

ISD Vapor Flow Meter

Installation Guide



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ISD Vapor Flow Meter Installation

This manual contains instructions to install a Veeder-Root ISD (In-Station Diagnostic) Vapor Flow Meter in a dispenser’s vapor return line in vacuum assist systems.

This manual assumes all preliminary site preparation is completed, and that wiring from the console to the Vapor Flow Meter junction box is in place and meets the requirements set out in the TLS-3XX Series Site Prep and/or TLS RF Wireless 2 system (W2) installation manuals.

DOCUMENTS REQUIRED TO INSTALL EQUIPMENT

This equipment must be installed according to the applicable installation document:

Equipment	ATEX Descriptive System	IECEX Descriptive System	UL/cUL Control Drawing
	Document No.	Document No.	Document No.
Associated Apparatus			
TLS-450	331940-006	331940-106	331940-008
TLS-350R or TLS-350 Plus	331940-001	331940-101	331940-011
TLS-300	331940-002	331940-102	331940-013
TLS-50 or TLS2 or TLS-IB	331940-003	331940-103	331940-014
Intrinsically Safe Apparatus for Wireless Applications			
Tank Gauge Accessories	331940-005	331940-105	331940-012

Reference Manuals

- 576013-879 TLS-3XX Series Consoles Site Prep Manual
- 577013-800 In-Station Diagnostics Install, Setup & Operation Manual
- 577013-964 TLS RF Wireless 2 System (W2) Installation and Maintenance Guide

Contractor Certification Requirements

Veeder-Root requires the following minimum training certifications for contractors who will install and setup the equipment discussed in this manual:

Installer (Level 1) Certification: Contractors holding valid Installer Certification are approved to perform wiring and conduit routing; equipment mounting; probe, sensor and carbon canister vapor polisher installation; wireless equipment installation; tank and line preparation; and line leak detector installation.

ATG Technician (Level 2/3 or 4) Certification: Contractors holding valid ATG Technician Certifications are approved to perform installation checkout, startup, programming and operations training, system tests, troubleshooting and servicing for all Veeder-Root Series Tank Monitoring Systems, including Line Leak Detection. In addition, Contractors with the following sub-certification designations are approved to perform installation

checkout, startup, programming, system tests, troubleshooting, service techniques and operations training on the designated system.

- Wireless 2
- Tall Tank

VR Vapor Products Certification: Contractors holding a certification with the following designations are approved to perform installation checkout, startup, programming, system tests, troubleshooting, service techniques and operations training on the designated system.

- ISD – In Station Diagnostics
- PMC – Pressure Management Control
- CCVP - Veeder-Root Vapor Polisher
- Wireless – ISD/PMC Wireless
- A current Veeder-Root Technician Certification is a prerequisite for the VR Vapor Products course.

Warranty Registrations may only be submitted by selected Distributors.

Safety Precautions

The following safety symbols may be used throughout this manual to alert you to important safety hazards and precautions.

 <p>EXPLOSIVE Fuels and their vapors are extremely explosive if ignited.</p>	 <p>FLAMMABLE Fuels and their vapors are extremely flammable.</p>
 <p>ELECTRICITY High voltage exists in, and is supplied to, the device. A potential shock hazard exists.</p>	 <p>TURN POWER OFF Live power to a device creates a potential shock hazard. Turn Off power to the device and associated accessories when servicing the unit.</p>
 <p>READ ALL RELATED MANUALS Knowledge of all related procedures before you begin work is important. Read and understand all manuals thoroughly. If you do not understand a procedure, ask someone who does.</p>	 <p>USE SAFETY BARRICADES Unauthorized people or vehicles in the work area are dangerous. Always use safety cones or barricades, safety tape, and your vehicle to block the work area.</p>

⚠ WARNING	
	<p>This product is to be installed and operated in the highly combustible environment of a gasoline dispenser where flammable liquids and explosive vapors may be present.</p> <p>FAILURE TO COMPLY WITH THE FOLLOWING WARNINGS AND SAFETY PRECAUTIONS COULD CAUSE DAMAGE TO PROPERTY, ENVIRONMENT, RESULTING IN SERIOUS INJURY OR DEATH.</p> <p>The following hazards exist:</p> <ol style="list-style-type: none"> 1. Electrical shock resulting in serious injury or death may result if power is on during installation and the device is improperly installed. 2. Product leakage could cause severe environmental damage or explosion resulting in death, serious personal injury, property loss and equipment damage. <p>Observe the following precautions:</p> <ol style="list-style-type: none"> 1. Read and follow all instructions in this manual, including all safety warnings. 2. Comply with all applicable codes including: the National Electrical Code; federal, state, and local codes; and other applicable safety codes. 3. Before installing this device, turn Off, tag/lock out power to the system, including console and submersible pumps. 4. To protect yourself and others from being struck by vehicles, block off your work area during installation or service. 5. Substitution of components may impair intrinsic safety.

Before You Begin

- A level 1 or higher certified Veeder-Root Technician must be available (on site) to assist in this type of installation.
- Comply with all recommended safety practices identified by OSHA (Occupational Safety and Health Administration) and your employer.
- Follow all installation requirements as per NFPA (National Fire Protection Association) 30, 30A, and 70.
- Review and comply with all the safety warnings in the installation manuals and any other national, State or Local requirements.
- When directly wiring to a TLS console, a 2-conductor, 18 AWG shielded cable must be installed in intrinsically safe conduit from each dispenser to the intrinsically safe wiring compartment of the TLS console.
- Debris from plumbing modifications should be flushed through the piping system prior to installing the ISD Vapor Flow Meter.
- Use only UL classified Gas/TFE yellow teflon tape on all fittings. Do not use pipe dope to seal pipe threads or fittings in and out of the ISD Vapor Flow Meter.

Veeder-Root Parts

- Veeder-Root ISD Vapor Flow Meter (P/N 331847-001).
- Sensor Installation Kit, see Table 1.

Table 1.- Vapor Flow Meter Installation Kit (P/N 330020-445)

Item	Qty.	Description	P/N
1	1	ISD Vapor Flow Meter	331847-002
2	2	Flange with 1" NPT threaded hole	332091-001
3	4	5/16-18 UNC-2B x 3/4" hex head bolt	514100-426
4	2	1-11.5 NPT x 2 " male to male threaded steel nipple	576008-655
5	1	Inlet filter	332092-001
6	1	Outlet o-ring (Parker size # 2-218, Nitrile)	512700-258
7	1	Cord grip group	331028-001
8	1	Sealing pack	514100-304
9	2	Wire nut	576008-461
10	2	Tie wrap	510901-337
11	4	5/16" Lock washer	514100-436

Tools Required

1. Pipe wrench suitable for tightening 1-inch NPT pipe.
2. 1/2" socket wrench to install Vapor Flow Meter flange bolts.
3. Necessary pipe fitter's equipment and a non-hazardous work space suitable to modify dispenser vapor line for Vapor Flow Meter installation, when necessary.

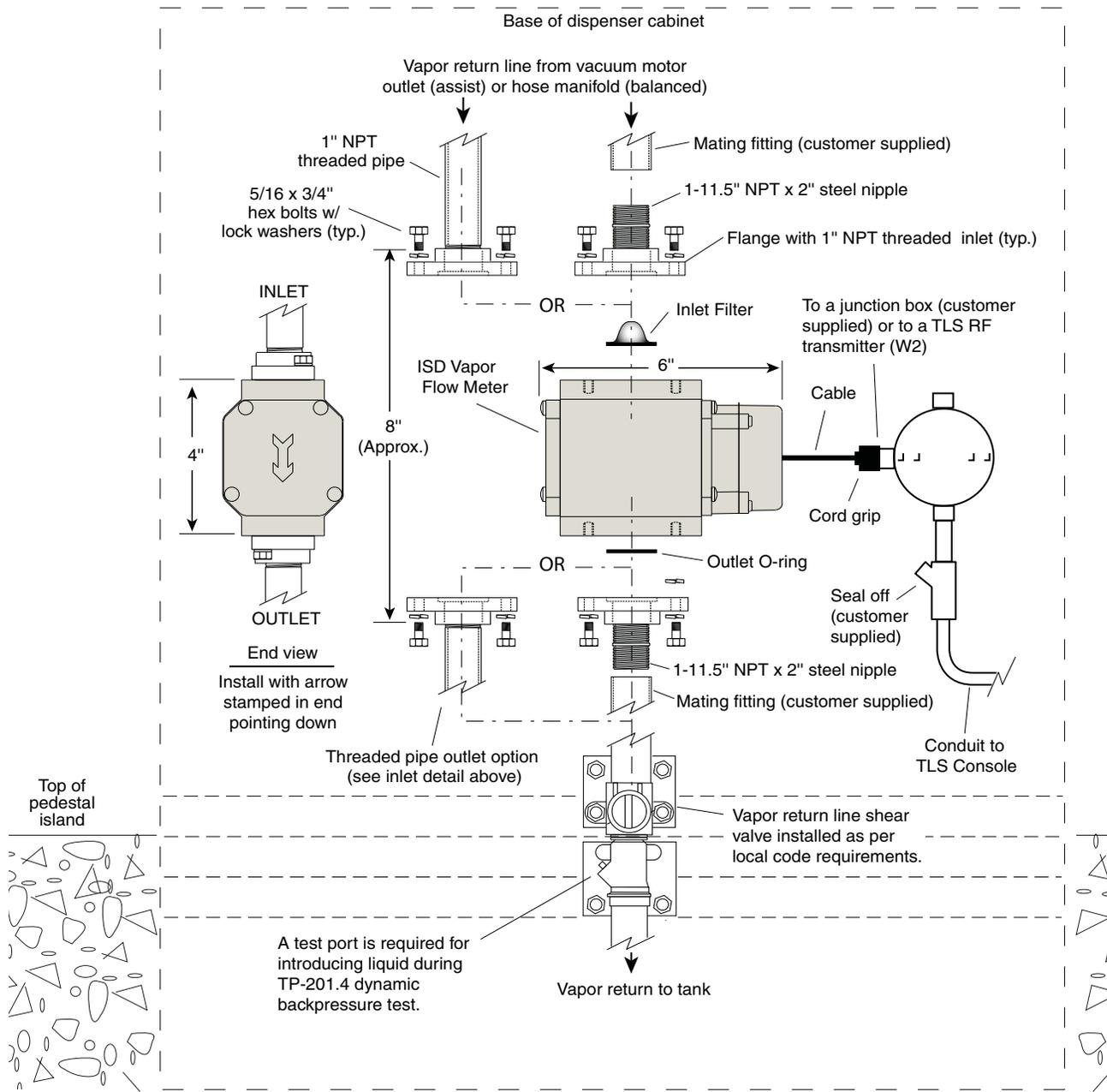
Installation Steps - Vacuum Assist System Above Shear Valve



1. Before installing this device, turn Off, tag/lock out power to the system, including console and submersible pumps.
2. Remove the dispenser's lower sheet metal doors to access the vapor plumbing.
3. Loosen any factory installed mounts and/or brackets necessary to provide room to disconnect the vacuum motor outlet plumbing.
4. Disconnect the factory installed plumbing between the outlet of the vacuum motors and the field installed plumbing above the vapor shear valve, if present (see example installation in Figure 1). Retain the manufacturers installed piping for later use.
5. Remove any unneeded field installed plumbing above the vapor shear valve. The Vapor Flow Meter with flanges attached can be used for sizing the required head space of approximately 8 inches. Approximately 3 inches of clearance is required on both sides of the piping to accommodate the width of the meter body.
6. Working through the vacuum motor mounting plate, if present, connect the upper flange to factory installed plumbing. Note that this may need to be temporarily suspended across the vacuum motor mounting plate while the lower plumbing work progresses.
7. Install any plumbing and the lower flange that will connect between the outlet side of the Vapor Flow Meter and the shear valve or lower vapor return line. Note: Elbows should be kept to a minimum (straight vertical plumbing is preferable). To improve efficiency and to reduce the risk of liquid traps, all horizontal plumbing must be pitched to drain.
8. Clean all debris around the inlet and outlet plumbing prior to installing the Vapor Flow Meter. Do not blow compressed air through the Vapor Flow Meter to prevent damaging the internal screens.
9. Install the o-ring into the lower mounting flange.
10. Taking care that foreign material (chips, debris, sealant, etc.) does not enter the open piping or Vapor Flow Meter, carefully insert the inlet filter and then connect the Vapor Flow Meter to the upper flange. Note that the flow arrow on the side of the meter body must point down.
11. Connect the lower flange to the Vapor Flow Meter.
12. Tighten any loose fittings and hardware
13. Route the wiring to the TLS RF transmitter (W2) or into the junction box via the supplied cord grip assembly when direct wiring to a TLS console.
14. Connect the wires from the Vapor Flow Meter to the field wiring from the console and cap with wire nuts (see Figure 2). Not required when connecting to the TLS RF transmitter (W2).
15. After all other ISD Vapor Flow Meters and the ISD Pressure Sensor are installed, pressurize the tank ullage space and vapor piping to at least 2 inches WC and test for leaks using leak detection solution.

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Installation Steps - Vacuum Assist System Above Shear Valve



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Figure 1. Example Vapor Flow Meter Installation Above Shear Valve

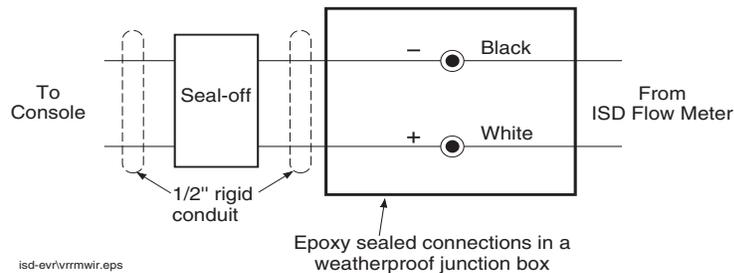
ISD Flow Meter Installation Guide*Installation Steps - Vacuum Assist System Below Shear Valve*

Figure 2. Field wiring Vapor Flow Meter - Observe Polarity

Installation Steps - Vacuum Assist System Below Shear Valve

NOTE: The Vapor Flow Meter should be installed prior to setting the dispenser in place or prior to installing any vacuum assist retrofit kits. If retrofitting the vacuum assist system, follow all manufacturer's instructions.



1. Before installing this device, turn Off, tag/lock out power to the system, including console and submersible pumps.
2. Remove the dispenser's lower sheet metal doors to access the vapor plumbing, if necessary.
3. If a retrofit vacuum assist kit will be installed, remove any hardware specified in the manufacturer's installation instructions. Do not install the retrofit assembly at this time.
4. Remove any unneeded field installed plumbing between the vapor shear valve and the vapor return line fitting. Figure 3 shows two example installations of the Vapor Flow Meter with the required lateral or wye fitting for running the TP-201.4 back pressure test. Approximately 3 inches of clearance is required on both sides of the piping to accommodate the width of the meter body.
5. Connect the lower flange to the pipe that is connected to the lateral or wye access fitting (see Figure 4).
6. Install the Vapor Flow Meter over the lower flange.
7. Connect the upper flange with serviceable screen above the Vapor Flow Meter.
8. Using a close nipple, thread the shear valve into the upper flange.
9. Install the vacuum assist retrofit kit, if required, following the retrofit kit manufacturer's installation instructions - or fit the dispenser to its permanent mounting points.
10. Using nipples, unions, and other plumbing as required, connect the vacuum assist outlet to the shear valve.
11. Route the wiring into the junction box via the supplied cord grip assembly. Connect the wires from the Vapor Flow Meter to the field wiring from the console and cap with wire nuts (see Figure 2) - OR - connect the wires to the TLS RF transmitter (W2).
12. After all other ISD Vapor Flow Meters and the ISD Pressure Sensor are installed, pressurize the tank ullage space and vapor piping to at least 2 inches WC and test for leaks using leak detection solution.

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Installation Steps - Vacuum Assist System Below Shear Valve

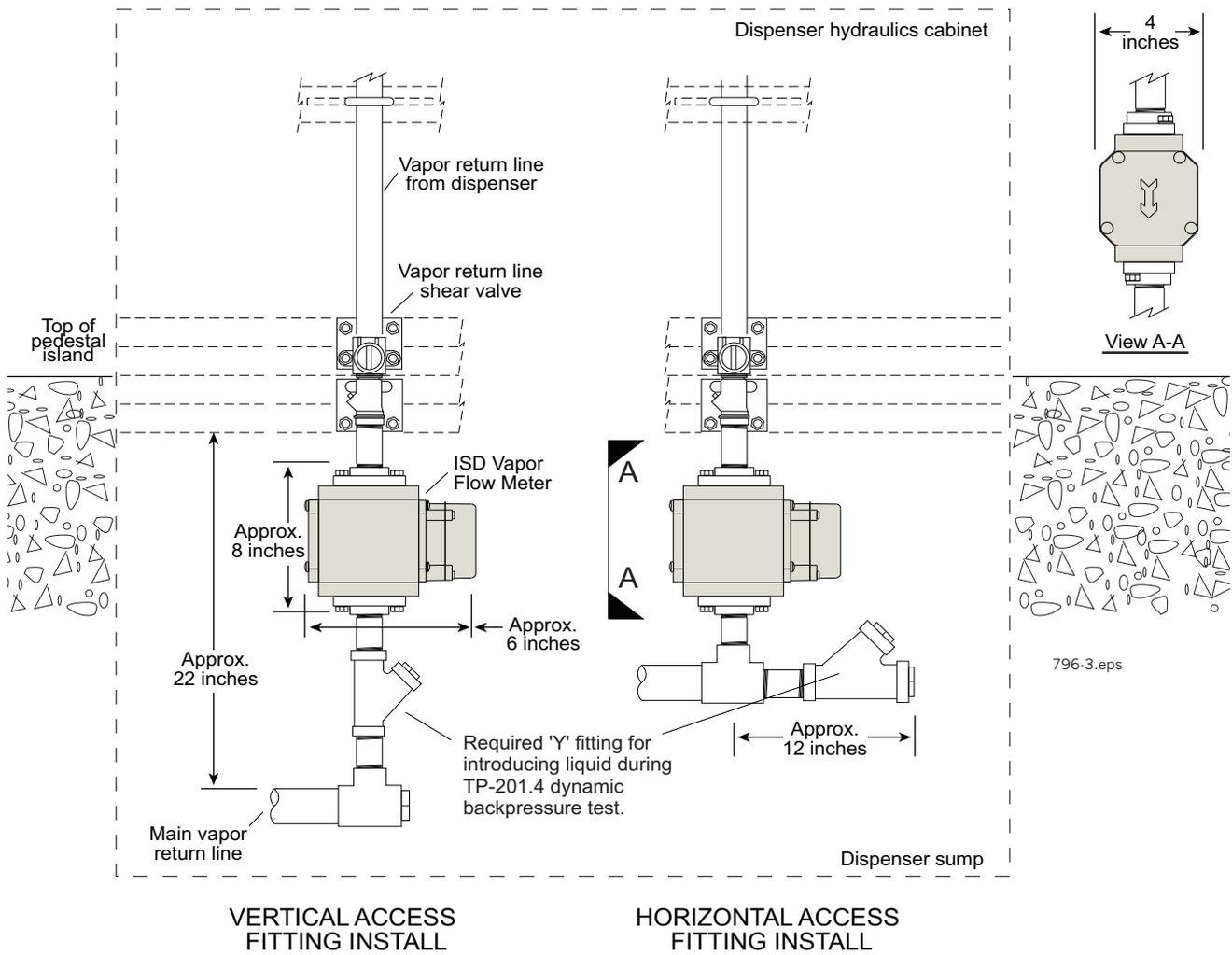


Figure 3. Example flow meter installations with approximate clearances

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Installation Steps - Vacuum Assist System Below Shear Valve

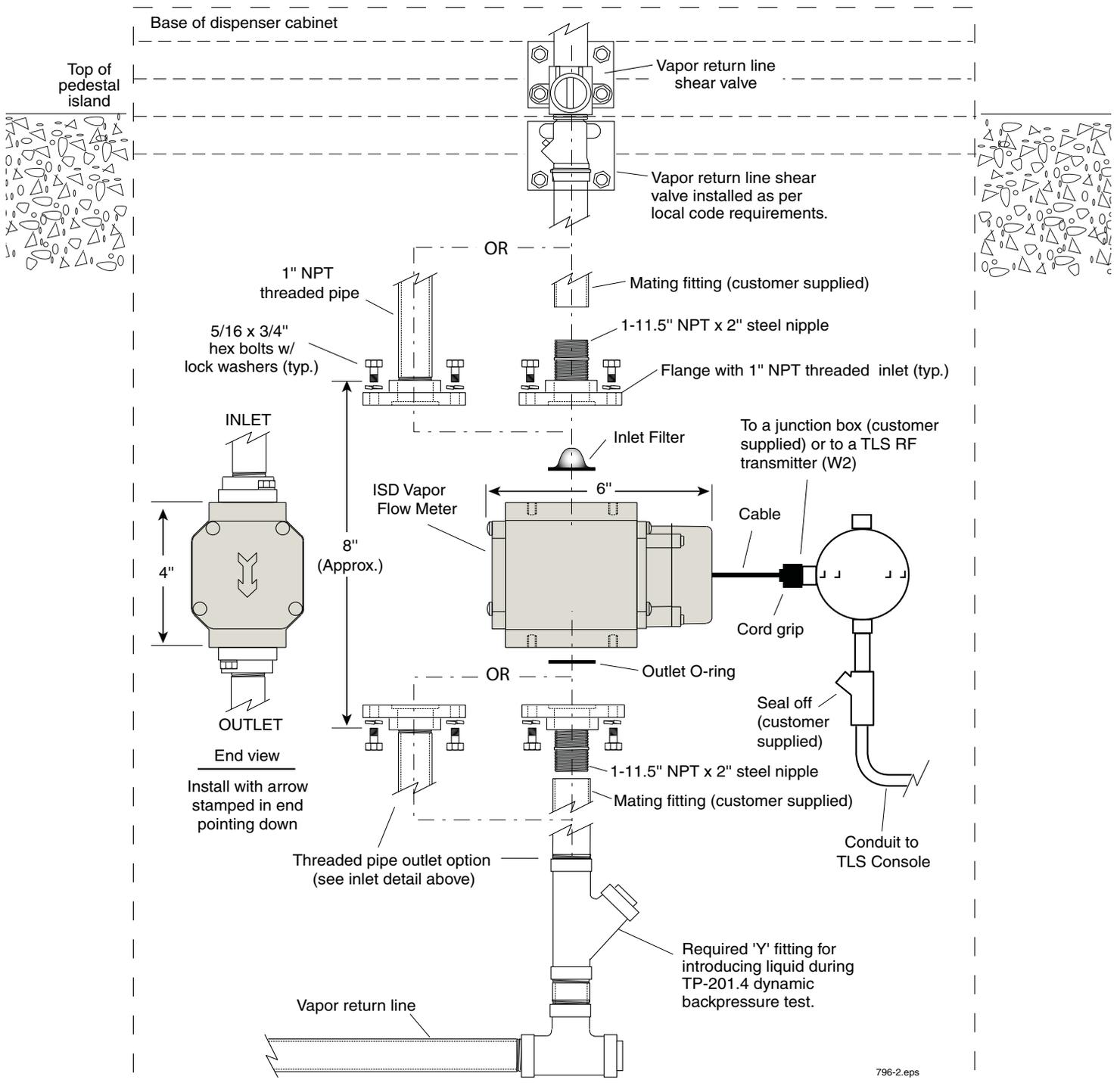


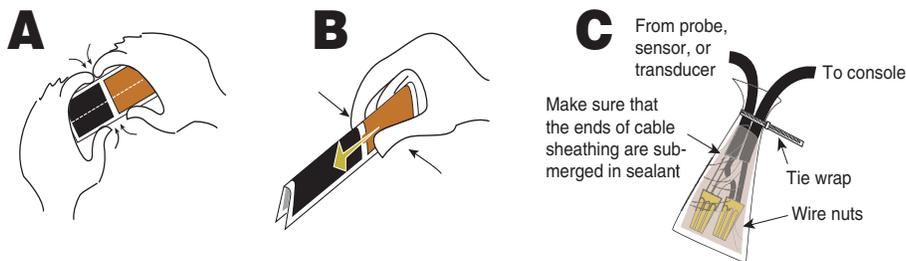
Figure 4. Example Vapor Flow Meter Installation Below Shear Valve

Seal and Connect Field Wiring

1. Seal wire nuts with epoxy sealant following the instructions in Figure 5. Note - wire sealing is not required for installations using a wireless interface.



CAUTION: Epoxy sealant is irritating to eyes, respiratory system, and skin. Can cause allergic skin reaction. Contains: epoxy resin and Cycloaliphatic epoxy-carboxylate. Precautions: Wear suitable protective clothing, gloves, eye, and face protection. Use only in well ventilated areas. Wash thoroughly before eating, drinking, or smoking.



Instructions:

NOTE: When temperature is below 50°F (10°C), keep resin in a warm place prior to mixing (e.g., in an inside pocket next to body).

1. Open epoxy sealant package, and remove resin pak.
2. Holding resin pak as shown in A, bend pak along long length.
3. As shown in B, firmly squeeze the RED SIDE of the resin, forcing it through the center seal and into BLACK SIDE.

4. Mix thoroughly to a uniform color by squeezing contents back and forth 25-30 times.
5. Squeeze mixed, warm resin into one end of bag and cutoff other end.
6. Slowly insert wiring connections into sealing pack until they fit snugly against the opposite end as shown in C.
7. Twist open end of bag and use tie wrap to close it off and position the tie wrapped end up until the resin jells.

consoles\epoxy2w.eps

Figure 5. Epoxy sealing field wiring

2. Push the epoxy sealed bag into the junction box. Replace and tighten the junction box cover.
3. Terminate field wiring into TLS Console and connect to Smart Sensor Module located in the intrinsically safe wiring compartment of the TLS as shown in Figure 6. Note: you must observe polarity! Also, the cable length between the console and sensor must not exceed the distance stated in the TLS-3XX Site Prep manual (P/N 576013-879). For the wireless version, terminate the wires in the TLS RF transmitter (W2).
4. Replace the lower sheet metal doors in the dispenser.

Note: Intrinsically safe devices must be installed in accordance with Article 504 of the National Electrical Code, ANSI/NFPA 70, for installation in the United States, or Section 18 of the Canadian Electrical Code for installations in Canada.

This intrinsically safe flow meter P/N 331847-001, has only been evaluated for connection to a UL listed TLS-350 Series Liquid Level Gauge / Leak Detector.

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Seal and Connect Field Wiring

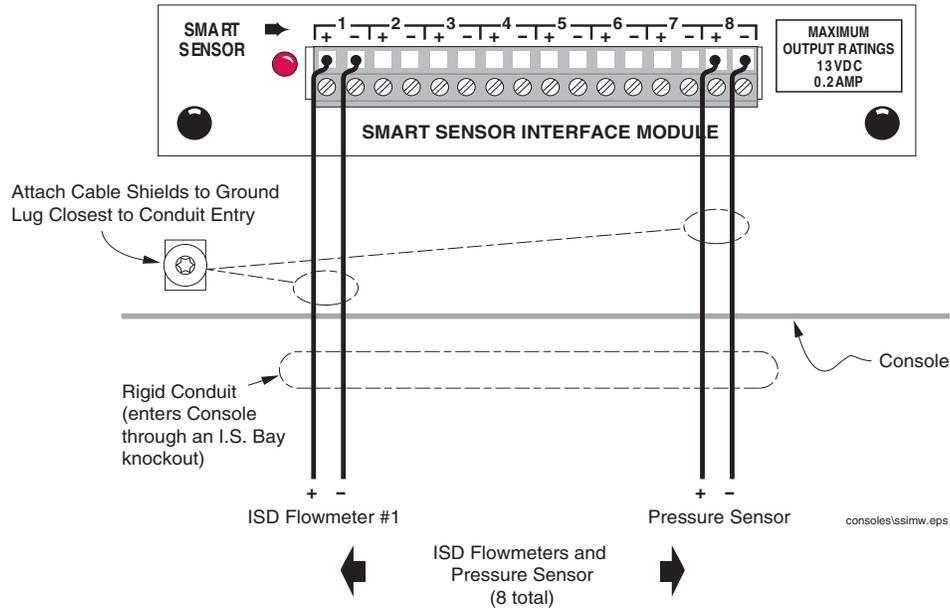


Figure 6. Connecting Vapor Flow Meter to Smart Sensor Interface Module



NOTE! For wireless configurations, see TLS RF System Control Drawing 331940-012.

