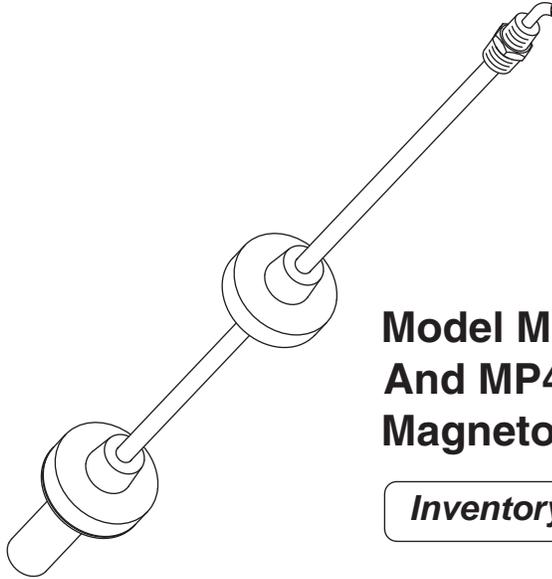


MP46xSA Flex Probes* Installation Instructions



**Model MP461SA, MP462SA, MP463SA
And MP464SA
Magnetostrictive Flex Probes**

Inventory Management Of Tanks Up To 70 Feet [21.3m]

**For use with the
following consoles:**

TMS2000	TMS3000	TMS4000	TMS4000M
<p>NOTE: MP46xSA SERIES PROBES ARE NOT COMPATIBLE WITH TMS1000, TMS2000W, TMS4000W SERIES AND Wireless DATA ACQUISITION MODULE (WiDAM) USED IN CONJUNCTION WITH WIRELESS CONSOLES. REFER TO THE MP56xSA SERIES.</p>			

*** NOTE:**

*BEFORE USING THIS BULLETIN, VERIFY MODEL NUMBER ON PROBE TAG IS MP46xSA.
"X" CAN BE NUMBER 1, 2, 3 OR 4.*

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TEL: (631) 293-8450

FAX: (631) 293-8533

WEBSITE: www.pneumercator.com

PNEUMERCATOR TECHNICAL SUPPORT

1 (800) 209-7858

GENERAL SYSTEM OVERVIEW: Figure 1 shows a block diagram of how the system should be configured for installation. It is supplied as a guide to planning the installation.

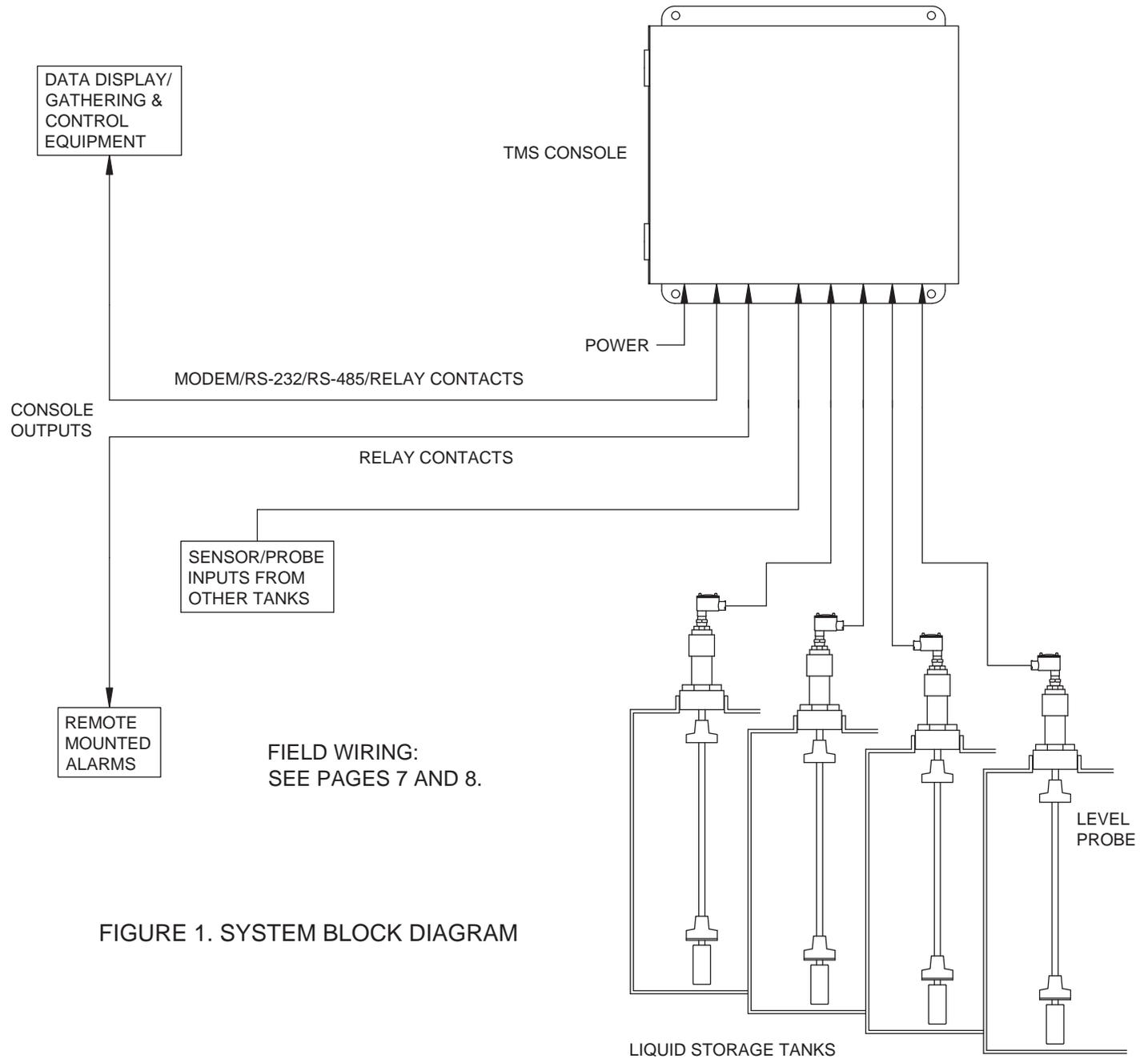


FIGURE 1. SYSTEM BLOCK DIAGRAM

⚠ WARNING

Refer to TMS installation manual for WARNINGS and CAUTIONS before proceeding. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY, PROPERTY LOSS AND EQUIPMENT DAMAGE.

PRODUCT DESCRIPTION: MP46xSA series level gauging probes utilize proven magnetostrictive technology for accuracy and reliability. There are (4) models with (6) size ranges as shown in the table below. Probes are supplied with (1) product float for product level gauging and optionally (1) interface float for bottom water gauging. Additionally the probe contains either (1) or (5) thermistors for temperature measurement.

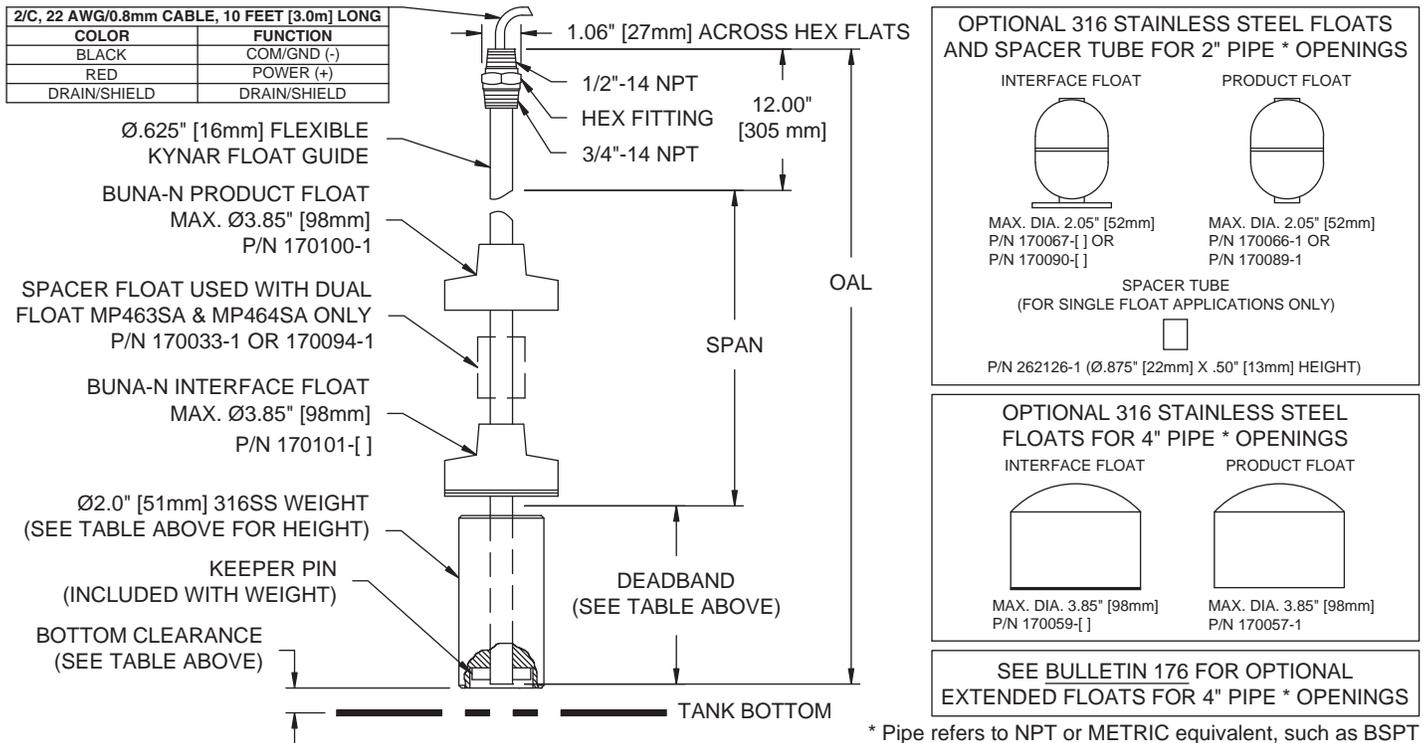
MODEL NO.	OAL ¹ (Overall Length)	BOTTOM CLEARANCE	BOTTOM DEADBAND DIMENSION	WEIGHT HEIGHT ²	HEIGHT (ABOVE TANK)
MP461SA ³	151 - 216	2.00" [51mm]	8.00" [203mm]	7.00" [178mm]	12" [305mm] MINIMUM SEE PAGE 5
MP462SA	217 - 288	2.00" [51mm]	8.00" [203mm]	7.00" [178mm]	
MP463SA ⁴	289 - 432	3.00" [76mm]	12.00" [305mm]	11.00" [279mm]	
	433 - 600	4.00" [102mm]	15.00" [381mm]	14.00" [356mm]	
MP464SA	601 - 720	5.00" [127mm]	17.00" [432mm]	16.00" [406mm]	
	721 - 840	6.00" [152mm]	19.00" [483mm]	18.00" [457mm]	

¹ Probes are sized using INCHES as the unit of measure. Multiply by 25.4 for MILLIMETERS (mm) equivalent.

² Maybe supplied as single-piece weight kit no. 10529-x or multiple-piece weight kit no. 10642-x (installation instructions included).

³ Probes are supplied coiled in shipping cartons except MP461SA with overall length 151" - 192" are NOT COILED, supplied in shipping tubes.

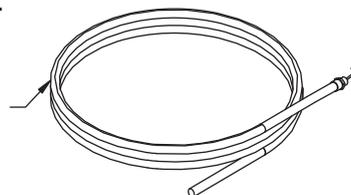
⁴ See BUL218 instructions for MP463SV replacement with MP463SA probes (433" to 600" probe OAL only).



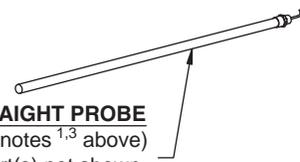
APPLICATIONS: The MP46xSA series flex probes are generally used for inventory management of tanks above 12.5 feet [3.8m] up to 70 feet [21.3m] tall where installation of a rigid probe is not possible due to tank height (above 18 feet [5.5m]), a low ceiling clearance or chemical incompatibility.

UNPACKING: All probes should be visually inspected regardless of their shipping carton/tube (save for returns if possible, see page 8) physical condition at delivery. Inspect probe for physical damage including the inner tubes. Contact PNEUMERCATOR and the shipping company immediately if any of the parts (see page 4) are missing or damaged. During inspection and removal of the probe from the shipping carton/tube, **IMPORTANT: DO NOT LIFT THE PROBE BY IT'S ELECTRICAL CABLE! DO NOT BEND THE TOP OR BOTTOM 2 FEET [0.6m] OF THE PROBE! DO NOT REMOVE PROBE TAG! IF COILED: DO NOT CUT THE TIE WRAPS AND UNCOIL THE PROBE!** Consult the factory if you are not sure that the parts you received are suitable for your application.

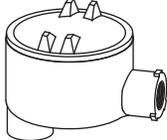
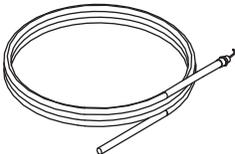
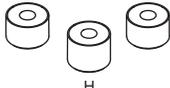
COILED PROBE
(OAL > 192", see notes^{1,3} above)
DO NOT UNWRAP
carton and foam insert(s) not shown,
SAVE ALL for returns (see page 8)



STRAIGHT PROBE
(OAL < 192", see notes^{1,3} above)
tube and foam insert(s) not shown,
SAVE ALL for returns (see page 8)



PNEUMERCATOR SUPPLIED COMPONENTS:
(NOT SHOWN TO SCALE)

	WATERTIGHT HOUSING
	<p>COILED PROBE DO NOT UNWRAP Overall Length (OAL) as required from table on page 3.</p> <p>NOTE: OAL < 192" NOT COILED, see notes ^{1,3} on page 3.</p>
  	<p>PRODUCT FLOAT Either A, B or C supplied A = 2" PIPE * opening or greater B, C = 4" PIPE * opening or greater</p>
	<p>SPACER FLOAT Supplied ONLY with models MP463SA & MP464SA probes with both product and interface floats.</p>
	<p>BOTTOM SPACER TUBE For single float (A) applications ONLY.</p>
  	<p>INTERFACE FLOAT ⁵ Either D, E or F supplied D = 2" PIPE * opening or greater E, F = 4" PIPE * opening or greater</p> <p>⁵ IF CONFIGURED FOR DUAL FLOAT OPERATION.</p>
 	<p>SINGLE-PIECE WEIGHT MULTIPLE-PIECE WEIGHT ⁶ PROBE WEIGHT Either G or H supplied Length as required from table on page 3.</p> <p>⁶ Installation instructions included</p>
	KEEPER PIN
	<p>WIRE SPLICE SEAL CONNECTOR (Installation instructions included with connector)</p>

CUSTOMER SUPPLIED COMPONENTS:
(NOT SHOWN TO SCALE)

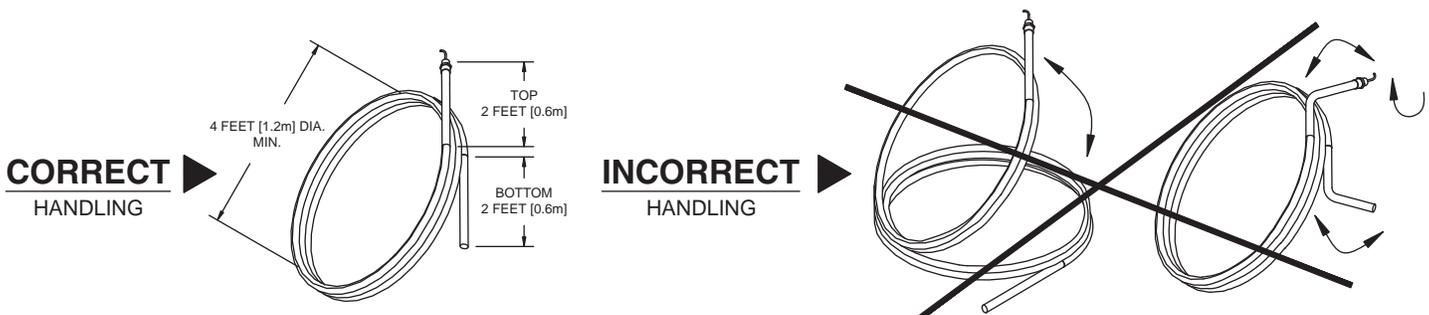
MOUNTING COMPONENTS FOR ALL APPLICATIONS	
	<p>2" PIPE * X 3/4" NPT METAL BUSHING 3/4" MUST BE NPT TO MATE WITH PROBE</p>
	2" PIPE * METAL COUPLING
	<p>2" PIPE * (BOTH ENDS) SCHEDULE 40 METAL NIPPLE <u>Length calculated from formula on page 5.</u></p>
OPTIONAL MOUNTING COMPONENTS	
	<p>METAL BUSHING Required ONLY for threaded openings greater than 2" PIPE *. Selected bushing MUST have mating 2" PIPE * thread for the nipple above.</p>
	<p>MATING METAL FLANGE For mating flange threaded openings greater than 2" PIPE *, an appropriate bushing must be used to connect the nipple.</p>
<p>NOTE: THE HEIGHT OF THESE OPTIONAL COMPONENTS ARE REPRESENTED BY "H" UNDER NIPPLE LENGTH CALCULATION ON PAGE 5.</p>	

* Pipe refers to NPT or METRIC equivalent, such as BSPT

INSTALLATION:

WARNINGS:

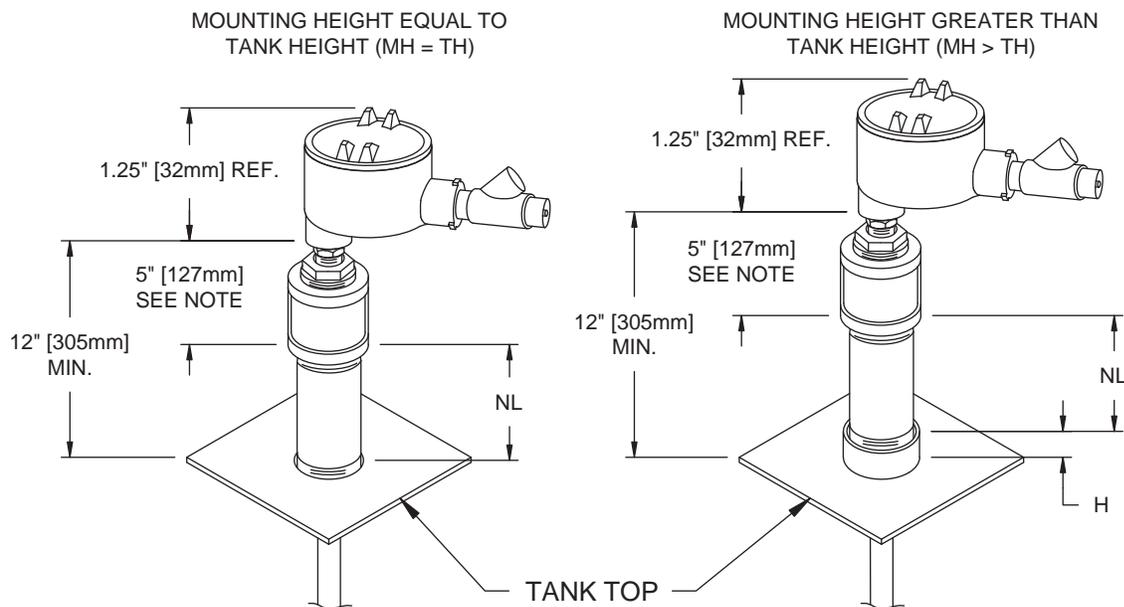
- Installation is only recommended at temperatures 30°F [-1°C] or above. Probe damage may occur as a result of handling at lower temperatures, voiding warranty.
- Installation must be done by 2 qualified personnel, familiar with local wiring codes and explosion hazard electrical practices.
- While handling the probe and during installation, DO NOT CUT OR MODIFY THE PROBE. DO NOT BEND THE TOP OR BOTTOM 2 FEET [0.6m] OF THE PROBE. IF COILED: KEEP THE COILS PARALLEL! DO NOT LIFT ONE COIL SEPARATELY FROM THE OTHER COILS. DO NOT TWIST THE COILS.



INSTALLATION CONT'D:

WARNINGS CONT'D:

- Probe mounting location should be selected to minimize effect from turbulence. **DO NOT LOCATE IN A DIRECT LINE OF INBOUND OR OUTBOUND FLOW.**
 - **IMPORTANT!** Maintain adequate clearance between probe and tank sidewall. A minimum clearance of 2 feet [0.6m], with 1 foot [0.3m] additional for every 10 feet [3.0m] above 20 feet [6.1m] is recommended.
 - **INCORRECT INSTALLATION!** Allowing the probe to touch the bottom of the tank then lifting it to match the bottom clearance value in the table on page 3. This method of installation will cause improper probe operation and may damage probe, voiding warranty. **USE NIPPLE LENGTH (NL) FORMULA BELOW.**
1. Confirm you were supplied the correct number of floats (1 or 2). A Probe part number with "21" or "25" suffix (see probe tag) requires DUAL (2) floats while "11" or "15" suffix requires a SINGLE (1) float. Contact Pneumercator immediately if supplied probe and number of floats do not match.
 2. **NIPPLE LENGTH CALCULATION:** Use the formula below to calculate the nipple length required for the correct mounting of probe. **INCORRECT NIPPLE LENGTH WILL CAUSE IMPROPER PROBE OPERATION AND MAY DAMAGE PROBE, VOIDING WARRANTY.**



NOTE: THIS DIMENSION IS 5" [127mm] WHEN STANDARD METAL 2" X 3/4" NPT BUSHING (TYPICALLY 1 3/8" [35mm] OVERALL HT) AND 2" NPT COUPLING (TYPICALLY 2 1/2" [64mm] OVERALL HT) ARE USE IN MOUNTING ASSEMBLY.

FORMULA* (ALL MEASUREMENT IN INCHES) : **NL = (L + BC + 8) - MH**

This formula assumes a 5/8" thread engagement on each end of the nipple.

WHERE: NL = Nipple Length

L* = Effective Probe length (see probe tag)

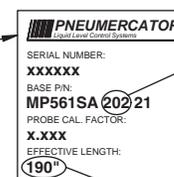
MH = Tank mounting height measured from inner bottom to top of threaded opening or TH + H.

TH = Tank height measured from inner bottom to tank roof.

H = The height from top of tank to where nipple will be installed.

BC = Probe bottom clearance from table on page 3.

PROBE TAG EXAMPLE
(BOTTOM SECTION)



DO NOT USE FOR NIPPLE LENGTH CALCULATION

USE FOR "L" VALUE IN FORMULA

NIPPLE LENGTH CALCULATION EXAMPLE 1:

L (from probe tag) = 407" MH = 403"

BC (from table on page 3) = 3"

NL = (407 + 3 + 8) - 403 = 15"

NIPPLE LENGTH CALCULATION EXAMPLE 2:

L (from probe tag) = 525" TH = 512" H = 5"

BC (from table on page 3) = 4" MH = 512 + 5 = 517"

NL = (525 + 4 + 8) - 517 = 20"

* **METRIC ORDERS ONLY** (ALL MEASUREMENT IN MILLIMETERS) **NL = (L + BC + 203) - MH**

This formula assumes a 16mm thread engagement on each end of the nipple. Probe tag length (L) is specified in MILLIMETERS (mm). Use MILLIMETERS (BC) table value(s) on page 3. Measurements for (H), (MH) and (TH) to be specified in mm.

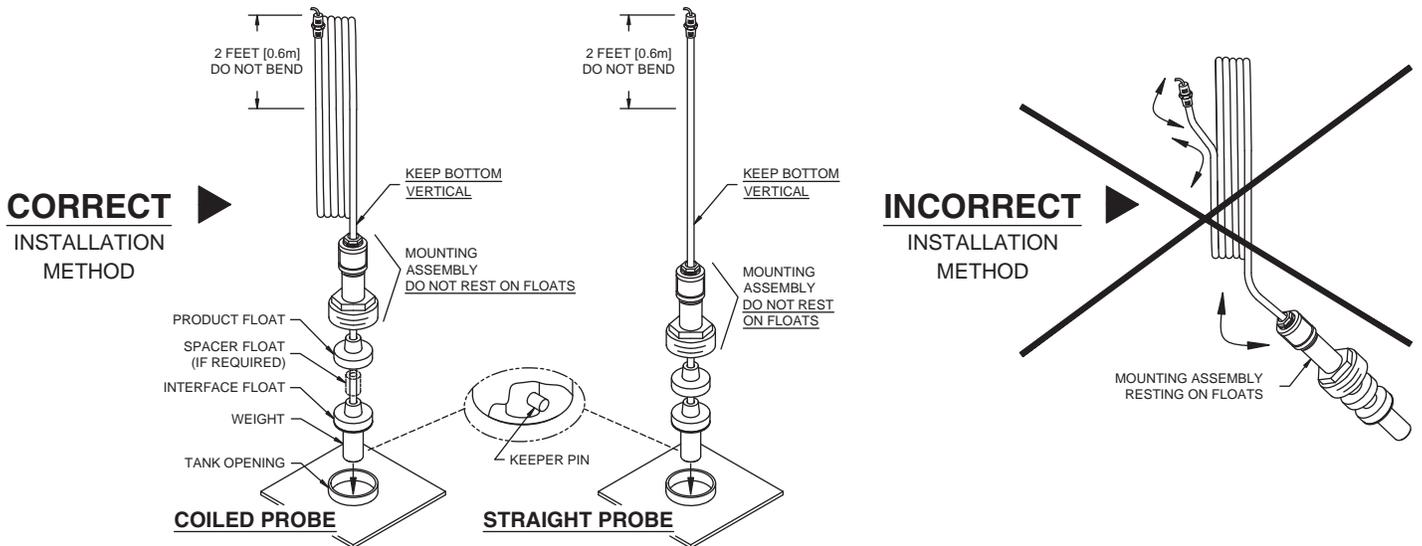
INSTALLATION CONT'D:

3. **TRANSPORT PROBE AND ACCESSORIES:** Transport the flex probe (with tie wraps still in place if coiled) and the other components to the top of the tank.

CAUTION

It is the INSTALLERS RESPONSIBILITY to ensure that they are adequately supported when handling the probe on top of the tank. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY, PROPERTY LOSS AND EQUIPMENT DAMAGE.

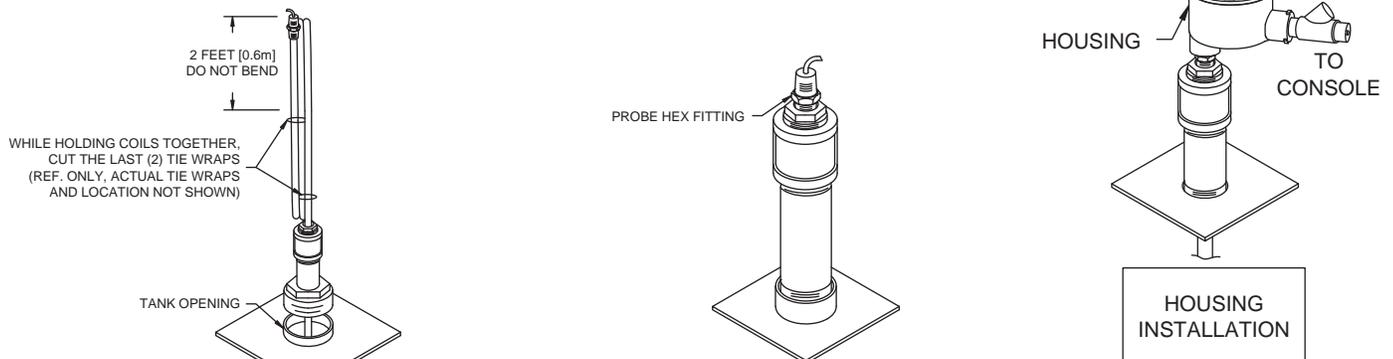
4. **INSTALL ACCESSORIES:** Use BOTH hands to hold probe (with tie wraps still in place if coiled) vertically at an adequate height above the tank. Steps (4a) and (4b) to be performed by second installer.
- If coiled (go to step 4b for straight probes), cut the first 1-3 tie wraps as required to uncoil and provide enough vertical height to install components. Start with the tie wrap at the bottom/end of the probe that has a hole through it, marked #1. DO NOT CUT ALL THE TIE WRAPS AT ONCE.
 - Keeping the probe bottom vertical and supported to prevent it from twisting, install the components on the end of the probe as required. DO NOT BEND THE BOTTOM 2 FEET [0.6m] OF THE PROBE.



5. **INSTALL PROBE:** With the components supported by the second installer (If coiled, cut the tie wraps in the numbered sequence as marked. DO NOT CUT ALL THE TIE WRAPS AT ONCE), carefully feed the weight and floats through the tank opening, THE TOP 2 FEET [0.6m] OF THE PROBE CONTAINS ELECTRONICS. DO NOT BEND. Use BOTH hands to hold the remaining coils together and keep THE TOP 2 FEET [0.6m] STRAIGHT, the second installer can cut the last (2) tie wraps.
6. **SECURE PROBE:** Screw the mounting assembly into tank opening, then the probe hex fitting into the mounting assembly.
7. **INSTALL HOUSING:** Install watertight housing as required on all installations and proceed with probe wiring on pages 7 and 8.

WARNINGS

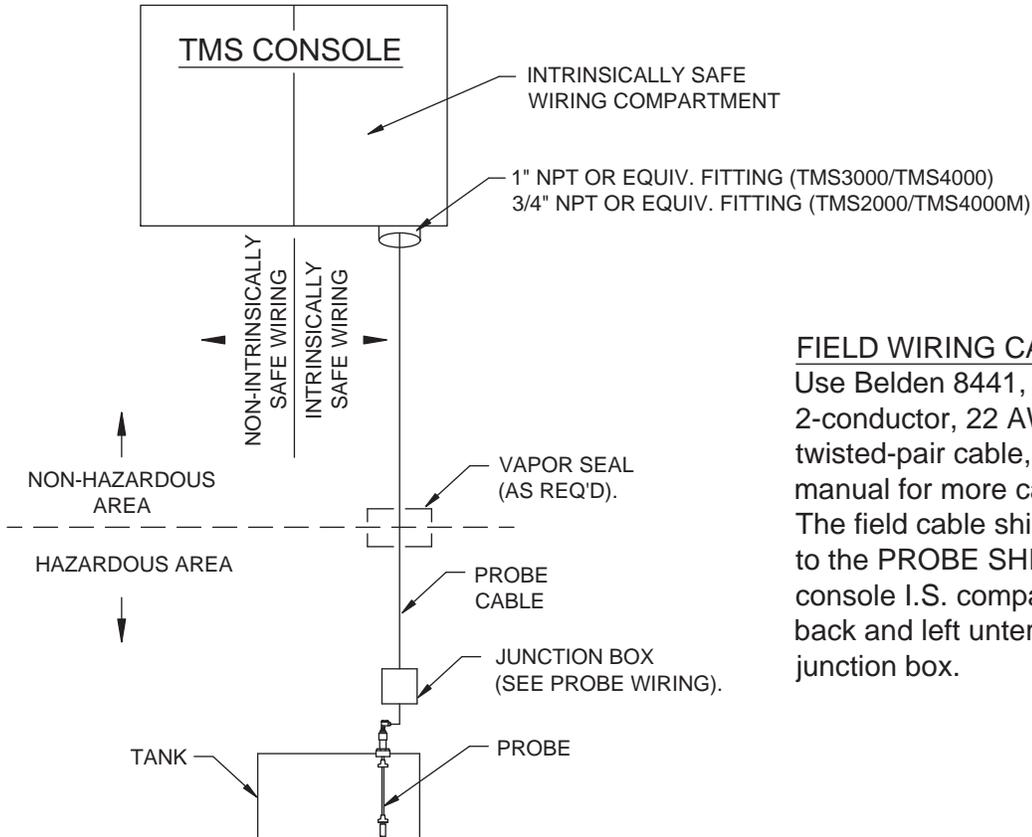
- DO NOT ALLOW CONDUIT WEIGHT LOAD TO BE APPLIED TO PROBE.
- HAND TIGHTEN HOUSING WHILE SECURING PROBE HEX FITTING NUT.
- DO NOT BEND OR STRAIN PROBE WHEN CONNECTING CONDUIT.



WIRING:

⚠ WARNING

Refer to TMS installation manual for WARNINGS and CAUTIONS before proceeding. FAILURE TO COMPLY MAY RESULT IN PERSONAL INJURY, PROPERTY LOSS AND EQUIPMENT DAMAGE.



FIELD WIRING CABLE SELECTION:

Use Belden 8441, or any equivalent 2-conductor, 22 AWG/0.8mm shielded, twisted-pair cable, refer to TMS installation manual for more cable selection information. The field cable shield wire must be connected to the PROBE SHIELD TERMINAL in the console I.S. compartment and should be cut back and left unterminated at the probe junction box.

TYPICAL JUNCTION BOX WIRING

WIRE SPLICE SEAL CONNECTOR
FOLLOW SUPPLIED WIRE SPLICE INSTRUCTIONS
BULLETIN 179; KIT P/N 10585-2

CONDUIT AND VAPOR SEAL FITTING
(SIZE AND LOCATION TO BE DETERMINED
BY QUALIFIED INSTALLER)

PROBE CABLE

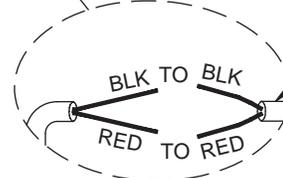
WATERTIGHT RATED BOX

TO CONSOLE
(AS SHOWN ON NEXT PAGE)

WARNINGS

- DO NOT ALLOW CONDUIT WEIGHT LOAD TO BE APPLIED TO PROBE.
- HAND TIGHTEN HOUSING WHILE SECURING PROBE HEX FITTING NUT.
- DO NOT BEND OR STRAIN PROBE WHEN CONNECTING CONDUIT.

PROBE FITTING



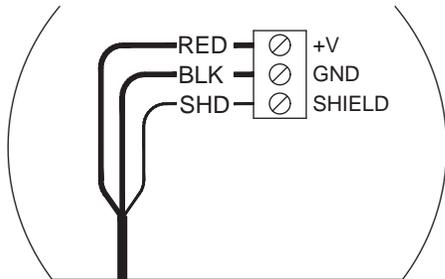
FIELD CABLE

Note: The field cable shield wire must be connected to the PROBE SHIELD TERMINAL in the console I.S. compartment and should be cut back and left unterminated at the probe junction box.

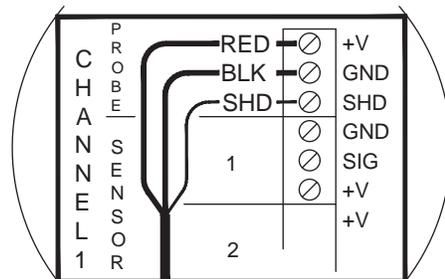
WIRING CONT'D:

TYPICAL WIRING FOR TMS CONSOLES

TMS2000/TMS4000M PROBE INPUT WIRING

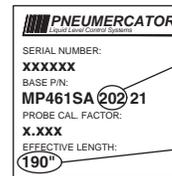


TMS3000/TMS4000 PROBE INPUT WIRING



PROGRAMMING: Information necessary for programming this probe can be found on the tag attached to the probe. One side of the tag has certification information and the other side has information needed to program the TMS console to enable this probe. Copy the information from the tag on the probe onto this sheet and onto the tank worksheet in the TMS Operation Manual for referencing when programming the TMS. If you have more than 6 probes, make a copy of this sheet. USE THE EFFECTIVE LENGTH GIVEN ON THE TAG WHEN PROGRAMMING THE SYSTEM PROBE LENGTH PARAMETER. THE "SA" ON THE PROBE TYPE IS NOT NEEDED FOR PROGRAMMING.

PROBE TAG EXAMPLE
(BOTTOM SECTION)



DO NOT USE FOR PROGRAMMING

USE THIS VALUE FOR PROGRAMMING

PROBE NAME, LOCATION OR DESCRIPTION: _____

SERIAL NO. _____

P/N: MP46_SA _____

Probe Cal. Factor: _____

Probe Type: MP46_SA _____

Effective Length: _____

PROBE NAME, LOCATION OR DESCRIPTION: _____

SERIAL NO. _____

P/N: MP46_SA _____

Probe Cal. Factor: _____

Probe Type: MP46_SA _____

Effective Length: _____

PROBE NAME, LOCATION OR DESCRIPTION: _____

SERIAL NO. _____

P/N: MP46_SA _____

Probe Cal. Factor: _____

Probe Type: MP46_SA _____

Effective Length: _____

PROBE NAME, LOCATION OR DESCRIPTION: _____

SERIAL NO. _____

P/N: MP46_SA _____

Probe Cal. Factor: _____

Probe Type: MP46_SA _____

Effective Length: _____

PROBE NAME, LOCATION OR DESCRIPTION: _____

SERIAL NO. _____

P/N: MP46_SA _____

Probe Cal. Factor: _____

Probe Type: MP46_SA _____

Effective Length: _____

PROBE NAME, LOCATION OR DESCRIPTION: _____

SERIAL NO. _____

P/N: MP46_SA _____

Probe Cal. Factor: _____

Probe Type: MP46_SA _____

Effective Length: _____

REMOVAL AND RETURNS: Turn off power to the monitoring console or panel. Disconnect probe cable wiring leads from field cable. To remove, follow the installation instructions in reverse, starting with step 7 on page 6 (carefully unscrewing conduit, housing, probe and mounting assembly as required). If OAL > 192" (see notes ^{1,3} on page 3), lift and re-coil to a large diameter of up to 7 feet [2.1m], 4 feet [1.2m] MINIMUM. As probe is lifted and re-coiled, secure coils together every 5 to 7 feet [1.5 to 2.1m] with tie wraps or equivalent. While removing probe, DO NOT LIFT THE PROBE BY IT'S ELECTRICAL CABLE! DO NOT BEND THE TOP OR BOTTOM 2 FEET [0.6m] OF THE PROBE. Returns are rare but if instructed by Pneumercator, all units should be returned as supplied in their appropriate shipping carton/tube. If OAL > 192" (see notes ^{1,3} on page 3), use the foam insert inside the carton as a template/guide to re-coil (see page 3) the probe. If carton/tube is not available, contact PNEUMERCATOR.