconel 600

Sensor Type

RTDs

-PT14 Platinum 3850 RTD; 4-Wire; 100 ohm
-PT13 Platinum 3850 RTD; 3-Wire; 100 ohm
-PT104 Platinum 3850 RTD; 4-Wire; 1000 ohm
-PT103 Platinum 3850 RTD; 3-Wire; 1000 ohm
-CU4 Copper RTD; 4-Wire; 10 ohm
-CU3 Copper RTD; 3-Wire; 10 ohm
-N4 Nickel RTD; 4-Wire; 120 ohm
-N3 Nickel RTD; 3-Wire; 120 ohm
-2PT14 Dual Element Pt 3850 RTD; 4-Wire; 100 ohm
-2PT13 Dual Element Pt 3850 RTD; 3-Wire; 100 ohm
-2PT104 Dual Element Pt 3850 RTD; 4-Wire; 1000 ohm
-2PT103 Dual Element Pt 3850 RTD; 3-Wire; 1000 ohm

Thermocouples

-TCJG J-Type Thermocouple; Grounded
-TCJU J-Type Thermocouple; Ungrounded
-TCKG K-Type Thermocouple; Grounded
-TCKU K-Type Thermocouple; Ungrounded
-TC?G Replace "?" with other T/C type E, N or T; Grounded
-TC?U Replace "?" with other T/C type E, N or T; Ungrounded
-2TC?G Replace "?" with E, J, K, N or T T/C, Grounded (Dual Sensor)
-2TC?U Replace "?" with E, J, K, N or T T/C, Ungrounded (Dual Sensor)

***Note:** Other RTD and T/C types are also available. Consult factory for details

Temperature Assemblies

Solid Sheath Sensors



Sensor Options

- 04 Class AA High Accuracy Platinum RTD Sensor
- 06 Class A High Accuracy Platinum RTD Sensor
- WW Wire wound RTD sensor
- 10G Low Intensity Vibration Sensor
- 30G High Intensity Vibration Sensor
- CTD? Bath Comparison Data for Sensor - Unknown vs Primary Standard
- JL? Jacket Length (? Length in inches) - For Model SEN, additional insulated wire beyond the fitting
- FG Fiberglass insulation on wires

Assembly Options

- 1ST 1 Chained SS Tag for customer use.
- 2ST 2 Chained SS Tags for customer use.

Connection Head / Enclosure (TB = Terminal Block)

- SEN Sensor with No Head/Enclosure, TB, Transmitter.

Need Help With Specifying Replacement Sensors?

Of course, our Applications Specialists can help with your specific needs, but some of the examples shown below may also help.

Should you ever need to calculate the appropriate WORM Spring Length using the drawings on page 9 as an example and starting at the bottom of the well: $\text{Spring Length} = (U+1''+T+.75''+5.5''+.5'')$

Full Assemblies Replacement Sensors Examples

Model T2X / C-P2 / U2-T0 / S316 / -26 -ECS -PT1C4 [LH1NS]
Replacement sensor: SEN / CL6.25 / D25 / S316 / -PTC14 [SEN]

Model WEL / B-P3 / U12-T0 / S446 / -26 -TCKU -NUE [LH2NS]
Replacement sensor: SEN / CL19.75 / D25 / INC / -TCKU [SEN]

Model TRX / A-P3 / U2-T4 / S316 / -26 -RES -PT104 -.06 -VTB [LH1NS]
Replacement sensor: SEN / CL10.25 / D25 / S316 / -PT104 -.06 -CTD3 [SEN]

Fixed Immersion Assembly Example

Model TDY / CL12 / D25 / S316 / -PT14 [BH2NG]
Replacement Sensor: SEN / CL12 / D25 / S316 / -PT14 [SEN]

Flex Armor Example

Model SEN / CL6 / D25 / S316 / -PT14 -JL600 -FLEX540 -MPAD [LH2NS]
Replacement Sensor: SEN / CL6 / D25 / S316 / -PT14 -JL600 -FLEX540 [SEN]

SS Braid Example

Model SEN / CL9 / D25 / S316 / -TCJG -JL48 -SSB -CLAMP [CH19]
Replacement Sensor: SEN / CL9 / D25 / S316 / -TCJG -JL48 -SSB [SEN]

Temperature Assemblies WORM & Solid Sheath Sensors

Table 8. Spare Parts for Solid Sheath Section.

	Model # Code	Moore P/N	Description
Spring-load Fittings	-ECS	233-804-00	Spring-load Fitting
	-FLS	801-913-24	Fluid Seal
	-RES	233-803-00	Removable Spring-load Fitting
	-SPR2	233-824-00	Spring-load Fitting; 316 SS bar stock
	-NUE	233-808-00	Nipple-Union-Spring-load Fitting
	-NUR	233-807-00	Nipple-Union-Removable Spring-load Fitting
Assembly Options	-SSF11	803-996-27	SS Compression Fitting for 1/4" OD Sheath
	-SSF15	803-984-27	SS Compression Fitting for 3/8" OD Sheath
	-.75NPT	802-008-24	SS Adapter - 1/2-NPT to 3/4-NPT (for LH Enclosure)
	-GRIP	804-821-26	Cord Grip; 1/2-NPT
	-BOOT	800-856-26	~2" Heat Shrink Tubing
Surface Mounts	-CLAMP	233-227-01	Allows PAD Mounting Option to be Clamped onto any Pipe
	-MPAD	803-986-24	Magnetic Mounting PAD for Mounting on a Metal Surface
	-PAD	233-226-01	Protective Mounting PAD Welds or Bolts onto a Metal Surface
Terminal Blocks	TB4	805-989-27	4-Position Ceramic Terminal Block
	TB6	803-821-27	6-Position Ceramic Terminal Block
	TB8	804-918-27	8-Position Ceramic Terminal Block
	TS4	234-807-00	4-Position Removable Terminal Strip (for LH Enclosure)
	TS8	234-807-01	8-Position Removable Terminal Strip (for LH Enclosure)
Connection Heads	CH6	800-803-19	Black Polypropylene Body & Cap; Type 4X & IP166
	CH6W	800-804-19	White Polypropylene Body & Cap; Type 4X & IP166
	CH19	800-860-18	316 Stainless Steel Body & Cap; Type 4X & IP166

Contact us at any time regarding your particular temperature assembly configuration—we'll be glad to help!
Call Toll-free in US and Canada: +1-800-999-2900 or +1-818-894-7111.
Email us at sales@miinet.com
or visit our Ehelp page at <https://www.miinet.com/contact-us-e-help> and complete the form.



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