ISD Pressure Sensor

Installation Guide
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**DAMAGE CLAIMS**

1. Thoroughly examine all components and units as soon as they are received. If damaged, write a complete and detailed description of the damage on the face of the freight bill. The carrier's agent must verify the inspection and sign the description.

2. Immediately notify the delivering carrier of damage or loss. This notification may be given either in person or by telephone. Written confirmation must be mailed within 48 hours. Railroads and motor carriers are reluctant to make adjustments for damaged merchandise unless inspected and reported promptly.

3. Risk of loss, or damage to merchandise remains with the buyer. It is the buyer’s responsibility to file a claim with the carrier involved.

**RETURN SHIPPING**

For the parts return procedure, please follow the appropriate instructions in the "General Returned Goods Policy" and "Parts Return" pages in the "Policies and Literature" section of the Veeder-Root North American Environmental Products price list.
ISD Pressure Sensor Installation

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This manual contains instructions to install a Veeder-Root ISD (In-Station Diagnostic) Pressure Sensor in a dispenser’s vapor return line.

This manual assumes all preliminary site preparation is completed, and that wiring from the console to the ISD Pressure Sensor junction box is in place and meets the requirements set out in the TLS-3XX Series Site Prep manual.

Contractor Certification Requirements

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

**Level 1** Contractors holding valid Level 1 Certification are approved to perform wiring and conduit routing, equipment mounting, probe and sensor installation, tank and line preparation, and line leak detector installation.

**Level 2/3 or 4** Contractors holding valid Level 2, 3, or 4 Certifications are approved to perform installation checkout, startup, programming and operations training, troubleshooting and servicing for all Veeder-Root Tank Monitoring Systems, including Line Leak Detection and associated accessories.

Warranty Registrations may only be submitted by selected Distributors.

Related Manuals

- 576013-879 TLS-3XX Series Consoles Site Prep Manual
- 577013-800 In-Station Diagnostics (ISD) Install, Setup, & Operation Manual

Safety Precautions

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

<table>
<thead>
<tr>
<th>EXPLOSIVE</th>
<th>FLAMMABLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuels and their vapors are extremely explosive if ignited.</td>
<td>Fuels and their vapors are extremely flammable.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ELECTRICITY</th>
<th>TURN POWER OFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>High voltage exists in, and is supplied to, the device. A potential shock hazard exists.</td>
<td>Live power to a device creates a potential shock hazard. Turn Off power to the device and associated accessories when servicing the unit.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>READ ALL RELATED MANUALS</th>
<th>USE SAFETY BARRICADES</th>
</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
<td>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.</td>
</tr>
</tbody>
</table>
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.
• Review and comply with all the safety warnings in the installation manuals and any other national, State or Local requirements.
• A 2-conductor, 18 AWG shielded cable must be installed in intrinsically safe conduit from the dispenser to the intrinsically safe wiring compartment of the TLS console.
• The ISD Pressure Sensor must be installed in a VERTICAL position with the sensing port pointing down, and its connection to the vapor return line must be made BELOW the vapor return line shear valve in the base of the dispenser.
• For all connections requiring sealant, use only yellow Gas/TFE teflon tape.

WARNING

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. Improper installation may result in fire or explosion causing serious injury or death.

The following hazards exist:

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.

Observe the following precautions:

1. Read and follow all instructions in this manual, including all safety warnings.
2. To be installed in accordance with the National Electrical Code, NFPA 70 and the Automotive And Marine Service Station Code, NFPA 30A.
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.
Veeder-Root Parts

Veeder-Root parts and kits required to install the ISD Pressure Sensor are listed in Table 1.

Table 1.- Sensor Installation Kit (P/N 330020-433)

<table>
<thead>
<tr>
<th>Item</th>
<th>Qty.</th>
<th>Description</th>
<th>P/N</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Pressure sensor</td>
<td>331946-001</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>Male connector 68CA-4-4, brass 1/4&quot; tube to 1/4&quot; pipe</td>
<td>514100-430</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>Union 62CA-4, brass 1/4&quot; tube size</td>
<td>514100-431</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>Plug 59CA-4, brass 1/4&quot; tube size</td>
<td>514100-432</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>Universal sensor mounting kit - miscellaneous assortment of U-bolts, brackets, clamps, and fasteners</td>
<td>330020-012</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>Wire nut</td>
<td>576008-461</td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>Sealing pack</td>
<td>514100-304</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>Cord grip</td>
<td>331028-011</td>
</tr>
<tr>
<td>9</td>
<td>2</td>
<td>Tie wrap</td>
<td>510901-337</td>
</tr>
<tr>
<td>10</td>
<td>1</td>
<td>Shim</td>
<td>332061-001</td>
</tr>
<tr>
<td>11</td>
<td>1</td>
<td>Ball Valve, 3-way, 1/4&quot;</td>
<td>576008-649</td>
</tr>
<tr>
<td>12</td>
<td>1</td>
<td>Copper tube, soft, 1/4&quot; OD, 36&quot; length</td>
<td>332151-001</td>
</tr>
</tbody>
</table>

Tools Required

1. Wrenches suitable for tightening tubing fittings.
2. Necessary pipe fitter’s equipment and a non-hazardous work space suitable to modify the dispenser vapor line for Pressure Sensor installation.
Installation Steps

1. Before installing this device, turn Off, tag/lock out power to the system, including console and submersible pumps.

2. Determine which dispenser is closest to the tank being monitored. Remove that dispenser's lower sheet metal doors to gain access to the vapor plumbing.

3. Locate a suitable port or plumb a suitable "T" fitting in one of the locations listed below (listed in order of preference):
   a. The main vapor return line (see Figure 1) - this is the preferred position,
   b. In the vapor return line between shear valve and main vapor return line, or
   c. If the vapor flow meter is above the vapor shear valve, in the shear valve housing below the shear valve mechanism. Note: 1 to 2 ports are typically available on a shear valve. If you have to use one of these ports, make certain it accesses the plumbing below the valve mechanism.

4. Install one of the 68CA-4-4 male connectors (item 2 in Table 1) from the kit into the tapped hole.

5. Install ISD Pressure Sensor (item 1 in Table 1) vertically to the dispenser frame or piping using the 2-inch conduit clamp, rubber shim, and necessary bolts, nuts, and washers from the included Universal Sensor Mounting kit. Wrap the rubber shim (item 10 in Table 1) around the sensor before inserting it into the clamp. Also make sure the sensor cable outlet is facing up and the pressure sensing port tube in the base of the sensor is facing down.

6. Attach one end of the 62CA-4 union (item 3 in Table 1) to the pressure sensing port in the base of the ISD Pressure Sensor.

7. Install the remaining 68CA-4-4 male connectors (item 2 in Table 1) from the kit into each of the three ports in the 3-way calibration valve (item 13 in Table 1).

8. Measure, fabricate, and install a ¼" OD copper tube (item 12 in Table 1) that runs between the 62CA-4 union in the base of the sensor and the center port of the 3-way calibration valve.

9. Measure, fabricate, and install a ¼" OD copper tube that runs between the ¼" tube end of the male connector fitting installed beneath the shear valve and one of the two unused ports on the 3-way valve, being careful not to create any potential liquid traps.

10. Screw the 59CA-4 plug, item 4, from the kit onto the last port's male connector. Make sure the valve's handle is set to connect the sensor to the vapor return line and not to the capped (ambient) port.

   Important! All plumbing's pitch to drain should be 1/4" vertical per 12" horizontal to eliminate liquid traps.

11. Route the cable from ISD Pressure Sensor to the ISD Flow Meter/ISD Pressure Sensor junction box in the dispenser. Observing polarity, connect the sensor wiring to the field wiring from console and cap with wire nuts (see Figure 2).
Figure 1. Example ISD Pressure Sensor Installation

- Wrap rubber shim from kit around sensor before inserting in clamp
- Pressure sensing port
- Vapor return line from dispenser
- 1/4" OD copper tube as required
- Conduit to TLS Console
- Flow Meter and Pressure Sensor wiring can share the same conduit to console (Observe polarity!)
- Seal off (customer supplied)
- Junction box (customer supplied)
- Vapor return line shear valve
- ISD Flow Meter
- Cord grip
- Cord grip
- Seal-off (customer supplied)
- Conduit to TLS Console
- 2" or 3" common main vapor return line

Numbers in circle refer to item numbers (kit components) in Table 1

Figure 2. Field wiring ISD Pressure Sensor - Observe Polarity

- To Smart Sensor Interface Module
- Seal-off
- From ISD Pressure Sensor
- 1/2" rigid conduit
- Epoxy sealed connections in a weatherproof junction box
- Black
- White
12. Seal wire nuts in epoxy sealant following the instructions in Figure 3.

**CAUTION:** Epoxy sealant is irritating to eyes, respiratory system, and skin. Can cause allergic skin reaction. Contains: epoxy resin and cycloaliphatic epoxycarboxylate. 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.

**Figure 3. Epoxy sealing field wiring**

13. Push the epoxy sealed bag into the junction box. Replace and tighten the junction box cover.

14. Terminate field wiring into TLS Console and connect to Smart Sensor Interface Module located in the intrinsically safe wiring compartment of the TLS as shown in Figure 4. Note: observe polarity! The cable length between the console and sensor must not exceed 1000 feet.

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 pressure sensor P/N 331946-001, has only been evaluated for connection to a UL listed TLS-350 Series Liquid Level Gauge / Leak Detector.

Conductors of different intrinsically safe circuits run in the same cable/conduit must have at least 0.01 inch (0.25 mm) of insulation.

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.

16. Replace lower dispenser sheet metal doors onto dispensers.
Figure 4. Connecting ISD Pressure Sensor to Smart Sensor Interface Module

SMART SENSOR INTERFACE MODULE

SMART SENSOR INTERFACE MODULE

Console

ISD Pressure Sensor

Max output ratings:
- 13 VDC
- 0.2 AMP

Attach cable shields to ground lug closest to conduit entry.

Rigid conduit (enters console through an I.S. Bay knockout).