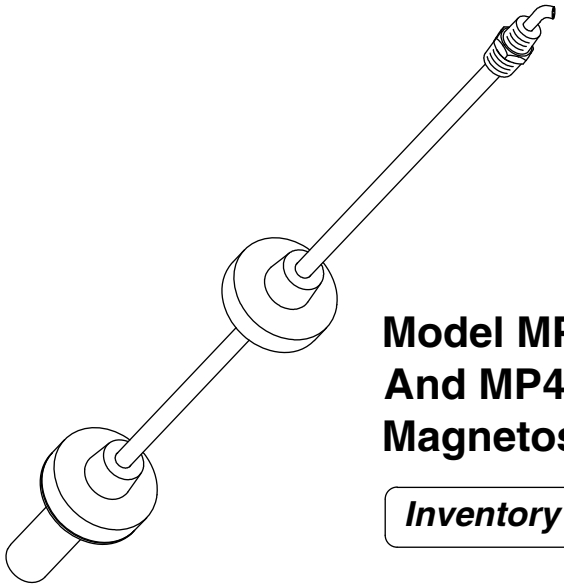
PNEUMERCATOR
Liquid Level Control Systems

MP46xSA Flex Probes*
Installation Instructions



Model MP461SA, MP462SA, MP463SA And MP464SA Magnetostrictive Flex Probes

Inventory Management Of Tanks Up To 70 Feet

For use with the following consoles:

TMS2000	TMS3000
NOTE: **MP46xSA SERIES** PROBES ARE **NOT COMPATIBLE** WITH **TMS1000** SERIES AND **Wi**reless **D**ATA **A**CQUISITION **M**ODULE (**WiDAM**) USED IN CONJUNCTION WITH WIRELESS CONSOLES. REFER TO THE MP56xSA SERIES.	

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

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.

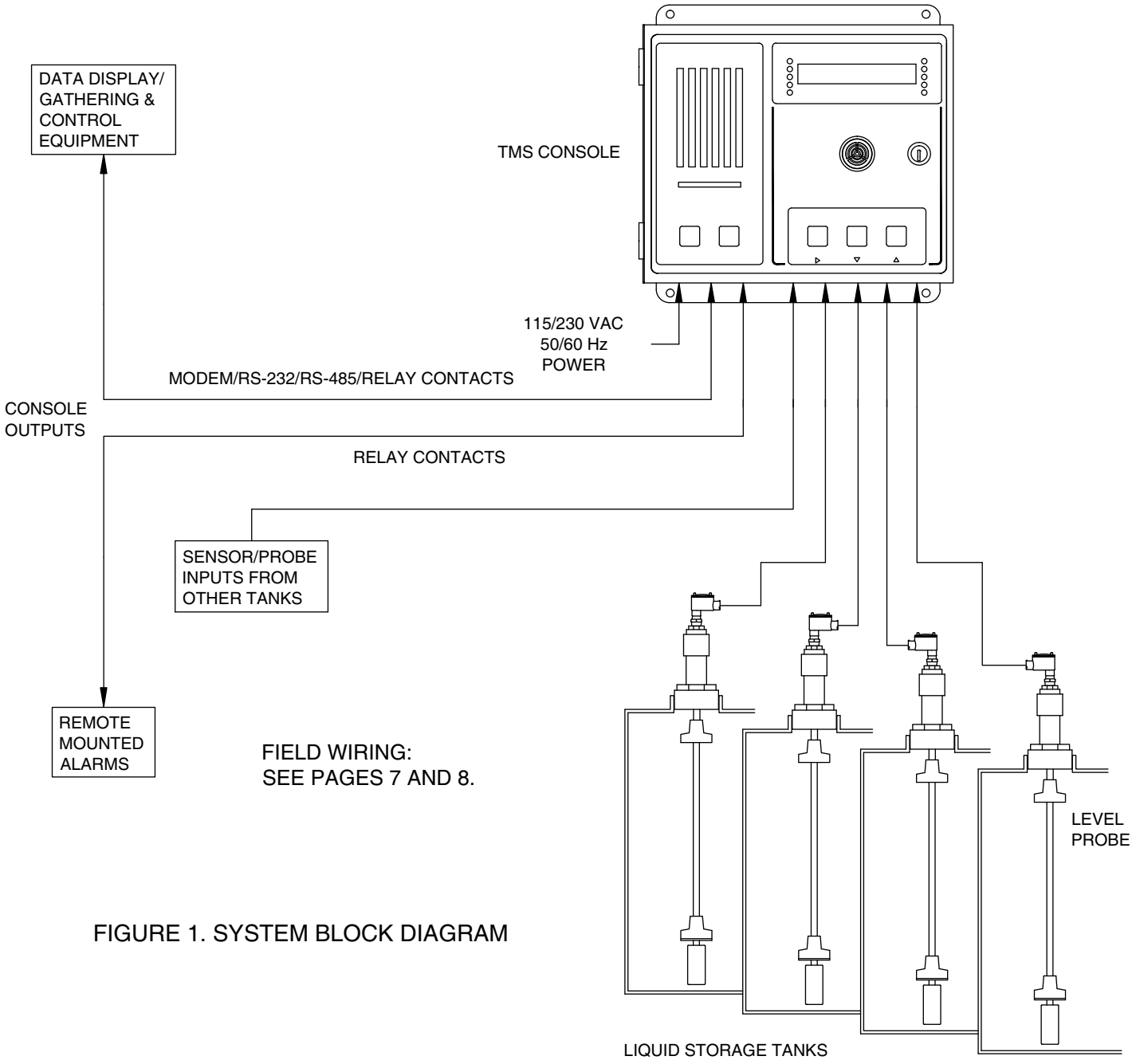


FIGURE 1. SYSTEM BLOCK DIAGRAM

⚠ 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.

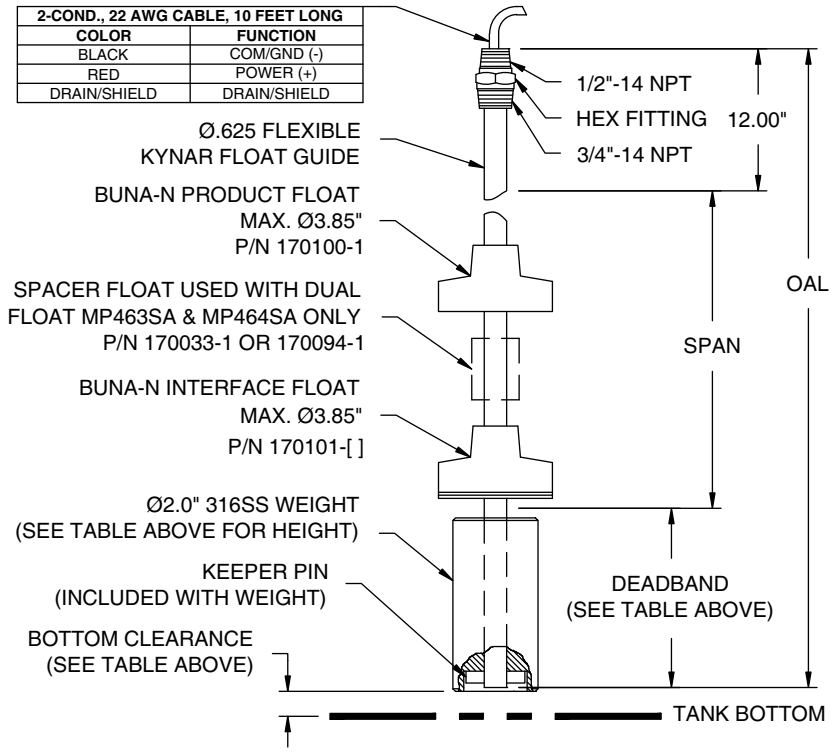
MODEL NO. *	OAL (IN.) (Overall Length)	BOTTOM CLEARANCE (IN.)	BOTTOM DEADBAND DIMENSION (IN.)	WEIGHT HEIGHT (IN.) **	HEIGHT (ABOVE TANK)
MP461SA	151 - 216	2.00	8.00	7.00	12 INCHES MINIMUM SEE PAGE 5
MP462SA	217 - 288	2.00	8.00	7.00	
MP463SA ***	289 - 432	3.00	12.00	11.00	
	433 - 600	4.00	15.00	14.00	
MP464SA	601 - 720	5.00	17.00	16.00	
	721 - 840	6.00	19.00	18.00	

* Unless otherwise specified, all probes are supplied coiled in shipping cartons except MP461SA probes with overall length 151" - 192" are NOT COILED, supplied in shipping tubes.

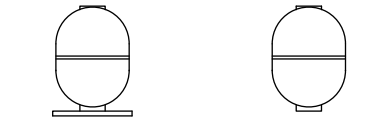
** Maybe supplied as single-piece weight kit no. 10529-x or multiple-piece weight kit no. 10642-x (installation instructions included).

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

2-COND., 22 AWG CABLE, 10 FEET LONG	
COLOR	FUNCTION
BLACK	COM/GND (-)
RED	POWER (+)
DRAIN/SHIELD	DRAIN/SHIELD



OPTIONAL 316 STAINLESS STEEL FLOATS AND SPACER TUBE FOR 2" OPENINGS



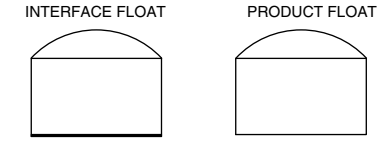
MAX. DIA. 2.05" P/N 170067-[ ] OR P/N 170090-[ ]

MAX. DIA. 2.05" P/N 170066-1 OR P/N 170089-1

SPACER TUBE (FOR 2" S.S. SINGLE FLOAT APPLICATIONS ONLY)

P/N 262126-1 (Ø.875" X .50" HEIGHT)

OPTIONAL 316 STAINLESS STEEL FLOATS FOR 4" OPENINGS



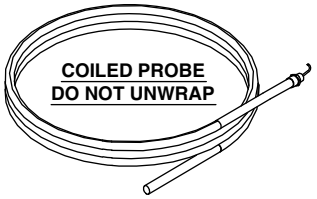
MAX. DIA. 3.85" P/N 170059-[ ]

MAX. DIA. 3.85" P/N 170057-1

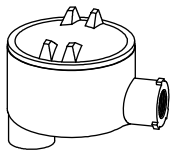
SEE BULLETIN 176 FOR OPTIONAL EXTENDED FLOATS FOR 4" OPENINGS

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

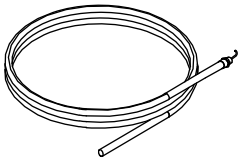
UNPACKING: All probes should be visually inspected regardless of their shipping carton/tube physical condition at delivery. Inspect probe for physical damage including the inner tubes. Contact PNEUMERCATOR and the shipping company immediately if any of the parts (see page 4) are missing or damaged. During 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 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.



PNEUMERCATOR SUPPLIED COMPONENTS:
(NOT SHOWN TO SCALE)

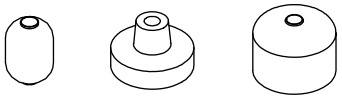


WATERTIGHT HOUSING



COILED PROBE
DO NOT UNWRAP
Overall Length (OAL) as required from table on page 3.

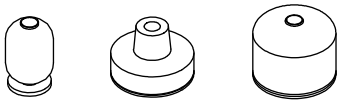
NOTE: Overall length 151" -192" NOT COILED.



PRODUCT FLOAT
Either A, B or C supplied
A = 2" opening or greater
B, C = 4" opening or greater

SPACER FLOAT
Supplied ONLY with models MP463SA & MP464SA probes with both product and interface floats.

BOTTOM SPACER TUBE
For 2" S.S. single float applications ONLY.



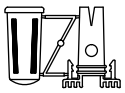
INTERFACE FLOAT *
Either D, E or F supplied
D = 2" opening or greater
E, F = 4" opening or greater

* IF CONFIGURED FOR DUAL FLOAT OPERATION.

PROBE WEIGHT
Either G or H supplied
Length as required from table on page 3.

** Installation instructions included

KEEPER PIN



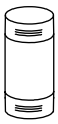
WIRE SPLICE SEAL CONNECTOR
(Installation instructions included with connector)

CUSTOMER SUPPLIED COMPONENTS:
(NOT SHOWN TO SCALE)

MOUNTING COMPONENTS FOR ALL APPLICATIONS

2" X 3/4" NPT METAL BUSHING

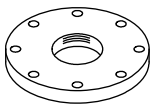
2" NPT METAL COUPLING



2" NPT (BOTH ENDS)
SCHEDULE 40 METAL NIPPLE
Length calculated from formula on page 5.

OPTIONAL MOUNTING COMPONENTS

METAL BUSHING
Required ONLY for threaded openings greater than 2" NPT. Selected bushing MUST have mating 2" NPT thread for the nipple above.



MATING METAL FLANGE
For mating flange threaded openings greater than 2" NPT, an appropriate bushing must be used to connect the nipple.

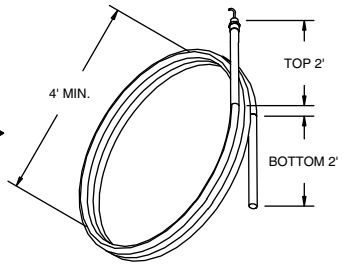
NOTE:
THE HEIGHT OF THESE OPTIONAL COMPONENTS ARE REPRESENTED BY "H" UNDER NIPPLE LENGTH CALCULATION ON PAGE 5.

INSTALLATION:

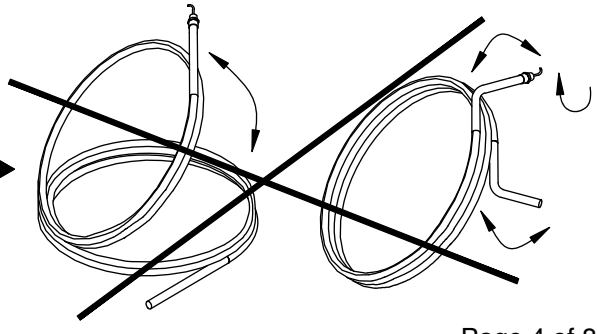
WARNINGS:

- Installation is only recommended at temperatures 30°F 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 OF THE PROBE. IF COILED: KEEP THE COILS PARALLEL! DO NOT LIFT ONE COIL SEPARATELY FROM THE OTHER COILS. DO NOT TWIST THE COILS.

CORRECT ▶
HANDLING



INCORRECT ▶
HANDLING

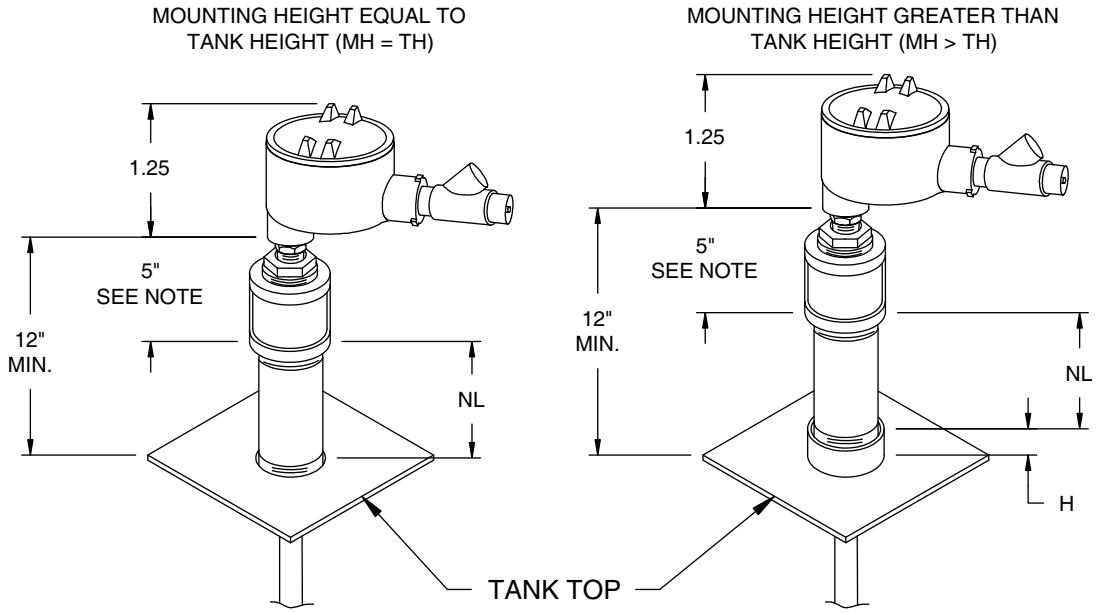


INSTALLATION CONT'D:

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. The recommended guideline is a minimum clearance of 2 feet, with 1 additional foot for every 10 feet above 20 feet.
- **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. **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.



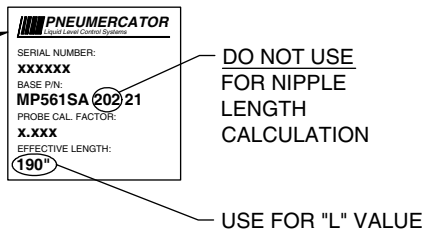
NOTE: THIS DIMENSION IS 5" WHEN STANDARD METAL 2" X 3/4" BUSHING (TYPICALLY 1 3/8" OVERALL HT) AND 2" COUPLING (TYPICALLY 2 1/2" OVERALL HT) ARE USE IN MOUNTING ASSEMBLY.

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)



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"**

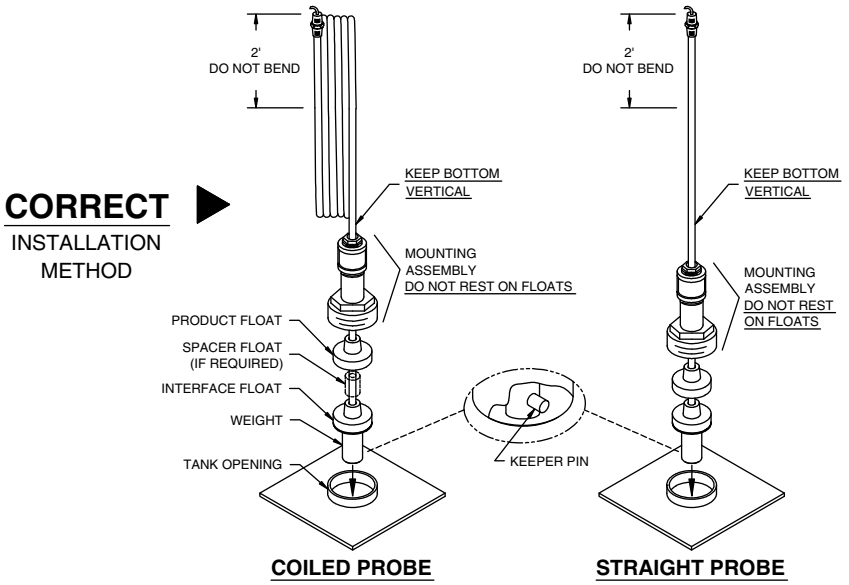
INSTALLATION CONT'D:

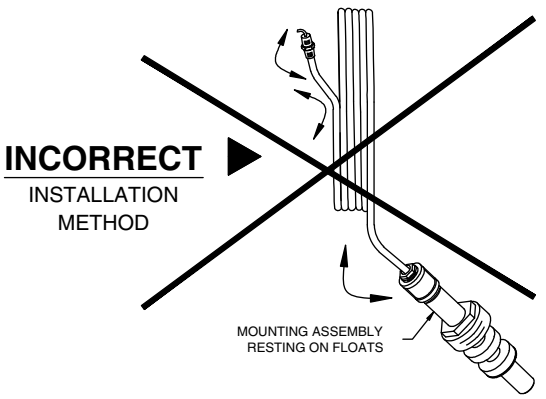
2. **TRANSPORT PROBE AND ACCESSORIES:** Transport the flex probe (with tie wraps still in place if coiled) and the other components to the top of the tank.

⚠ 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.

3. **INSTALL ACCESSORIES:** Steps (3a) and (3b) apply to coiled probes, step (3b) applies to straight probes.
   a) Rest the coiled probe over your shoulder. Let the second installer cut ONLY the tie wrap at the end of the tube with a hole through it, marked #1.
   b) Keeping the probe bottom vertical, install the appropriate components on the end of the probe as shown, making sure to support the end of the probe to keep it from twisting. DO NOT BEND THE BOTTOM 2 FEET OF THE PROBE.

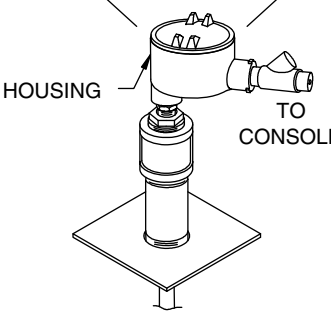




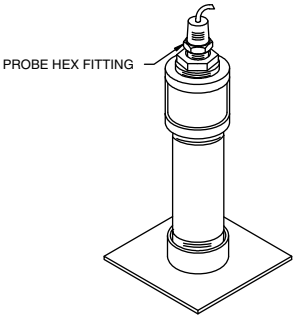
4. **INSTALL PROBE:** With the components supported by the second installer (If coiled, keep coils on your shoulder cutting the tie wraps in number sequence only when necessary), carefully feed the weight and floats through the tank opening, THE TOP 2 FEET OF THE PROBE CONTAINS ELECTRONICS. DO NOT BEND. DO NOT REMOVE PROBE TAG!
5. **SECURE PROBE:** Screw the mounting assembly into tank opening, then the probe hex fitting into the mounting assembly.
6. **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.



HOUSING INSTALLATION



WIRING:

⚠ WARNING

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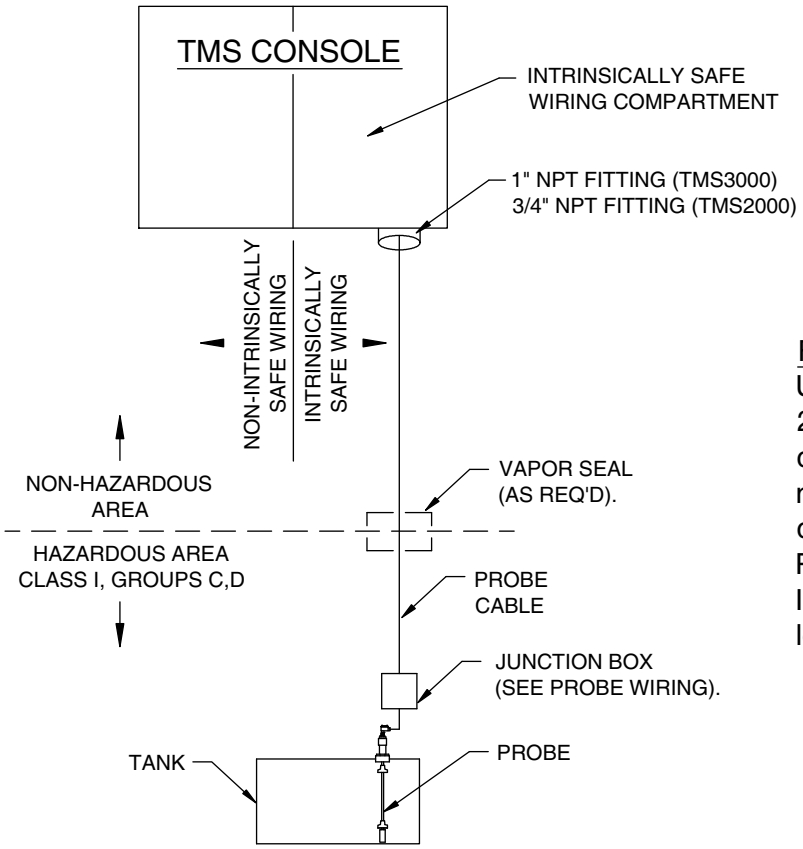
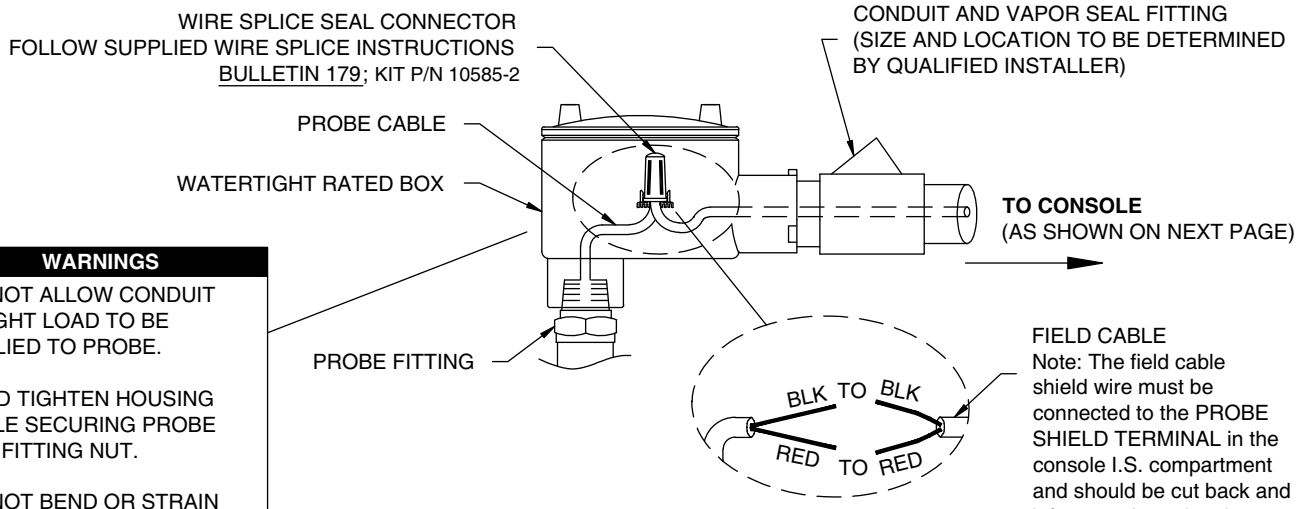


FIELD WIRING CABLE SELECTION:

Use Belden 8441, or any equivalent 2-conductor, 22 AWG 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



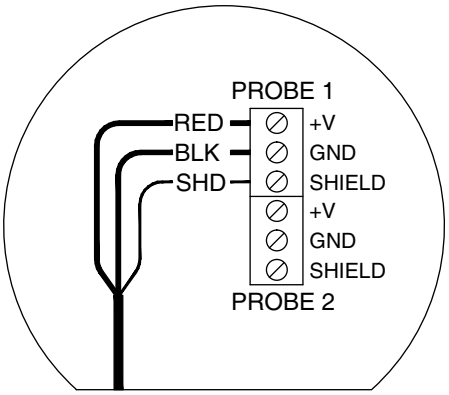
WARNINGS

- 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.

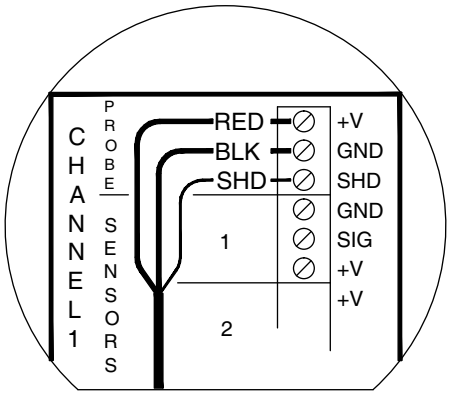
FIELD CABLE
Note: The field cable shield wire must be connected to the PROBE SHIELD TERMINAL in the console I.S. compartment and should be cut back and left unterminated at the probe junction box.

WIRING CONT'D:

TYPICAL WIRING FOR TMS CONSOLES



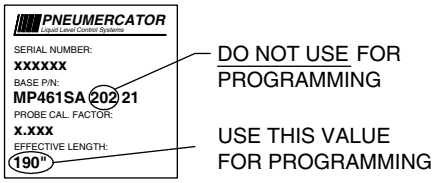
TMS2000 PROBE INPUT WIRING



TMS3000 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)



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:_____