**MOORE INDUSTRIES** ®

Featuring Moore Industries' innovative WORM Flexible Sensor, these versatile temperature assemblies mount directly to tanks, pipes, motors, compressors, reactors or anywhere else a skin (surface) temperature measurement is needed. Precise engineering and solid, sturdy construction allow these assemblies to endure the harshest plant conditions and field environments.

the WORM
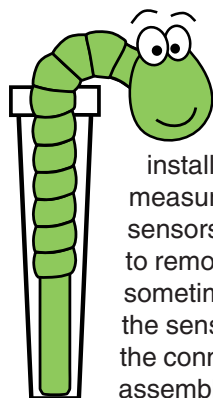
Delivering simple installation and removal, our versatile, spring-loaded, flexible sensor trims-to-length providing quick and easy installation in a wide range of temperature measurement applications. With other sensors, such as straight sensors, you have to remove the connection head, and sometimes assembly components, to install the sensor. The WORM slides right through the connection head port, and into the assembly, without removing any assembly components. The WORM bends to accommodate awkward mounting positions and locations.
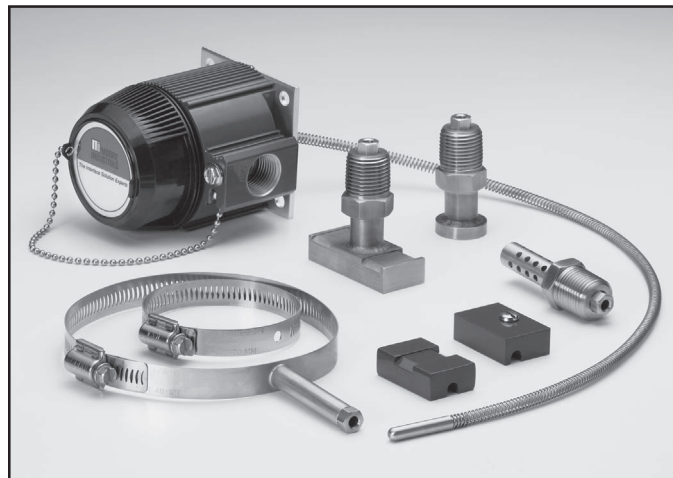
The Versatile WORM *mounts directly to tanks, pipes, motors, compressors, reactors or anywhere else a skin temperature measurement is needed.*

Features

- **Multiple mounting possibilities.** Clamp, bolt, or weld in place anywhere a skin (surface) temperature measurement is needed.

- **Universal temperature transmitter options.** Ready-to-install assemblies come with a choice of our universal TRY & TRX PC-Programmable and THZ Smart HART® Temperature Transmitters (models without transmitters are also available).

- **Trims to desired length.** There's no need to stock an expensive array of different sensor lengths, one size fits most every application.

- **Popular RTD and thermocouples.** Available sensor types include 100 and 1000 ohm, platinum RTDs; plus J- and K-type thermocouples (others are available on request).

- **High accuracy measurements.** These temperature assemblies keep the spring-loaded sensor in place and shielded against external ambient temperature effects that can negatively influence readings.

- **Faster response time.** The WORM delivers step response times 13% faster than standard sensors.

- **Solid, sturdy construction.** High-impact connection heads (models without connection heads also available) combined with stainless steel mounting accessories allow our temperature assemblies to withstand the most rigid plant environment.

Certifications

CSA   Ex   FM APPROVED   CE

Approvals for Hazardous 'Classified' Areas including Explosion-Proof/Flame-proof and Non-Incendive are available. Consult the individual temperature transmitter data sheets (Models TDY, THZ & TDZ and TRY & TRX) for specific information for each certifying agency.

Optional Approvals: FMRC, SAA, NEPSI, KEMA (ATEX), and LCIE (ATEX) Intrinsically Safe approvals are also available as options. Consult factory for details.

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

U.S. and Foreign Patents Pending

RTI 3
Ready-to-Install Temperature Assemblies for Surface Measurements

PAD Mount (-PAD)

The PAD completely surrounds the WORM, shielding it from external interference, while providing maximum heat transfer to the sensor. Weld or bolt the PAD into place, securing the sensor directly against the surface in which the temperature measurement is needed.

Installation

1. Clear any insulation or paint and clean area of surface in which contact with the sensor will occur.

2. Affix the PAD Mounting Plate.

    A. When welding, position plate against surface to which it will be be welded. Allowing enough room for the sensor to slide under the PAD, lay a steady, even weld around the outside perimeter, being careful not to weld across the sensor insertion slot.

    B. When fastening, position plate and insert machine screw through provided hole and tighten so that the mounting plate rests securely against the surface to be measured.

3. Slide the WORM sensor tip into the PAD's insertion slot, positioning it firmly between skin surface and mounting plate.

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.

6. Re-insulate as necessary.

Sensor Specifications

Lead Wire Materials: Standard (WS) Sensors: Teflon insulated, hermetically sealed; High Temperature (WH) Sensors: Braided fiberglass
Sensor Sheath Material: Stainless Steel 316
Accuracy: RTD: ±0.12% at 0°C. Consult the factory for thermocouple tolerances
Stability: RTD: 0.2°C after 10,000 hrs. at maximum temperature (1 year, 51 days, 16 hrs. continuous)
Response Time: RTD: <5 seconds to 63.2% temperature change; Thermocouple, 4.5 sec. for ungrounded, typical; 2.0 sec. for grounded to 63.2% temperature change
Humidity: Standard (WS) Sensors: Excellent moisture resistance for condensing environments; High Temperature (WH) Sensors: Specify for non-condensing atmospheres
Pull Force: Wires will withstand at least 20 lbs. of pull force before separating from sensor head

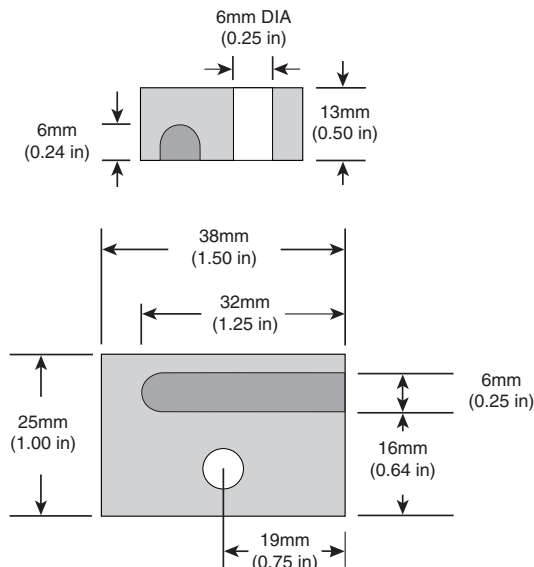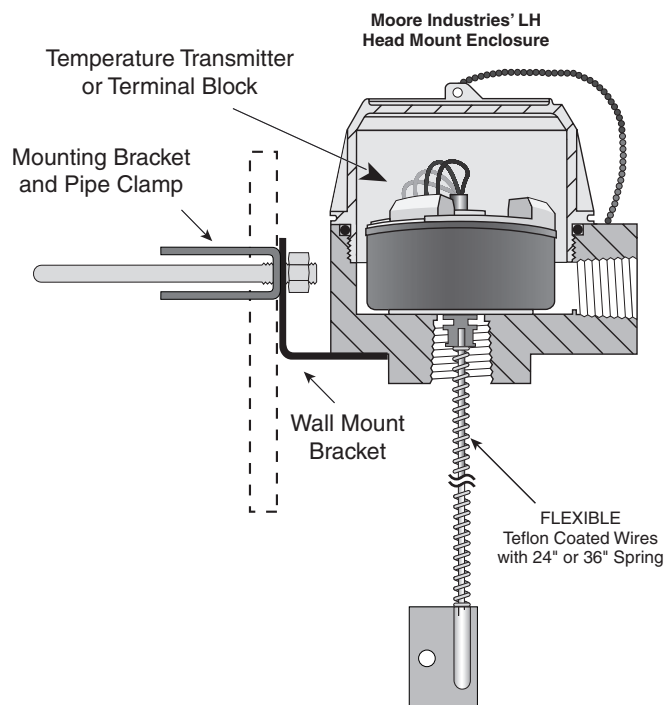**Figure 1.** *Dimensions for PAD option.*

Figure 2. *PAD option with remote mount connection head assembly.*

CLAMP Mount (-CLAMP)

The CLAMP option allows the PAD to be used for pipe-mounting applications without welding. The CLAMP installs in minutes and fits most 51mm (2-inch) to 300mm (12-inch) pipes. This stainless steel assembly is corrosion resistant and suitable for use in the harshest industrial environments.

Installation

1. Clear any insulation or paint and clean area of surface in which contact with the sensor will occur.

2. Open clamp and wrap around prepped section of pipe.

3. Place mounting plate between the clamp and pipe, ensuring that the clamp rests inside the provided channel on the top of the mounting plate.

4. Close and tighten the clamp, causing the mounting plate to rest firmly against the pipe surface.

5. Slide the WORM sensor into the insertion point so that it rests firmly against the pipe's surface.

6. Distribute sensor leads up to the mounted connection head and thread the leads through the conduit entry port.

7. Connect each sensor wire to the appropriate temperature transmitter terminal.

8. Re-insulate as necessary.
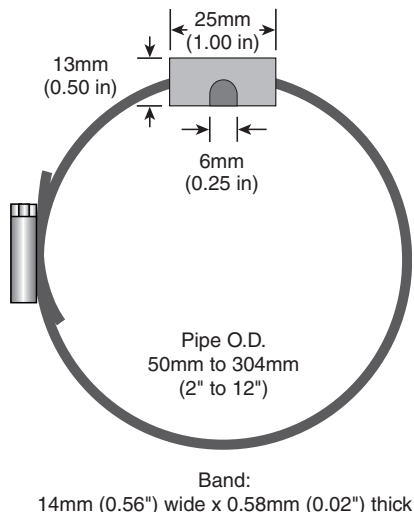
Figure 3. Dimensions for CLAMP option.

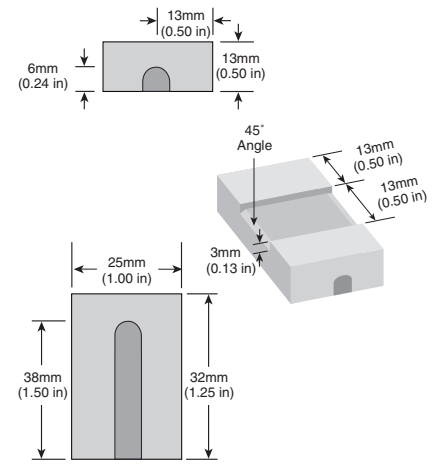*Figure 4.* Dimensions for CLAMP option mounting pad.

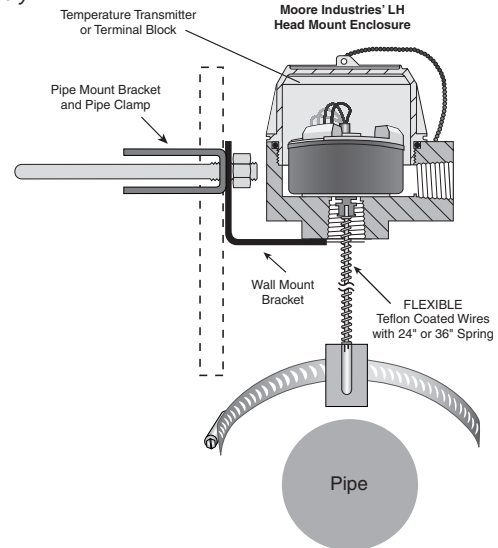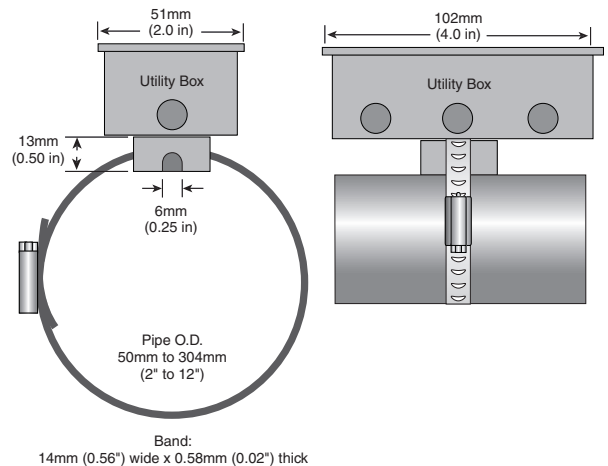*Figure 5.* CLAMP option with remote mount connection head assembly.

Figure 6. CLAMP option with utility box (D2 enclosure).

RTI 3
Ready-to-Install Temperature Assemblies for Surface Measurements

Exposed Air Thermowell (-EXP)

The Exposed Air Thermowell 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 ½-inch 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.

Installation

1. Screw connection head onto the ½-inch NPT threads at top of the Exposed Air Thermowell.

2. Cut the WORM's spring to be between 1 and 1½-inches longer than the combined length of the TANK mount and conduit entry port of the connection head (this will provide the necessary pressure to securely hold the sensor probe against the skin surface).

3. 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.

4. Snap the clip onto the spring cap. Then slide cap/clip combination (or just cap by itself depending on connection head being used) over the sensor leads and onto the top of the spring.

5. Insert sensor assembly (sensor tip first) through connection head and into top of TANK mount and snap the retaining clip securely into place. Install the transmitter into place.

6. Connect each sensor wire to the appropriate temperature transmitter terminal. Re-insulate if necessary.

Note: *When running sensor leads distances in excess of 36-inches, please use the provided screw-on retaining cap to keep the necessary pressure on the sensor tip.*
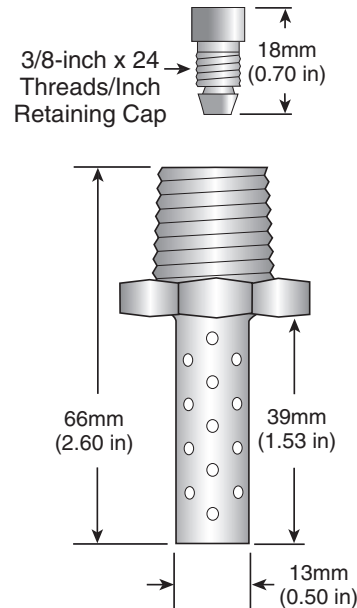
Figure 7. Dimensions for Exposed Air option.

3/8-inch x 24 Threads/Inch Retaining Cap — 18mm (0.70 in)
66mm (2.60 in) — 39mm (1.53 in) — 13mm (0.50 in)

Figure 8. Exposed Air option with connection head assembly.

Moore Industries' LH Head Mount Enclosure
Temperature Transmitter or Terminal Block
Mounting Bracket and Pipe Clamp
Wall Mount Bracket
1/2-inch NPT

PIPE Mount (-PIPE)

The PIPE Mount option quickly clamps onto most pipes 51mm (2-inches) to 300mm (12-inches) in diameter. The spring loaded sensor is completely encased, creating the best environment for maximum heat transfer to the probe. The PIPE Mount's heavy duty stainless steel construction is corrosion-resistant and suitable for use in any field environment. The top is equipped with a ½-inch NPT connection for mounting a transmitter and field-mount enclosure.

Installation

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

2. Open and wrap both clamps around prepped section of pipe. Place 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.

3. Close and tighten the clamps, forcing the PIPE Mount to rest firmly against the pipe surface. Screw connection head onto the ½-inch NPT threads at top of PIPE Mount.

4. Cut the WORM's spring to be between 1 and 1½-inches longer than the combined length of the PIPE Mount and conduit entry port of the connection head (this will provide the necessary pressure to securely hold the sensor against the skin surface).

5. 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.

6. Snap the clip onto the spring cap. Then slide cap/clip combination (or just cap by itself depending on connection head being used) over the sensor leads and onto the top of the spring.

7. Insert sensor assembly (sensor tip first) through connection head and into top of PIPE Mount and snap the retaining clip securely into place. Install the transmitter into place.

8. Connect each sensor wire to the appropriate temperature transmitter terminal. Re-insulate if necessary.

Note: *When running sensor leads distances in excess of 36-inches please use the provided screw-on retaining cap to keep the necessary pressure on the sensor tip.*
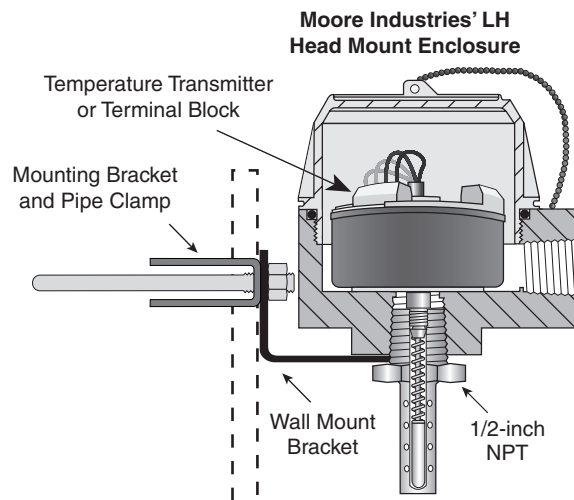
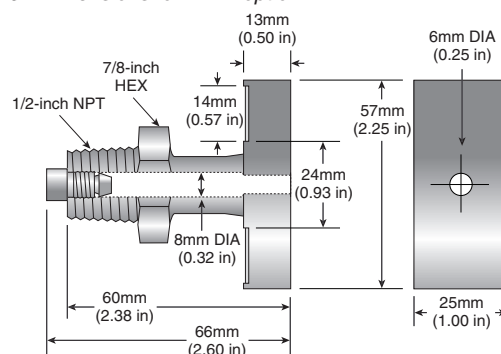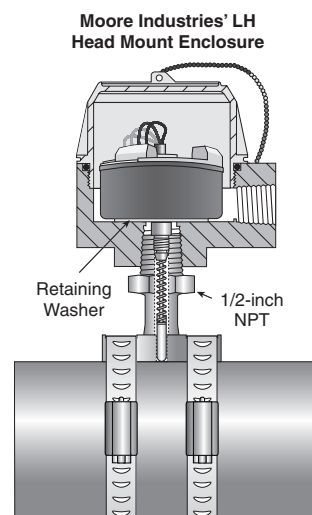**Figure 9.** *Dimensions for PIPE option.*

Figure 10. *PIPE option with connection head assembly.*

Remote-Mounted Terminal Block

Remove the Display From the Process–Position your sensor in the heart of your process while keeping your transmitter in an easily accessible area with our *Remote Terminal Block* (-RM) option. Add the **-RM** option to your temperature assembly and receive two housings: a transmitter in the specified connection head, and a terminal block enclosed in an additional connection head with your selected sensor and fittings attached. Sensor extension wiring (not included; available upon request) connects the terminal block to the transmitter.
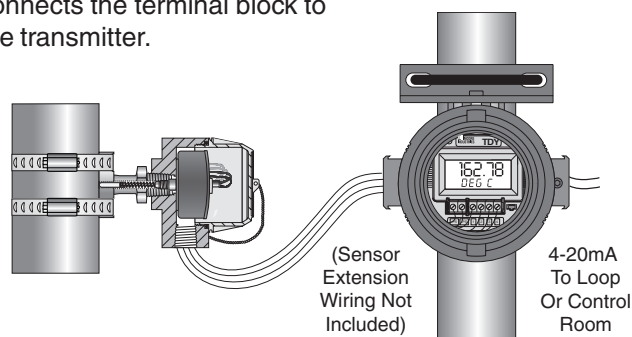
RTI 3
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Assemblies for Surface Measurements

BAYONET Pipe Mount (-BAY)

The BAYONET option is a clamp-on pipe-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. The spring loaded WORM 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.

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 1¼-inches (this will provide the necessary pressure to securely hold the sensor probe against the pipe's surface).

5. 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.

6. 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.

7. Insert sensor assembly (sensor tip first) into top of BAYONET mount and screw down retaining cap.

8. Distribute sensor leads up to the mounted connection head and thread the leads through the conduit entry port.

9. Connect each sensor wire to the appropriate temperature transmitter terminal.

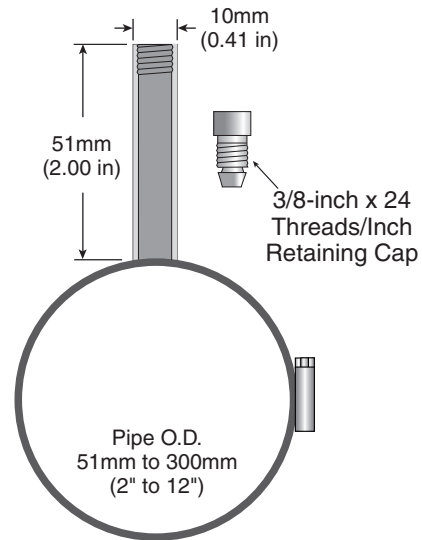**10.** Re-insulate as necessary.

Figure 11. *Dimensions for BAYONET option.*

10mm
(0.41 in)

51mm
(2.00 in)

3/8-inch x 24
Threads/Inch
Retaining Cap

Pipe O.D.
51mm to 300mm
(2" to 12")

Figure 12. *BAYONET option with remote mount connection head assembly.*

**Moore Industries' LH
Head Mount Enclosure**

Temperature Transmitter
or Terminal Block

Mounting Bracket
and Pipe Clamp

Wall Mount
Bracket

FLEXIBLE
Teflon Coated Wires
with 24" or 36" Spring
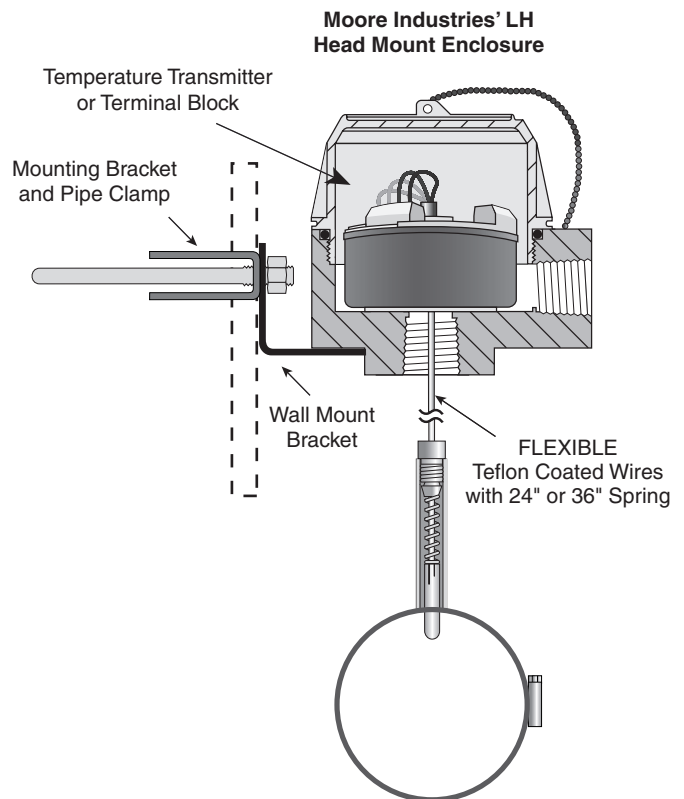
TANK Mount (-TANK)

The TANK option welds into place, securing the spring loaded sensor tip directly against the surface in which the temperature measurement is needed. This mount completely encases the WORM's sensor probe, shielding it from any external interference while providing the best environment for maximum heat transfer. The top is equipped with a ½-inch NPT connection for mounting a transmitter and field-mount enclosure.

Installation

1. Clear any insulation or paint and clean area of surface in which installation will occur.

2. Position and secure the TANK Mount on prepped location, making sure that the base is flat against prepped surface.

3. Lay a steady, even weld around outside perimeter of TANK Mount base. Screw connection head onto the ½-inch NPT threads at top of TANK Mount.

4. Cut the WORM's spring to be between 1 and 1½-inches longer than the combined length of the TANK Mount and conduit entry port of the connection head (this will provide the necessary pressure to securely hold the sensor probe against the skin surface).

5. 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.

6. Snap the clip onto the spring cap. Then slide cap/clip combination (or just cap by itself depending on connection head being used) over the sensor leads and onto the top of the spring.

7. Insert sensor assembly (sensor tip first) through connection head and into top of TANK Mount and snap the retaining clip securely into place. Install the transmitter into place.

8. Connect each sensor wire to the appropriate temperature transmitter terminal. Re-insulate if necessary.

Note: *When running sensor leads distances in excess of 36-inches, please use the provided screw-on retaining cap to keep the necessary pressure on the sensor tip.*
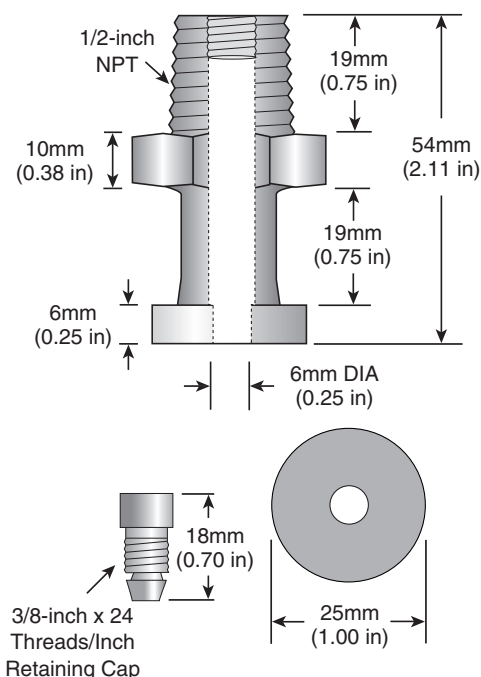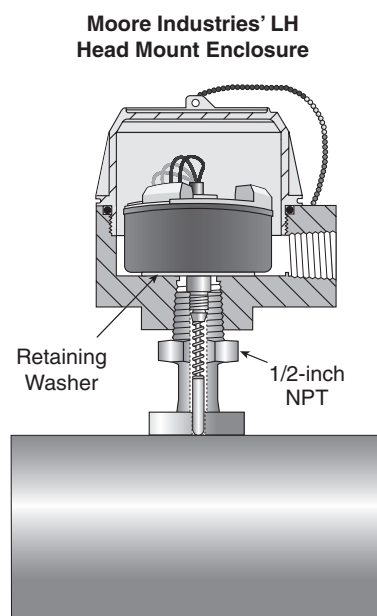
Figure 13. TANK option dimensions.

1/2-inch NPT
19mm (0.75 in)
10mm (0.38 in)
54mm (2.11 in)
19mm (0.75 in)
6mm (0.25 in)
6mm DIA (0.25 in)

18mm (0.70 in)
3/8-inch x 24 Threads/Inch Retaining Cap
25mm (1.00 in)

Figure 14. TANK option with connection head assembly.

**Moore Industries' LH
Head Mount Enclosure**

Retaining Washer
1/2-inch NPT

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Select one from each category to order a Sensor Kit with Mounting Accessory:

Universal Temperature Transmitter (See TDY, THZ/TDZ and TRY/TRX Data Sheets for Specifications)

TRY Isolated, PC-Programmable Temperature Transmitter (specify with LH1NS or LH2NS connection head)
TRX Non-Isolated, PC-Programmable Temperature Transmitter (specify with LH1NS or LH2NS connection head)
THZ Smart HART® Temperature Transmitter (specify with LH1NS or LH2NS connection head)
TDY Isolated, PC-Programmable Temperature Transmitter with Display (specify with BH2NG or D2LC connection head)
TDZ Isolated, PC-Programmable Smart HART® Temperature Transmitter with Display (specify with BH2NG or D2LC connection head)
SEN Sensor Without Temperature Transmitter

Sensor Length

CL24 24-Inch Length (specify for total sensor insertion lengths of 22-inches and under)
CL36 36-Inch Length (specify for total sensor insertion lengths of 22-inches to 34-inches)

IMPORTANT NOTE

Specify Standard (**WS**) Sensors for measurements up to 205°C (400°F).

Specify High Temperature (**WH**) Sensors for measurements up to 590°C (1100°F).

See "Sensor Specifications" for additional information.

Sensor Sheath Diameter

D25 Appropriate for 0.25-Inch and 6mm Diameter Applications

Sensor Sheath Material

S316 Stainless Steel 316

Sensor Type (See Page 2 for Specifications)

RTD SENSORS:
WSPT14 Standard Platinum RTD; 4-Wire; 100 ohm; alpha = 0.00385
WSPT104 Standard Platinum RTD; 4-Wire; 1000 ohm; alpha = 0.00385
WHPT14 High Temperature Platinum RTD; 4-Wire; 100 ohm; alpha = 0.00385
WHPT104 High Temperature Platinum RTD; 4-Wire; 1000 ohm; alpha = 0.00385

THERMOCOUPLE SENSORS:
WSTCJG Standard J-Type Thermocouple; Grounded
WSTCJU Standard J-Type Thermocouple; Ungrounded
WHTCJG High Temperature J-Type Thermocouple; Grounded
WHTCJU High Temperature J-Type Thermocouple; Ungrounded
WSTCKG Standard K-Type Thermocouple; Grounded
WSTCKU Standard K-Type Thermocouple; Ungrounded
WHTCKG High Temperature K-Type Thermocouple; Grounded
WHTCKU High Temperature K-Type Thermocouple; Ungrounded

T/C IDENTIFICATION

Type	Wire Color	
	+	−
J	White	Red
K	Yellow	Red

Options

-CLAMP Mounting Plate with Pipe Clamp
-PAD Mounting Plate
-EXP Exposed Air Thermowell
-PIPE Thermowell Mount with Clamps
-BAY Pipe Mounting Clamp
-TANK Thermowell Mount
-TB6 Terminal Block
-VTB High Accuracy Temperature System Calibration with NIST Test Data Report
-VTD Standard Factory Calibration with NIST Test Data Report
-RM? Remote-Mount Terminal Block; Replace "?" with Connection Head Type for terminal block, i.e. -RMLH2NS. See page 6 for details.

Connection Head/Enclosure

LH1NS Aluminum Body with Valox (357U) Cap, NEMA 4X, IP66 (for TRY/TRX/THZ)
LH2NS Aluminum Body with Aluminum Cap, Explosion-Proof (for TRY/TRX/THZ)
BH2NG Aluminum Body with Clear Glass Cover, Explosion-Proof (for TDY/TDZ)
D2LC Aluminum Body with Clear Valox Cover, NEMA 4X, IP66 (for TDY/TDZ)
D2 Metal, General Location Utility Box (for TRY/TRX/THZ)
NC No Connection Head

THZ / CL36 / D25 / S316 / WSPT104 –CLAMP [LH2NS] (Ordering Number Example)