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OPW FUEL MANAGEMENT SYSTEMS
A DOVER COMPANY

M1500 SiteSentinel® iTouch™ Tank-Gauge Monitoring System

Installation Guide

6900 Santa Fe Drive • Hodgkins, IL 60525 • Tel: (708) 485-4200 • Fax (708) 485-7237 • www.opwglobal.com

OPW Fuel Management Systems

Visit us at www.opwglobal.com, or contact us at:

Call 1-877-OPW-TECH (877-679-8324)
For calls outside US and Canada, call +1-708-485-4200
Fax 1-800-421-3297

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Table of Contents

Section 1 Introduction

This manual describes the installation procedures for the SiteSentinel® iTouch™ Integrated Monitoring System. Included in this manual are installation instructions for the Controller, probes and sensors.

1.1 Warnings

1.1.1 Safety

When working in an environment containing fuel and fuel vapors, there is ALWAYS a risk of fire and explosion.

TO AVOID SEVERE INJURY OR DEATH, KEEP ALL POSSIBLE IGNITION SOURCES AWAY FROM HAZARDOUS AREAS.

Disconnect power before installing. DO NOT install this equipment in a volatile, combustible or explosive atmosphere (the “hazardous area” defined in the National Electrical Code).

Certain components have DANGEROUS voltages even with the power cord disconnected.

NOTE: Many of the procedures described in the following pages must be followed for each tank that is to be included in the system. Please read the directions carefully before proceeding.

Improper installation may endanger installers and users of this equipment! Read these instructions CAREFULLY.

Installers must know the requirements of intrinsically safe devices, and must strictly obey instructions in this manual to perform a safe installation.

1.1.2 Compliance

Installation must comply with the National Electrical Code (NFPA No. 70) and the Automotive and Marine Service Station Code (NFPA No. 30A).

Follow all of your local or regional codes as well.

A fuel tank is a hazardous area as defined in the NEC. Do not mount any part of the system, or any external devices (other than probes or sensors) within or above the hazardous area.

1.1.3 Precision Leak Test

A precision leak test should be performed on each tank – especially older ones – before installing the SiteSentinel iTouch. This test makes sure that leak data generated by the system is accurate and reliable. A pressurized precision leak test can be done on a tank after the probe has been installed, but DO NOT let the pressure exceed 20 psi.

1.1.4 Initial Inspection

The packing list contains details about your system. It is packed in the box with this manual. Store this sheet in a secure location. Be sure to check the packaging carefully for any damage that might have occurred during shipping.

1.1.5 Connect Internal Battery

For shipping, the internal battery in the Controller is disconnected. To activate the internal battery, remove the yellow strips.

Figure 1-1 Yellow Battery Strip

Section 2 Specifications

> **NOTE**: "I.S." (Intrinsically Safe) Interface Module refers to the sealed "terminal strip" inside the Controller. "I.S. Interface Module Position" refers to one (1) set of three (3) screw terminals on this terminal strip (for power, signal and ground connections). Each I.S. Interface Module contains four "positions."

1.2 SiteSentinel iTouch Controller

iTouch Controller Specifications	
Physical Dimensions:	Height: 23.5 cm (9.25 in) Width: 31.1 cm (12.25 in) Depth: 13.3 cm (4.25 in)
Power Input:	100-250 VAC, 50/60 HZ, 1.0A
Operating Temperature Range:	0° - 40° C. (32° - 104° F)
Remote Alarm Output:	Contact Rated at 30 VAC/DC 2A
Probe and Sensor Capacity:	16 probes and/or sensors
I.S. Interface Module:	14.5 VDC, 220 mA, 6.4 uF, 6 mH
Optional Output Module OM4:	See Appendix E – OM4 Output Module Option

MOUNT THE CONTROLLER AND PRINTER OUTSIDE THE HAZARDOUS AREA.

Substituting components will impair intrinsic safety.

For connection to intrinsically safe devices used in EEX ia IIA T4 (IEC/CENELEC) and Class 1, Division 1, Group D (North America) hazardous locations.

For use ONLY with equipment specified in these installation instructions.

1.3 Printer

A thermal printer, the Seiko Model DPU-414, is available for reports and other printouts. See Figure 4-2 on page 16 for mounting instructions.

Printer Specifications	
Physical Dimensions:	Height: 17.8 cm (7 in) Width: 17.8 cm (7 in) Depth: 7.6 cm (3 in)
Power Input:	Provided by Controller
Operating Temperature Range:	0° - 40°C (32° - 104°F)

Section 3 Magnetostrictive Probe (Model 924B)

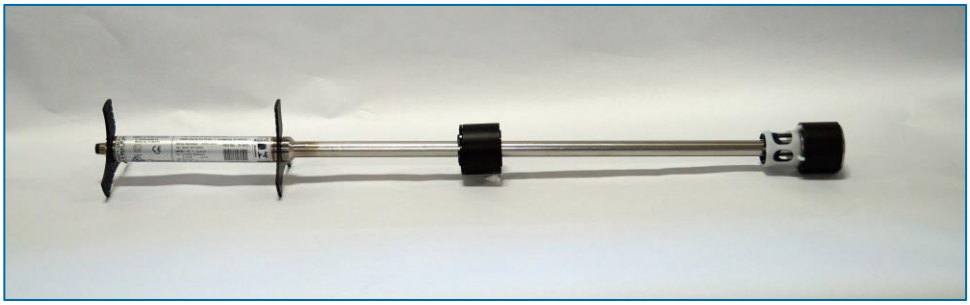


Figure 3-1 924B Probe

1.4 About the 924B Probe

The 924B probe uses magnetostrictive principles to derive product and water levels, and product temperatures. These probes are primarily used in under-ground storage tanks for both inventory and leak detection.

Two floats can be fitted to the probe shaft: The upper (product) float sits on top of the product, and the lower (water float) sits on the product/water boundary at the bottom of the tank.

Five temperature sensors reside in the probe shaft for measuring product temperature. They are located at positions of approximately 10%, 20%, 40%, 60% and 80% of the tank volume (based upon a cylindrical tank). The sensors compensate for the expansion and contraction of the product with temperature and thus producing net corrected product volume.

924B Probe Specifications	
Operating Temp. Range:	-40° - 60°C (-40° - 140°F)
Head Dimensions:	With connector, 21.5 cm x 2.54 cm (8.5 in x 1 in)
Cable:	1.83 m (6 ft) of gas & oil resistant cable
Sensor Power:	Must be provided by OPW Fuel Management Systems' I.S. Interface Module
Certifications:	North America: Class I, Division 1, Group D Outside North America: Ex ia IIA T4 Ga DEMKO 11 ATEX 1012670X IECEx UL 11.0012X
Level Resolution:	0.0127 mm (0.0005 in)
Temp. Sensor Resolution:	Less than +/- 0.3°C or 0.5°F

Special Conditions for safe use:

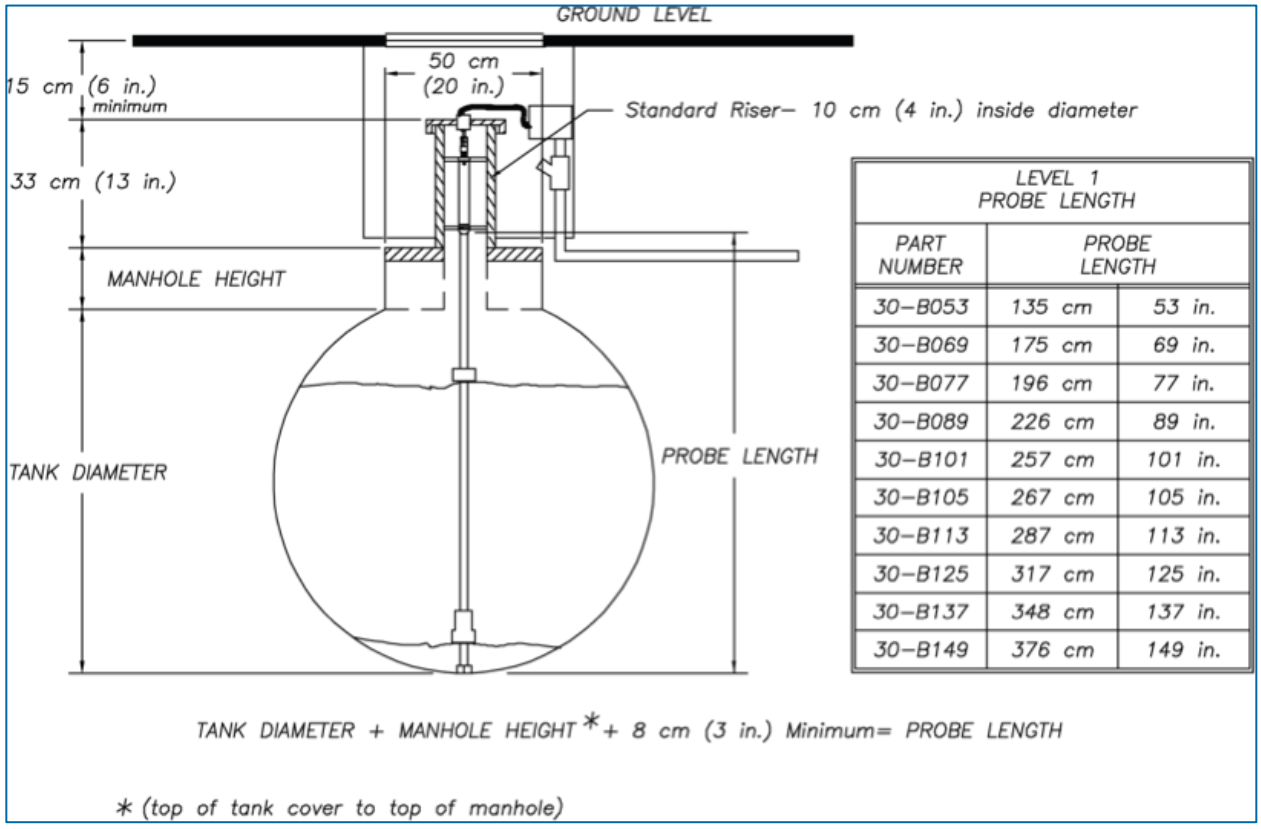
On devices supplied with 4-inch floats: to avoid build-up of static charge, do not rub with a dry cloth or clean in any manner that would result in a charge build-up. Discharge the probe outside of the hazardous area before putting it into service.

These devices have not been evaluated for use across a boundary wall.

The upper housing cover in the top of the enclosure is aluminum. Care must be taken to avoid ignition hazards due to impact or friction.

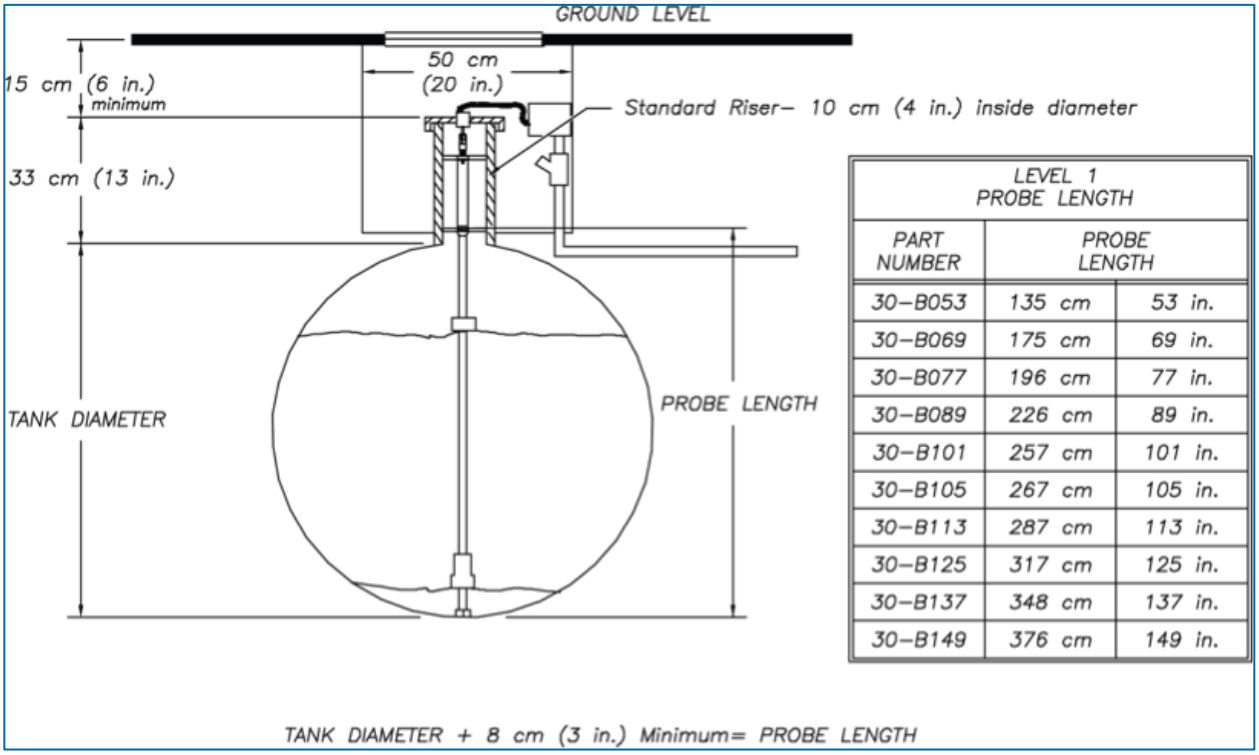
> **NOTE**: A probe for LPG tanks is also available, see Appendix F – LPG Probe Option.

1.5 Probe Lengths/Installation Scenarios



LEVEL 1 PROBE LENGTH		
PART NUMBER	PROBE LENGTH	
30–B053	135 cm	53 in.
30–B069	175 cm	69 in.
30–B077	196 cm	77 in.
30–B089	226 cm	89 in.
30–B101	257 cm	101 in.
30–B105	267 cm	105 in.
30–B113	287 cm	113 in.
30–B125	317 cm	125 in.
30–B137	348 cm	137 in.
30–B149	376 cm	149 in.

Figure 3-2 Probe in Manhole Equipped Tank



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30–B137	348 cm	137 in.
30–B149	376 cm	149 in.

Figure 3-3 Probe in Tank Without Manhole

Section 4 Controller Installation

WARNING

Do not mount the Controller or external printer within or above the hazardous area.

Choose a Mounting Location for the Controller and Printer. Choose an indoor mounting location where it will be protected against moisture and extreme temperature and humidity conditions.

Wall mount the Controller at eye level close to a circuit breaker. Leave room above and below Controller for power, probe, sensor, remote alarm, and other conduits that must be connected to the Controller.

If purchased, also leave room for the optional printer that normally mounts to the left of the Controller.

1.6 Mounting the Controller

Mount the Controller to the wall using the dimensions shown in Figure 4 on page 19. The four (4) mounting holes are 0.80 cm (0.3125 in) diameter. Use as large a fastener as possible.

NOTICE

Do not drill holes in the SiteSentinel iTouch cabinet.

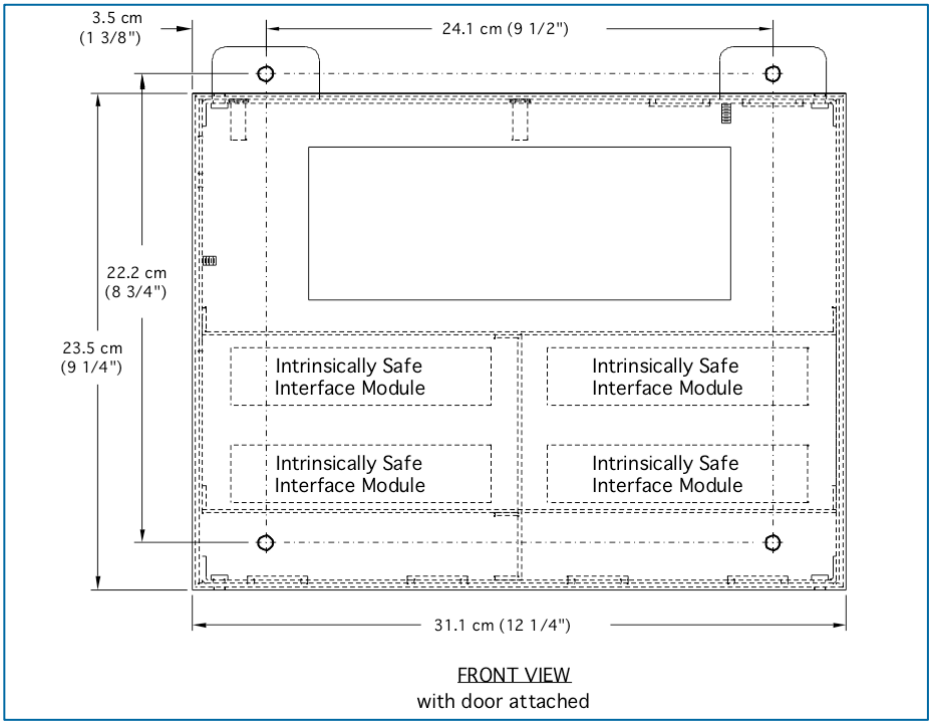


Figure 4-1 Mounting Footprint

1.7 Mounting the Optional Printer Bracket

Mount the printer bracket to the wall using Figure 5, below. Holes are 0.56 cm (0.177 in). Use as large a fastener as possible, but ensure that the fastener does not protrude past the recess in the bracket.

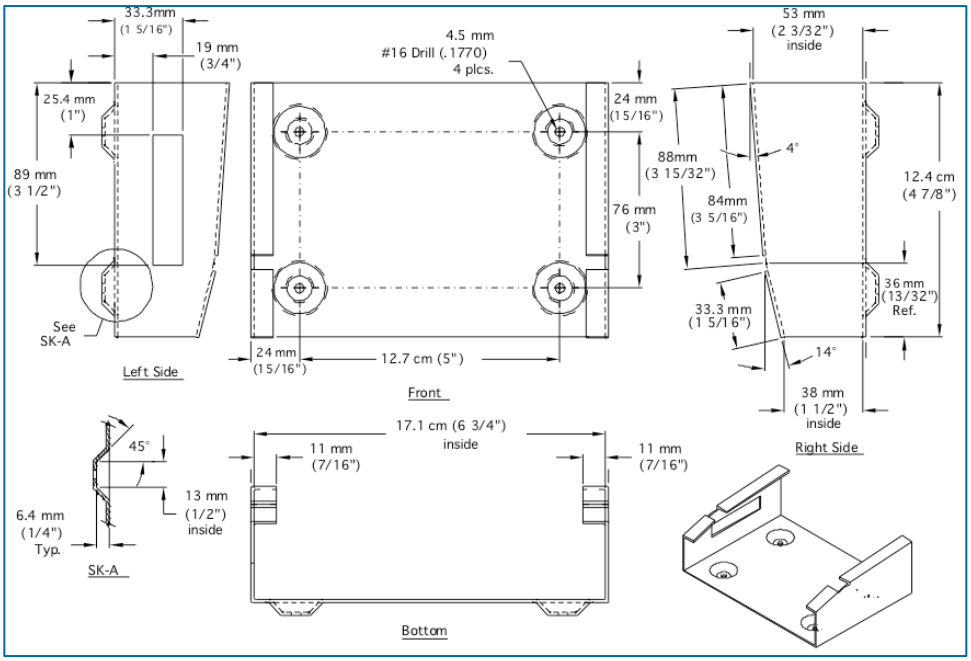


Figure 4-2 Printer Bracket Mounting Dimensions

1.8 Installing the Controller Power Supply Conduit

A local circuit breaker/disconnect device must be installed close to the Controller. Run conduit from this local breaker back to the main site distribution panel. Install 13 mm (0.5 in) rigid steel conduit from the local circuit breaker panel to the top right Controller knockout Figure 6 below.

> **NOTE**: The left knockout is reserved for optional external alarm wiring.

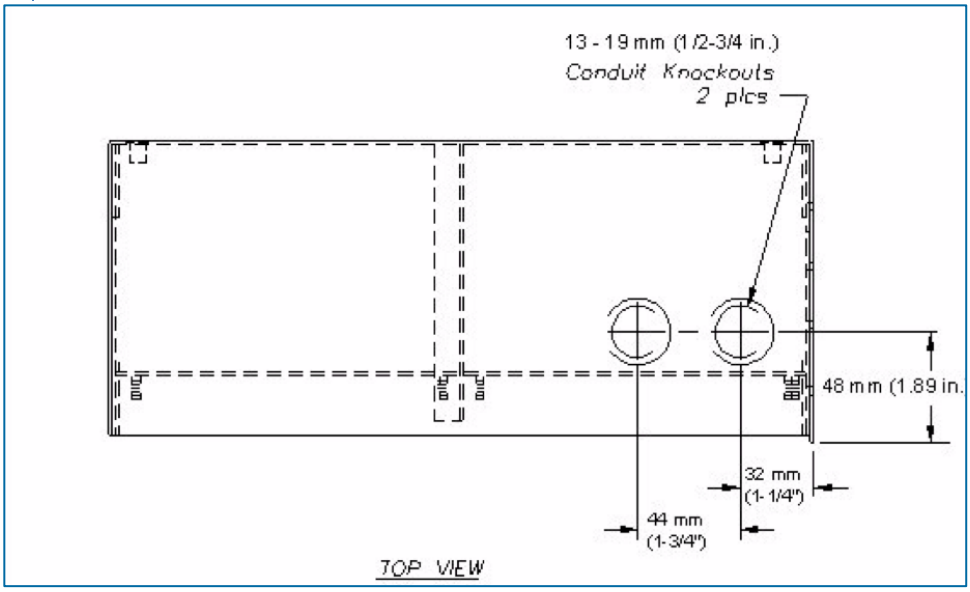


Figure 4-3 Controller Conduit Knockouts

CAUTION

Do not connect the Controller to equipment that exceeds the maximum ratings of voltage and current as specified in Section 2, Specifications. Probe cables and sensor wiring must not share conduit with any other wiring.

1.9 Wiring the Controller Power Supply

> **NOTE**: The power supply automatically adjusts for supply voltages from 100 to 250 VAC.

1. Pull two #14 AC power wires and one #12 AWG ground wire through the conduit from the distribution panel to the local breaker dedicated to the Controller.
2. Pull two #14 AC power wires and one #12 AWG ground wire through the conduit from the local breaker to the controller.
3. Just enough wire through the bushing to attach to the 3-pin green terminal block located on right of the Controller circuit board.
4. Connect AC neutral and AC hot wires (order not important) to pins 1 and 3 of the green terminal block. Center pin is not used. Attach the cover to the terminal block.

5. Attach the ground wire to one of the ground terminal studs (near the top knockouts marked as ground_ and run back to the main distribution panel for connection.

NOTE: The ground wire must be #12 AWG or larger.

Some countries/states require a redundant ground wire; this should be attached to the second ground terminal stud and run back to the main distribution panel for connection.

Power wiring must enter the Controller via the designated power conduit knockout.

Connect the power wires to a dedicated circuit.

See Specifications on page 10 for power requirements.

Protecting communication ports and ensuring site intrinsic safety for the SiteSentinel iTouch

Proper Grounding of the SiteSentinel iTouch is essential for protecting the communication ports and lessens the risks of hazardous situations occurring when power surges or lightning strikes happen. This document outlines the recommended practices for a safe and damage-free installation.

4.1.1 Grounding the SiteSentinel iTouch Tank Gauging System

There are two ground lugs within the SiteSentinel iTouch (see Figure 4-4 below). You will need to install two continuous ground wires (green 12 AWG or larger) from both ground lugs connected back to the distribution panel ground. The intrinsic barriers rely on these ground connections; if they are not present the barriers will not work. The redundant ground ensures that the SiteSentinel iTouch will operate properly and safety.

Figure 4-4 SiteSentinel iTouch Controller Ground Lugs

4.1.2 SiteSentinel iTouch Port Protection

The communication ports can be damaged by ground faults within the SiteSentinel iTouch. If you are communicating from another type of system, such as a point-of-sale (POS) system, to the SiteSentinel iTouch and there is a slightly ground potential difference, this difference will either cause immediate failure of the SiteSentinel iTouch, or will cause a failure over time. To eliminate this possible damage, make sure the other equipment is grounded back to the same ground potential as the SiteSentinel iTouch at the distribution panel. In addition, a 12 AWG or larger wire can be run from the ground lug in the SiteSentinel iTouch to the ground of the other equipment.

OPW Fuel Management Systems can provide an external surge suppressor (Part #: 75-0104). This device will help protect the ports from power surges or lightning strikes.

Figure 4-5 External Surge Protector

To install, simply insert the surge protector in series between the incoming communication lines and the I/O port of the SiteSentinel iTouch. The surge protector ground wire must be connected to the metal chassis of the SiteSentinel iTouch or to the ground lug within the SiteSentinel iTouch. Each port requires one surge protector.

Figure 4-6 External Surge Protector I/O Port Connection

Section 5 Preparing for Probe and Sensor Installation

1.10 Probe and Sensor Wiring

5.1.1 Compliance

Installation of this equipment must be in accordance with all Local, State and Federal regulations pertaining to this type of equipment including, but not limited to, the National Electrical Code, NFPA No. 70 and he Automotive and Marine Service Station Code, NFPA No. 30A.

5.1.2 Wire Type

All wiring should have a capacitance rating of less than 100 picofarads per foot.

5.1.3 Probe Wiring

Gas and oil resistant shielded, 2-conductor cable is required to extend the probe cable to the I.S. Interface Module in the Controller. OPW Fuel Management Systems recommends you use Belden #88760 or Alpha #55371 cable.

> **NOTE**: Belden #88760 is available directly from OPW Fuel Management Systems; part #12-1300.

5.1.4 Sensor Wiring

You can use the same cable as used for the probe or you can use individual Gas and Oil resistant cable, providing it is 18 AWG or greater.

5.1.5 Wire Length

Wire runs must be less than 300 m (1000 ft) to meet intrinsic safety standards. Also, wire lengths of 300 m (1,000 ft) or more between probe/sensor and the Controller will jeopardize signal integrity and system operations.

5.1.6 Wire Splices

There should be no splices between the field junction box and the I.S. Interface Module in the SiteSentinel iTouch Controller. A splice in the hazardous area requires the use of a silicon-filled wire nut that must be located in a waterproof junction box. Each splice would jeopardize signal integrity and system operations.

1.11 Conduit

All probe and sensor cabling to the SiteSentinel iTouch Controller must be in rigid steel conduit. The conduit must be dedicated to intrinsically safe wiring for this Controller.

Probe and sensor wiring for this Controller can share the same conduit.

This Controller's intrinsically safe wiring cannot share the same conduit with other equipment's intrinsically safe wiring.

> **NOTE**: PVC conduit may be substituted for rigid steel conduit where acceptable by local codes. Use SHIELDED cable for sensor and probe wiring as described in the above sections.

The size and number of probe and sensor conduits (probe-sensor-to-controller) depends on how many probes and sensors your site has.

It is recommended to group probe wires into separate conduits for each SiteSentinel iTouch Controller I.S. Interface Module position.

Probe Quantity vs. Conduit Capacity

Number of Probes	Number & Size of Conduits
1 to 2	One 13 mm (0.5 in)
3 to 4	One 19 mm (0.75 in)
5 to 6	One 13 mm (0.5 in) and one 19 mm (0.75 in)
7 to 8	Two 19 mm (0.75 in)
9 to 12	Three 19 mm (0.75 in)
13 to 16	Four 19 mm (0.75 in)

Section 6 Probe-Cable Seal-Offs

WARNING

To prevent explosive vapors from entering the I.S. barrier, seal-off the probe cables ***before*** they enter the I.S. barrier.

1. Remove enough of the jacket to allow approximately 7.6 cm (3 inches) of wire leads to extend past each seal-off. ***DO NOT nick the wire insulation.***
2. Probe or sensor wires using prepared Belden or Alpha cable go through NPT bushings into a weatherproof junction box. Bushings must be used in all junction boxes.
3. The cable is then routed—via rigid steel conduit—out of the box and directly to the I.S. barrier.
4. Label each cable and wire.

CAUTION

The console must have a dedicated power circuit, and must be on the same phase as all other OPW equipment.

NOTICE

Only OPW probe cables and sensor wiring can share the conduit to the I.S. barriers.

Improper cables, wiring, or conduit allow electronic noise to interfere with probe/sensor measurements. This may cause measurement readings at the console resembling hardware failure. The warranty is voided if improper cables, wiring and/or conduit are installed. The ground wire must be properly installed for the operation of the noise-filtering circuitry. Do not rely on the conduit for the operation of the ground.

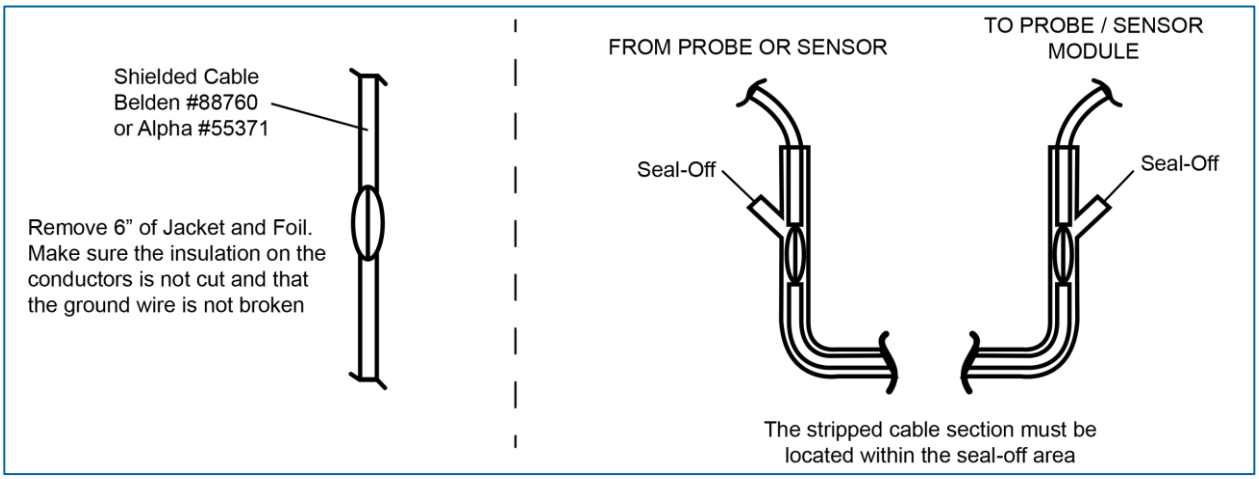


Figure 6-1 Probe Cable Seal-Offs

1.12 Junction Boxes

Weatherproof electrical junction boxes with a gasket-equipped cover are required at the end of each probe and conduit run at the UST manhole or monitoring well location.

Wires coming off of a probe or sensor connect to prepared Belden or Alpha cable, and then go through NPT busing into the weatherproof junction box. Bushings must be used in all junction boxes. The cable is then routed out of the junction box via rigid steel conduit.

Section 7 Preparing Your Tanks for Probes

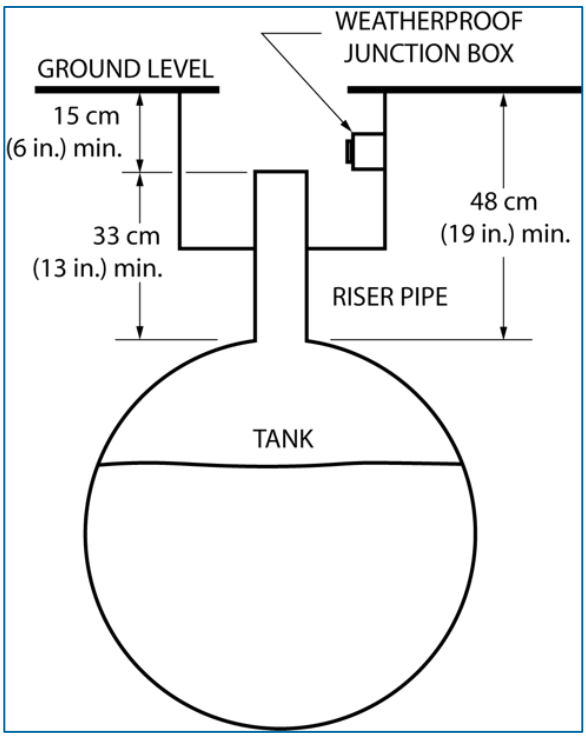


Figure 7-1 Underground Tank Manholes

1.13 Underground Tank Manholes

1. Excavate a 50 cm (20 in) minimum diameter manhole around an unused fitting in the top of the tank. The hole must be big enough for a weatherproof junction box. If this fitting is not in the center of the tank, you must take additional measurements for probe compensation (refer to Section 8, **Product Float and Water Float Offsets**).
2. Install a 7.5 cm – 10 cm (3 in – 4 in) diameter riser pipe in the fitting. This pipe must be long enough to accommodate the probe head, and it must be large enough to accommodate the probe head, and it must be large enough to accommodate the probe floats. 5 cm and 10 cm (2 in and 4 in) floats are available.
3. Install a weatherproof junction box with 13 mm (0.5 in) knockouts near the riser pipe. The junction box must be close to the riser to allow probe cable to reach.
4. Install a 13 mm (0.5 in) busing in the junction box.
5. Install an adapter collar onto the tank's riser pipe.

> **NOTE**: Use a riser cap with a suitable cable bushing installed. For older Model 924 and 613 probes, use a bushing with an inner diameter of 11 mm (0.44 in). For next-generation 924, use bushings with an inner diameter of 5 mm (0.19 in).

1.14 Precision Leak Test

Perform a precision leak test on each tank – especially older ones – before installing SiteSentinel iTouch. You can perform a pressurized leak test on a tank after probe installation; however, **DO NOT exceed 20 psi pressure**.

1.15 Probe Placement

Model 924B probes must be installed as described in this section. If the minimum or maximum dimensions specified cannot be met, do not proceed with the installation.

CAUTION

Model 924B probes are safe for Class 1, Div 1, Group D hazardous locations. This includes tanks containing regular, super, diesel and unleaded gasoline; antifreeze; kerosene; mineral spirits; oxinol, methanol and methanol blends; motor, torque and transmission oil; and alcohol. If you have any questions about whether a product is included in this classification, please contact your product specialist or OPW distributor.

The ideal location for a probe is in the center of the tank (See the illustration below).

The probe should be located at least 91.4 cm (3 feet) from the tank fill pipe. If this distance is less than 91.4 cm (3 feet), the force of the product entering the tank can cause the water float to rise up the shaft of the probe. This may cause the SiteSentinel iTouch to generate a false high-water alarm.

Adjust the drop tube of the fill pipe so that the product flow is diverted away from the probe.

Similarly, a Submersible Turbine Pump (STP) should be located at least 91.4 cm (3 feet) from the probe. If this distance is less than 91.4 cm (3 feet), the force of the product

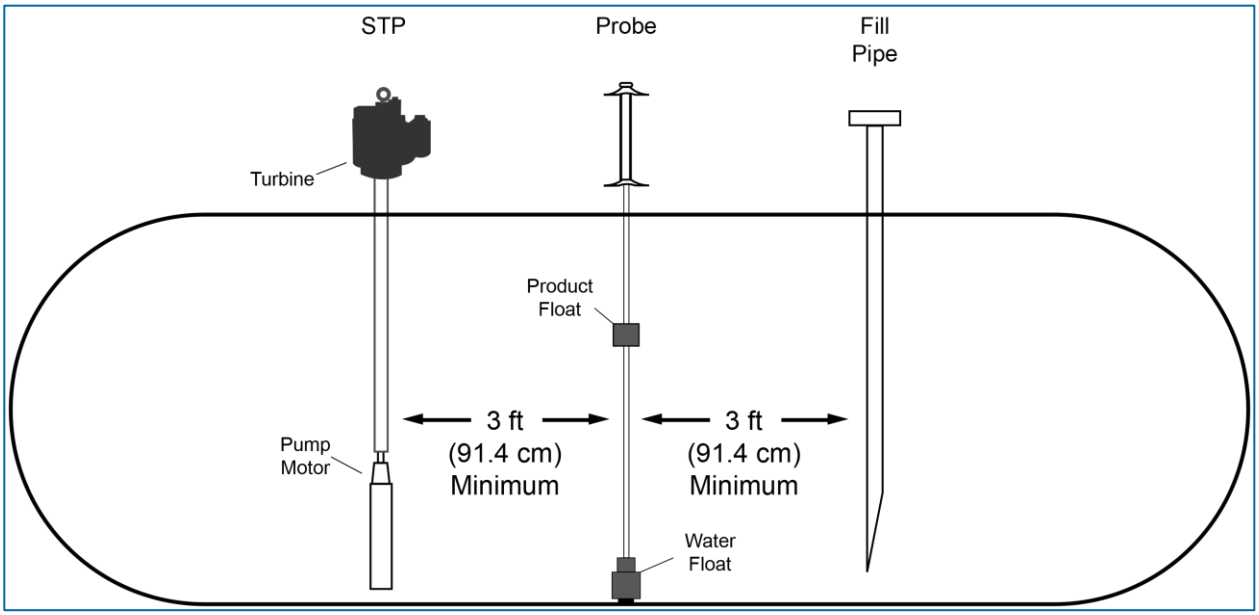


Figure 7-2 Probe Placement in Tank

Section 8 Product Float and Water Float Offsets

The 924B probes differ slightly in setup from previous models of probe. This section tells you how to match your manual dipstick tank readings to the readings from the probe. Offset compensates for the angle (or slope) that the tank may have.

When performing subtractions, remember that subtracting a negative number is the same as adding the positive version of that number. For example, subtracting **-2** from **6** results in **8**.

1.16 Offset Procedure

An example appears below.

1. Run the SiteConnect software. Set both the **Product Float Offset** and the **Water Float Offset** held in the SiteSentinel iTouch Controller to zero (0).
2. Using your normal dipstick access point in the tank, take a **Dipstick Product Level** and a **Dipstick Water Level.** To take the **Dipstick Water Level**, use water detect paste on the bottom of the dipstick.
3. Take an inventory reading from the Controller. Note the **Probe Product Level** and the **Probe Water Level.**
4. Calculate **Product Float Offset** and **Water Float Offset:**
5. Product Float Offset = (Dipstick Product Level – Probe Product Level)
6. Water Float Offset = (Dipstick Water Level = Probe Water Level)
7. Run SiteConnect software and configure the SiteSentinel iTouch Controller with the new offset values obtained in the previous step.
8. Take an inventory reading from the Controller. The **Probe Product Level** should now match the **Dipstick Product Level** and the **Probe Water Level** should now match the **Dipstick Water Level**.

> **NOTE**: A typical Product Float Offset is 7.4 cm (2.9 in) and a typical Water Float Offset is 0 cm.

8.1.1 Float Offset Example

Sample DIPSTICK Levels

- **Product** = 59.5
- **Water** = 1.2

Sample PROBE Levels

- **Product** = 56.6
- **Water** = 1.5

Using this data and this equation: **Dipstick Product Level = Probe Product Level = Product Float Offset**, the product offset value is 59.5 – 56.6, or 2.9.

Using this data and this equation: **Dipstick Water Level – Probe Water Level = Water Float Offset**, the water offset value is 1.2 – 1.5, or -0.3.

1.17 Calculating Tank Tilt and Offset Factor

You can calculate a product offset for a probe that is not installed in the center of a “pitched” tank. Pitch is the tilt of a tank along its horizontal axis. Some tanks are intentionally installed with one end lower than the other. This allows water and sediment to collect at the low end, while clear product is drawn from the high end. Pitch can also be caused by tank settling. The rate of pitch can be measured by using a dipstick to measure the level of product at two points (preferably opposite ends) of the tank (see illustration below). The product depth at the deep (lower) end of the tank is value “A”. The product depth at the shallow (higher) is value “B”. The distance between the two measuring points is “C”.

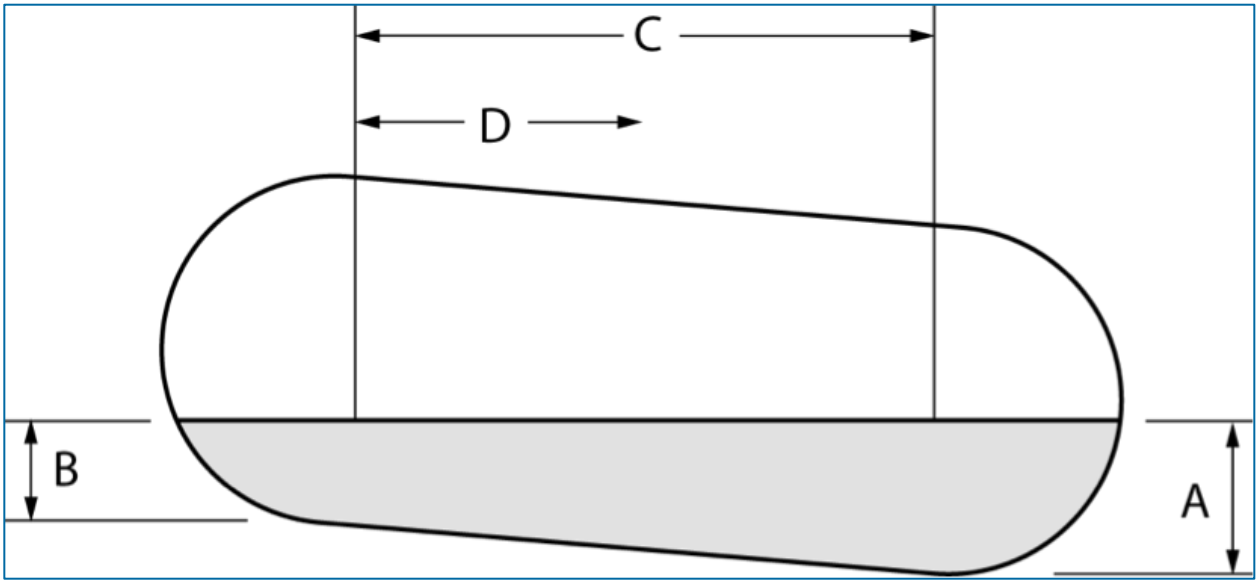


Figure 8-1 Calculating Tank Tilt

The formula for pitch is: **(A-B)/C**

For example: [(46” – 40”)/120”] = (6/120) = 0.05

To calculate the product offset, measure value “D”, the distance of the probe from *the center of the tank. The formula for product offset is “D” x pitch. For the example above, 36” x 0.05 = 1.8”*

If the probe is located closer to the shallow end of the tank, the product offset is positive; for the example, 1.8. if the probe is located closer to the deep end of the tank, the product offset is negative; for the example, 1.8.

See SiteConnect Help for details about entering the product offset.

Section 9 Probes

This section covers gasoline and diesel probes - for information on the optional LPG (liquefied petroleum gas) probe, see Appendix F – LPG Probe Option.

1.18 Probe Floats

This section describes the weight specification on the enclosed Water Level Indicator, correct range of products that can be used, identifying the Water Level Indicator for its intended product group, compatible fluid products, level indicator(s) installation, level indicator kit part numbers and contents.

Product Level vs. Water Level

Figure 8-1 shows how the probe components work together.

The Product Level Indicator floats on the gasoline or diesel fuel and registers the overall height of the fuel. You can use the Product Level Indicator with or without a Water Level Indicator.

Standard Water Level Indicators feature one of two different ballast weights and are etched to show gasoline or diesel. Stainless-Steel Water Level Indicators are weighted internally and are laser-etched with their specific-gravity value. Because fuel products are less dense than water, Water Level Indicators sink through the product and float on the water. Water height at the product/water boundary can be determined accordingly.

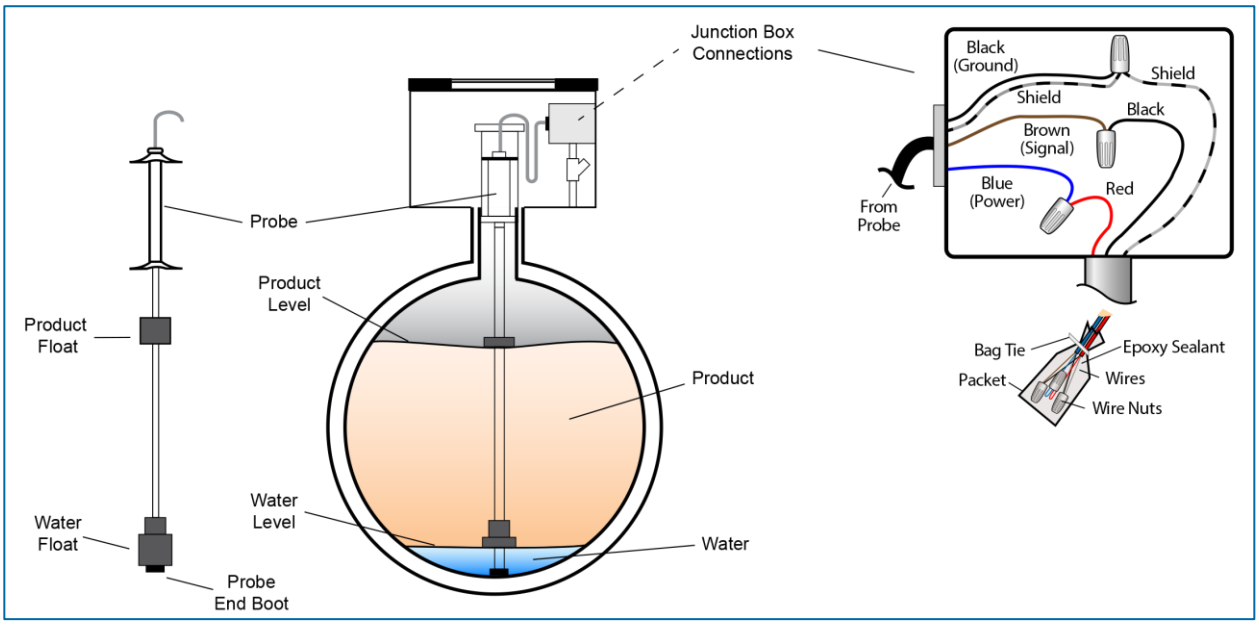


Figure 9-1 Probe Installation in Underground Tank

Instructional Video: “Multi-drop Probe & Sensor Wiring Instructions”

To watch the instructional video “Multi-Drop Probe & Sensor Wiring Instructions” that includes detailed instructions for Probe Level Indicator (float) installation and the assembly of the epoxy seal packs, use one of the following:

If you have a smartphone with a QR-code scanner, scan this QR Code

- If you are viewing this manual on a PC or laptop click this link:

Multi-drop Probe and Sensor Wiring Instructions

- The instructional video can also be found at www.YouTube.com by entering the search word “OPWGlobal.”

Installing the Level Indicator(s)

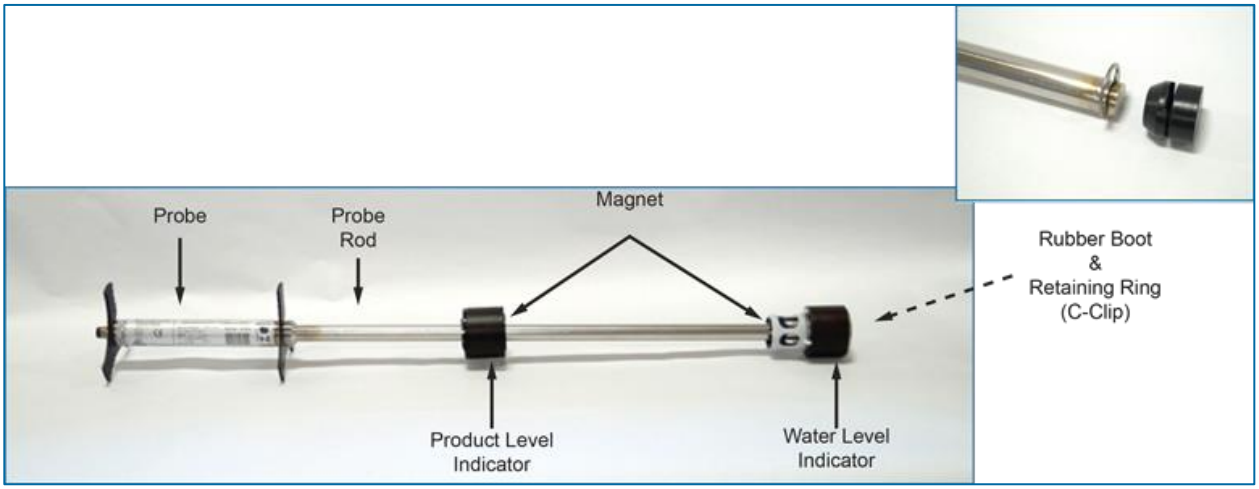


Figure 9-2 Probe Components

The procedure for assembling the probe level indicators (floats) and probe cable is outlined below.

> **NOTE**: If the wrong type of water level indicator is used, it may float to the top and register an unusually high water level, not register at all or sink too far and register an unusually low water level. If your product-fluid density does not fit into one of these groups, contact OPW Fuel Management Systems customer sales department for recommendations.

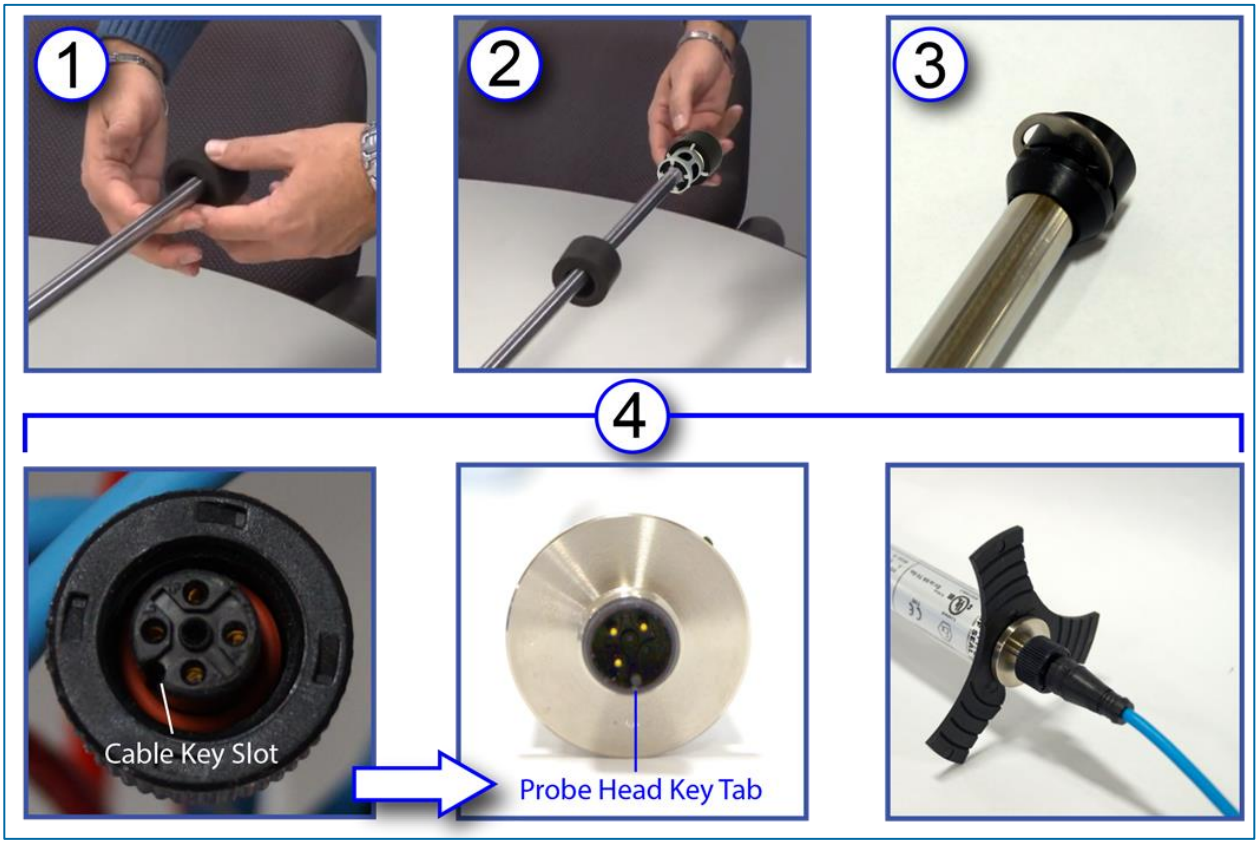


Figure 9-3 Probe Level Indicators and Cable Installation

1. Install the Product Float – Slide the float over the probe rod from the bottom of the rod. Make sure the magnet is facing toward the bottom end of the probe (for a Stainless-Steel Product Level Indicator make sure the etched “UP” faces UP). If you are installing a product float only, skip to Step 3.
2. Install the Water Float (if applicable) - Slide the float over the probe rod from the bottom of the rod. Make sure the magnet is facing toward the top of the probe (for a Stainless-Steel Water Level Indicator make sure the etched “UP” faces UP).
3. Install the rubber boot by sliding it onto the end of the probe rod until it stops. Slip the C-clamp into the slotted groove and push in until it snaps into place.
4. Install the probe cable. The probe-cable plug connector has a key slot that aligns with a corresponding key tab in the probe tip. This allows the plug to fit in only one direction.
    - Place the plug connector over the probe tip.
    - Rotate the plug until you feel the connector key slot slide over the probe-tip key tab.
    - Push the connector in all the way.
    - Rotate the outer compressor ring of the connector until it is snug against the top of the probe.

Product Density and Chemical Compatibility of Standard Level Indicators (Floats)			
Product Group	Compatibility	API	Specific Gravity
Gasoline	Gasoline Aviation Gasoline Regular Unleaded Regular Leaded Premium Unleaded Gasoline/Methanol blend, less than 5% methanol Gasohol, less than 40% ethanol	45 < API < 78	0.68 < d < 0.80
Diesel	Diesel Jet Fuel Kerosene Motor Oil Toluene Gear Oil Transmission Oil	26 < API < 45	0.80 < d < 0.90

NOTE: If the level indicator is used in a non-compatible fluid, swelling, cracking and dissolving may occur, leading to level-indicator failure. If your product is not chemically compatible with the level indicators, contact OPW Fuel Management Systems Customer Service for recommendations.

Determining Product Group for a Standard Water Level Indicator

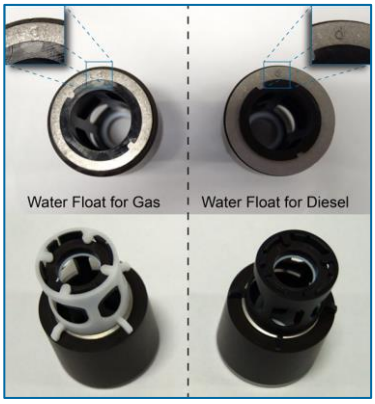


Figure 9-4 Determining Type of Standard Water Level Indicator

Standard Water Level Indicators feature one of two different ballast weights and are etched for gasoline or diesel (see Figure 9-4). This weight allows the level indicator to sink through the product, but to float on the water. This registers the height of the water at the product/water boundary. The weight is certified by OPW Fuel Management Systems for use with one of two product groups, the gasoline group OR the diesel group. There is a mark etched on the ballast weight plate ("g" for gasoline, "d" for diesel). The water float for gas also has a white outer ring while the water float for diesel is black.

Stainless-Steel Water Level Indicators are weighted internally and are laser-etched with their specific-gravity rating.

Waterproof Electrical Connections

To watch the instructional video “Multi-Drop Probe & Sensor Wiring Instructions” that includes detailed instructions for the assembly of the Epoxy packs, use one of the following:

If you have a smartphone with a QR-code scanner, scan this QR Code:

- If you are viewing this manual on a PC or laptop click this link

  Click Here for the Waterproof Electrical Connections Video

- The instructional video can also be found at www.YouTube.com by entering the search word “OPWGlobal.”

The procedure for assembling the wire connections and resin sealpacks is outlined below.

Safety Information

Contains vinyl cyclohexene dioxide. Harmful if swallowed. Do not get product on skin or in eyes. Do not inhale fumes.

For detailed product hazard information see the MSDS for the 3M™ Scotchcast™ 3570G-N (Parts A & B). Use one of the following, go to the Documents tab and select the MSDS:

If you have a smartphone with a QR-code scanner, scan this QR Code:

Or go to this link MSDS - Scotchcast 3570G-N (Parts A & B)

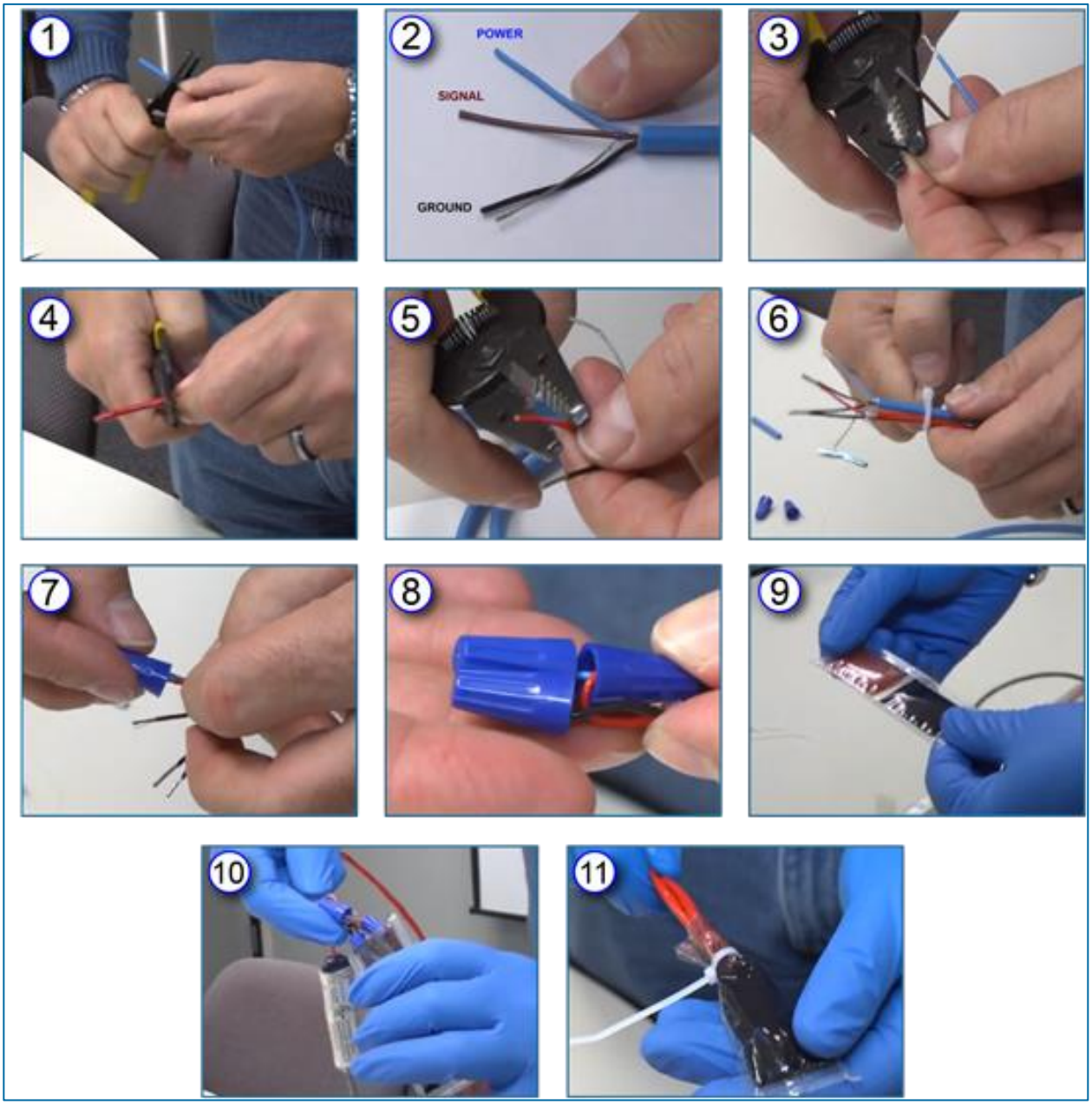


Figure 9-5 Assembling the Epoxy Sealpack for Waterproof Electrical Connections

NOTICE

It is VERY important to seal all probe and sensor connections in the junction box to prevent corrosion of the wires.

To make the connections waterproof, use the supplied SCOTCHCAST™ epoxy-resin Insulating Resin Sealpacks. They are provided to seal the electrical connections from moisture and water, and prevent corrosion of the connections. Install one for each cable connection.

1. Strip approximately 1.5 inches of the cable jacket from the end of the probe/sensor cable to expose the four (4) wires inside (power, signal ground and shield).

NOTE: When stripping cables and wires do not cut so deep as to nick the wiring inside the jacket material.

2. There are four (4) wires inside the probe/sensor cable.
    - The Blue wire is the Power connection
    - The Brown wire is the Signal connection
    - The Black wire and Braided Shield are the Ground
3. Strip 0.5 inch of jacket material from the ends of the Blue, Brown and Black wires.
4. Strip approximately 1.5 inches of the cable jacket from the end of the Home-run cable (Belden 88760 or 88761) to expose the three (3) wires inside (Red = Power, Black = Signal, Braided Shield = Ground).
5. Strip one-half inch of jacket material from the ends of the Red and Black wires.
6. Place a wire tie wrap around both of the stripped cables about 1 inch from the end of the cable jackets. Pull the tie snug and cut the excess tie material at the clamp.
7. Connect the Power, Signal and Grounds of the probe/sensor cable to the Power, Signal and Ground of the Home-run cable together using the three (3) supplied wire nuts.
    - Twist the ends of the exposed wires together
    - Insert the twisted wires into the end of the wire nut
    - Turn the nut clockwise several turns until the wires are firmly attached

NOTE: Refer to the wiring diagrams in the manual for specific information on probe/sensor wiring.

8. Fold one of the fastened wire nuts back as shown in the photo. This will allow the entire wire nut assembly to fit completely into the epoxy bag.

Always wear protective gloves and safety glasses when handling the epoxy resin packs!

9. Prepare the epoxy resin sealpack.
    - Bend the sealpack until the barrier between the two resins weakens
    - Thoroughly mix the two (2) resins together for approximately two (2) minutes. The mixed epoxy will become warm to the touch.
    - Push all of the mixed resin to the bottom of the bag
    - Cut and tear the top of the bag to open
10. Insert the wire-nut assembly all the way into the bottom of the bag. Fold the bag tightly around the tied cables. Attach a second tie wrap around the bag just above the tie wrap holding the wires (this will prevent the wire-nut assembly from slipping out of the bag).

Move the epoxy around to thoroughly cover all of the wires and wire nuts inside the bag. This will provide a secure, waterproof electrical connection and prevent corrosion of the wiring connections.

Kit Part Numbers and Contents					
Item and Part Number	**Kit Number**				
	30-1509-01	**30-1509-02**	**30-1514-01**	**30-1514-02**	**30-1514-03**
Product level indicator assembly 2-inch (30-0125)	X	X			
Water level indicator assembly, 2-inch gas (30-0126)		X			
Water level indicator assembly 2-inch diesel (30-0119)	X				
Stainless-Steel Product SG 0.70 min (30-0109)			X	X	X
Stainless-Steel Water SG 0.85 min (30-0108)				X	
Stainless-Steel Water SG 0.92 min (30-0107)					X
Cable, 3-pole, 22-gage, 6-ft., Blue (10-1185)	X	X	X	X	X
Cable Tie (280-014) x2	X	X	X	X	X
Seal Pack (390008)	X	X	X	X	X
Probe-End Boot (50-3092)	X	X	X	X	X
5/8” External Retaining Ring (50-0151)	X	X	X	X	X
Level Indicator Manual (M00-040.00)	X	X	X	X	X

The product float for LPG is not certified for applications in which it will be subjected to pressures at or above 300 psi. Pressures higher than 300 psi will damage the device, preventing it from providing accurate measurements.

Section 10 Probes Wiring

Probe conduit must be dedicated to intrinsically safe wiring.

The tables below show wiring specifications for two-conductor cable and three-conductor cable wiring to the Controller's I.S. Interface Module terminal blocks.

Interface Module Connections to Belden TWO-CONDUCTOR Cable with Shield		
I.S. Interface Module Terminal Position	**Belden Cable**	**Probe Cable**
+12 V	Red	Blue
(SIGNAL)	Black	Brown
(GROUND)	Shield	Black & Shield

I.S. Probe Connections to Belden THREE-CONDUCTOR Cable		
I.S. Interface Module Terminal Position	**Belden Cable**	**Probe Cable**
+12 V	Red	Blue
(SIGNAL)	Black	Brown
(GROUND)	Shield	Black & Shield

With 3-conductor cable, attach the shield from the cable ONLY TO THE CONTROLLER. Trim and tape the other end of the shield. Do NOT allow the shield to touch any of the probe wires OR the metal junction box.

Probe Installation and Wiring Procedure

1. Feed the blue probe cable through the bushing in riser cap.
2. Attach the cable connector to the socket in the probe head.
3. Carefully lower the probe into the riser pipe until it rests on the bottom of the tank. Be careful not to damage the floats.
4. Tighten the riser cap bushing, leaving enough cable to reach the junction box.
5. Snap the riser cap in place. Secure the cap with a lock.
6. Install a 13 mm (0.5 in) NPT bushing into the junction box.
7. Pass the probe cable through this bushing into the box, and then tighten the bushing.
8. Pull the shielded cable through the rigid conduit and through the installed seal-offs at both ends of the conduit run. Leave slack in the probe wiring emerging from the ends.
9. Using the silicon-filled wire nuts included with the probe, connect the blue probe cable to the shielded cable inside the electrical junction box.
10. Remove the clear plastic cover located over the I.S. Interface Modules inside the SiteSentinel iTouch Controller to attach the wiring from the probe conduit.
11. Connect the braided SHIELD from the Belden cable to the I.S. Module GROUND position.
12. Connect the BLACK wire to the I.S. Module SIGNAL position.
13. Connect the RED wire to the I.S. Module POWER position.

NOTE: When attaching probes to the Controller, start with I.S. Module Position “1” and work toward “16”. Fill one strip before starting another.

Write down which probe goes to each position. You will need this when you configure the SiteSentinel ITouch using the SiteConnect software.

Section 11 Sensors

1.19 Before You Begin

- See local and National Electrical Codes for your location.
- Ensure cabling (gas and oil resistant OPW Fuel Management Systems' part number 12-1030) back to the Controller is in conduit that is dedicated to intrinsically safe wiring.

1.20 30-3206 Interstitial Hydrocarbon Liquid/Water Sensor

About the 30-3206

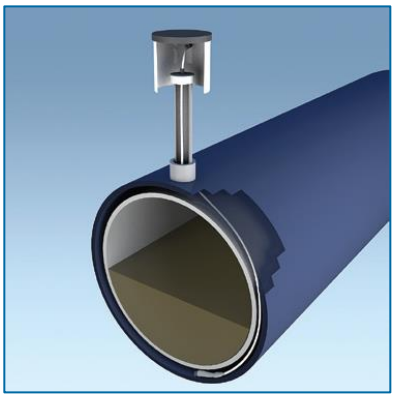


Figure 11-1 Interstitial Hydrocarbon Liquid/Water Sensor

The interstitial hydrocarbon liquid/water sensor is designed for use in the interstitial area of a double-walled tank.

The hydrocarbon liquid/water sensor contains a carbon/polymer material that changes its resistance when exposed to liquid hydrocarbons, as well as a water sensor that relies on the conductivity of water to detect its presence, providing the ability to discriminate between hydrocarbon liquid and water. In the event of a break in the cable, the system will activate the alarm.

30-3206 Specifications	
Operating Temperature	20°C to +50°C (-4°F to 122°F)
Dimensions	2.5 cm (1.0 in) x 35 cm (13.8 in)
Cable	6.1 m (20 ft) of gas & oil resistant cable
Nominal resistance (uncontaminated)	1K -3K ohms
Nominal resistance (contaminated)	10K – 200K ohms

NOTE: To ensure safe operating conditions the sensor has been designed to connect to OPW Fuel Management Systems' controllers only.

11.1.1 Installing the 30-3206

> **NOTE**: Hydrocarbons (i.e., gasoline, diesel and jet fuel, etc.) float on water = if this sensor is fully submerged, the polymer will NOT detect hydrocarbon liquid.

- This sensor requires two (2) Controller Interface Module Positions.
- Review the installation illustration below. Use the supplied cable gland and silicone wire nuts.
- Install seal-offs at both ends of the conduit run.

Interstitial Hydrocarbon Liquid/Water Sensor Wiring	
I.S. Interface Module Position 1 Terminals	**Sensor Wire**
+12	Red
⎍	Black (hydrocarbon)
⏚	No connection
I.S. Interface Module Position 2 Terminals	**Sensor Wire**
+12	No connection
⎍	White (water)
⏚	No connection

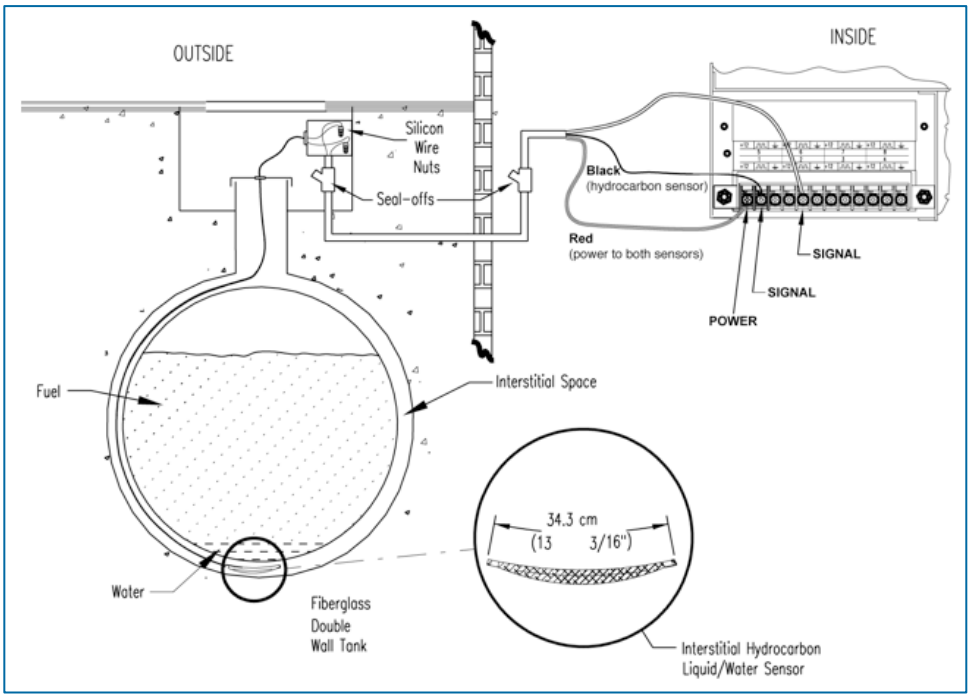


Figure 11-2 Interstitial Hydrocarbon Liquid/Water Sensor Installation

SiteSentinel iTouch Controller Setup for Interstitial (“I.S.”) Hydrocarbon Liquid/Water Sensor

11.1.2 1st I.S. Module Position – Hydrocarbon Liquid

1. Configure the barrier position to be a generic sensor (or, if using SiteConnect choose the appropriate icon) and install that position.
2. Using the Controller, take a dynamic reading of the hydrocarbon portion of the sensor.
3. Set the **lower** alarm threshold to be 0.5 volts lower than the reading taken (this assumes that there is no current hydrocarbon contamination).

> **NOTE**: SiteConnect will ask to adjust the lower threshold automatically, to 0.1 V below the current voltage reading. Answer YES.

1. Set the **upper** alarm threshold to 5.0 volts (disables upper threshold).
2. Program the alarms associated with the lower threshold that you wish to activate if the sensor detects hydrocarbon liquid.

11.1.3 2nd I.S. Module Position – Water

1. Configure the barrier position to be a generic sensor (or, if using SiteConnect choose the appropriate icon) and install that position. Set the upper alarm threshold to 0.5 volts.
2. Set the lower alarm threshold 0 volts (disables lower threshold).
3. Set the lower alarm threshold to 0 volts (disables lower threshold).
4. Program the alarms associated with the upper threshold that you wish to activate if the sensor detects water.

1.1.1 Testing and Decontaminating the Interstitial Hydrocarbon Liquid/Water Sensor

To prevent the possibility of explosion or fire, do not test the sensor in the Hazardous Area.

Work in a well-ventilated area with no hot surfaces or open flames.

Do not use fuel to test the sensor!

If the SiteSentinel iTouch Controller fails to detect alarm conditions simulated here, also check that your Controller thresholds are correct.

- **Testing the Hydrocarbon Liquid Sensor Portion.** Immerse the polymer in mineral spirits for about 10 minutes> Remove the sensor and let it hang to air dry. After another 10 minutes any Controller alarms or events associated with the hydrocarbon sensor should trigger. Disconnect this portion of the sensor from the Controller – an alarm should result. Short across these Controller positions – an alarm should also occur. If the open lead and/or short lead test fail, check all wiring and junction boxes for continuity.
- **Testing the Water Sensor Portion.** Testing the Water Sensor Portion. Immerse just the end of the sensor in tap water. Controller alarms or events associated with the water portion of the sensor should trigger. Short the water portion of the sensor – an alarm should occur. If the short lead test fails, check all wiring and junction boxes for continuity.

- **Cleaning the Hydrocarbon Sensor Portion.** To clean hydrocarbon contamination from the sensor from testing or actual use, immerse the contaminated portion in denatured alcohol for one hour. Then, flush the sensor with water to remove any residue. Leave the sensor to “settle” for another hour. The sensor should return to nearly its original resistance, but it may be necessary to readjust the Controller’s thresholds.

1.21 30-3207 Hydrocarbon Liquid Sensor

About the 30-3207-06, -10, -15

Figure 11-3 Hydrocarbon Liquid Sensor

The hydrocarbon liquid sensors are used primarily in monitoring wells with fluctuating ground water tables. The hydrocarbon liquid sensor contains a carbon/polymer material that changes its resistance when exposed to liquid hydrocarbons.

This sensor can also be placed in the containment areas of tanks, pumps and pipes. It will alert the system if any fuel enters into the containment area, which would indicate a leak. In the event of a break in the cable the system will activate the alarm.

30-3207 Specifications	
Operating Temperature	-20°C to +50°C (-4°F to 122°F)
Dimensions	1.8 cm (0.7 in) dia. x (available lengths) 1.83 m (6 ft), 3.05 m (10 ft), 4.57 m (15 ft)
Cable	3.05 m (10 ft) gas & oil resistant cable
Nominal Resistance (uncontaminated)	1k – 3k ohms
Nominal Resistance (Contaminated)	30k – 200k ohms

NOTE: To ensure safe operating conditions the sensor has been designed to connect to OPW Fuel Management Systems’ controller only.

11.1.4 Installing the 30-3207

CAUTION

See the Local and National Electrical Codes for your location. Make sure that the cabling leading back to the controller (gas/oil resistant Petro Vend number 12-1030) is installed in conduit dedicated to intrinsically safe wiring.

NOTE: Hydrocarbons (i.e., gasoline, diesel and jet fuel, etc.) float on water. If this sensor is fully submerged in water, the polymer will NOT detect hydrocarbon liquid.

- This sensor requires one (1) Controller Interface Module position
- Review the Connections table and the Typical Installation drawing below
- Use the supplied cable gland and silicon wire nuts
- Install seal-offs at both ends of the conduit run

30-3207 Connections	
I.S. Interface Module Position 1 Terminals	**Sensor Wire**
+12 (Power)	Red
(Signal)	Black
(Ground)	White (no connection)

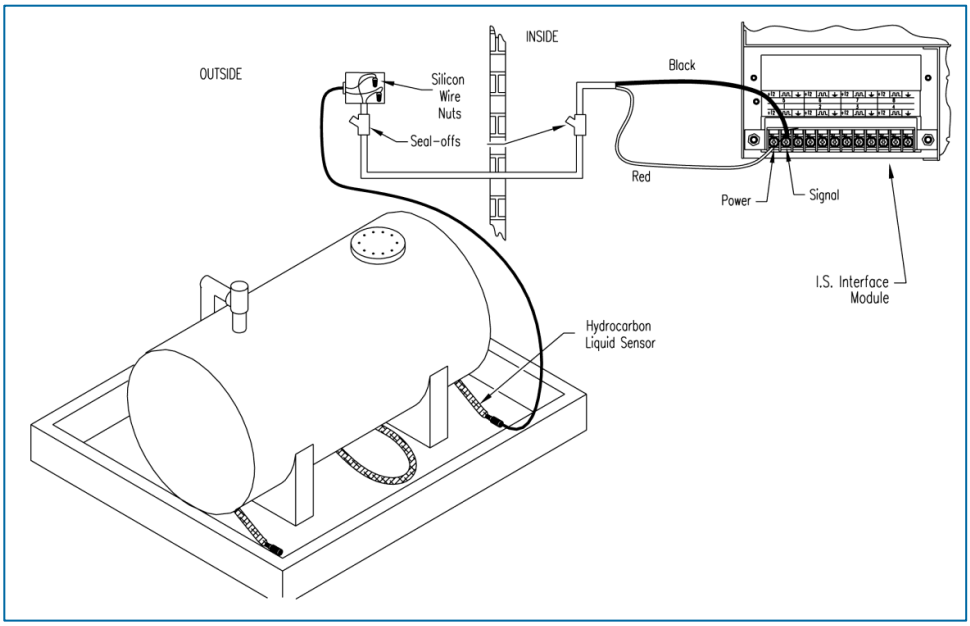


Figure 11-4 Typical Installation

11.1.5 Controller Setup for Hydrocarbon Liquid Sensor

1. Configure the barrier position to be a **generic** sensor and install that position.
2. Use the controller to take a dynamic reading of the hydrocarbon part of the sensor.
3. Set the **lower** alarm threshold at 0.5 volts lower than the reading taken (if there is no existing hydrocarbon contamination).
4. Set the **upper** alarm threshold at 5.0 volts (this will disable the upper threshold).
5. Program the alarms associated with the **lower** threshold that will activate if the sensor detects hydrocarbon liquid.

11.1.6 Testing and Decontaminating the Hydrocarbon Liquid Sensor

To prevent the possibility of explosion or fire, do not test the sensor in the Hazardous Area.

Work in a well-ventilated area with no hot surfaces or open flames.

Do not use fuel to test the sensor!

- **Test the Sensor**
  - Put the polymer fully into mineral spirits for about 10 minutes
  - Remove the sensor and let it hang to air dry
  - After another 10 minutes any Controller alarms or events associated with the hydrocarbon sensor should start
  - Disconnect this part of the sensor from the Controller. An alarm should occur immediately.
  - Short across these Controller positions. An alarm should occur.
  - If the open lead and/or short lead test results are unsatisfactory, examine all wiring and junction boxes for continuity

> **NOTE**: If your controller does not sense the alarm conditions simulated here, examine your controller thresholds to make sure they are correct.

- **Clean the Sensor.** To clean hydrocarbon contamination (as a result of testing or actual use) from the sensor:
  - Put the contaminated portion fully into denatured alcohol for one hour
  - Flush the sensor with water to remove any residue
  - Allow the sensor to “settle” for another hour

> **NOTE**: The sensor should return to near its original resistance though it may be necessary to readjust the controller’s thresholds.

1.22 30-3210-06, -10, -15 Hydrocarbon Liquid/Water Sensor

About the 30-3210

The hydrocarbon liquid/water sensor is used primarily in monitoring wells with fluctuating ground water tables or in containment areas of tanks, pumps and pipes.

The hydrocarbon liquid/water sensor contains a carbon/polymer material that changes its resistance when exposed to liquid hydrocarbons. It also has a water sensor that relies on the conductivity of water to detect its presence and allows the 30-3210 to distinguish between hydrocarbon liquid and water.

The sensor also alerts the system to the absence of ground water in a monitoring well or the presence of water in containment areas. It will alert the system if any fuel leaks into the containment area. In the event of a break in the cable the system will activate the alarm.

30-3210 Specifications	
Operating Temperature	-20°C to +50°C (-4°F to 122°F)
Dimensions	1.8 cm (0.7 in) dia. x (available length) 1.83 m (6 ft), 4.57 m (15 ft), 6.10 m (20 ft)
Cable	3.1 m (10 ft) gas & oil resistant cable.
Nominal Resistance	Uncontaminated: 1k – 3k ohms per foot Contaminated: 30k – 200k ohms
Maximum Wiring Length	305 m (1,000 ft)*

*Maximum Wiring Length is the maximum length of cable to be used to connect all sensors on an individual channel. The length includes the run of cable from the VSmart Module to each sensor board in the string.

NOTE: To ensure safe operating conditions the sensor has been designed to connect to OPW Fuel Management Systems' controllers only.

1.23 Installing the 30-3210

CAUTION

See the Local and National Electrical Codes for your location. Make sure that the cabling leading back to the controller (gas/oil resistant Petro Vend number 12-1030) is installed in conduit dedicated to intrinsically safe wiring.

NOTE: Hydrocarbons (i.e., gasoline, diesel and jet fuel, etc.) float on water. If this sensor is fully submerged in water, the polymer will NOT detect hydrocarbon liquid.

- This sensor requires two (2) Controller Interface Module positions
- Review the Connections table and the Typical Installation drawing below
- Use the supplied cable gland and silicon wire nuts
- Install seal-offs at both ends of the conduit run

30-3210 Connections	
I.S. Interface Module Position 1 Terminals	**Sensor Wire**
+12 (Power)	Red
(Signal)	Black (hydrocarbon)
(Ground)	No Connection
I.S. Interface Module Position 1 Terminals	**Sensor Wire**
(Power) +12	No Connection
(Signal)	White (water)
(Ground)	No Connection

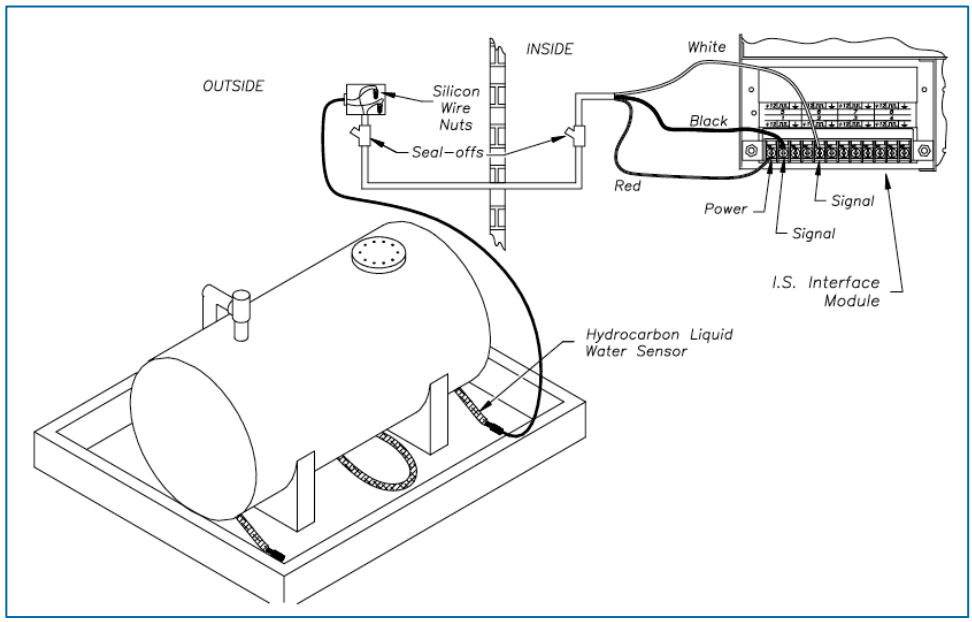


Figure 11-5 Hydrocarbon Liquid & Water Sensor Installation

11.1.7 1st I.S. Module Position – Hydrocarbon

1. Configure the barrier position to be a **generic** sensor and install that position.
2. Use the controller to take a dynamic reading of the hydrocarbon part of the sensor.
3. Set the **lower** alarm threshold at 0.5 volts lower than the reading taken (if there is no existing hydrocarbon contamination).
4. Set the **upper** alarm threshold at 5.0 volts (this will disable the upper threshold).

5. Program the alarms associated with the **lower** threshold that will activate if the sensor detects hydrocarbon liquid.

1.24 Hydrocarbon Liquid/Water Sensor Test and Decontamination Procedures

To prevent the possibility of explosion or fire, do not test the sensor in the Hazardous Area.

Work in a well-ventilated area with no hot surfaces or open flames.

Do not use fuel to test the sensor!

- **Test the Sensor Portion.**
  - Put the polymer fully into mineral spirits for about 10 minutes
  - Remove the sensor and let it hang to air dry
  - After another 10 minutes any Controller alarms or events associated with the hydrocarbon sensor should start
  - Disconnect this part of the sensor from the Controller. An alarm should occur immediately.
  - Short across these Controller positions. An alarm should occur.
  - If the open lead and/or short lead test results are unsatisfactory, examine all wiring and junction boxes for continuity.
- **Test the Water Sensor Portion.**
  - Put just the end of the sensor fully in tap water. Controller alarms or events associated with the water portion of the sensor should occur.
  - Short the water portion of the sensor. An alarm should occur.
  - If the short lead test result is unsatisfactory, examine all wiring and junction boxes for continuity

NOTE: If your controller does not sense the alarm conditions simulated here, examine your controller thresholds to make sure they are correct.

- **Clean the Hydrocarbon Sensor Portion.** To clean hydrocarbon contamination (as a result of testing or actual use) from the sensor:
  - Put the contaminated portion fully into denatured alcohol for one hour
  - Flush the sensor with water to remove any residue
  - Allow the sensor to “settle” for another hour

NOTE: The sensor should return to near its original resistance, though it may be necessary to readjust the controller’s thresholds.

Section 12 30-3219-12 Hydrocarbon Liquid Sump Sensor

About the 30-3219-12

The hydrocarbon liquid sump sensor is designed to detect the presence of liquid hydrocarbons in sumps, dispenser pans and other locations where the presence of a hydrocarbon liquid could indicate that a leak has occurred.

The hydrocarbon liquid sensor contains a carbon/polymer material that changes its resistance when exposed to liquid hydrocarbons. In the event of a break in the cable, the system will activate the alarm.

30-3219-12 Specifications	
Operating Temperature	**–**20°C to +50°C (–4°F to +122°F)
Dimensions	4.4 cm (1.7 in) dia. x 33.5 cm (13.2 in) long
Cable	3.6 m (12 ft) gas & oil resistant
Nominal Resistance (uncontaminated)	1k – 5k ohms
Nominal Resistance (Contaminated)	30k – 200k ohms

NOTE: To ensure safe operating conditions the sensor has been designed to connect to OPW Fuel Management Systems' controllers only.

12.1.1 Installing the 30-3219-12

CAUTION

See the Local and National Electrical Codes for your location. Make sure that the cabling leading back to the controller (gas/oil resistant Petro Vend number 12-1030) is installed in conduit dedicated to intrinsically safe wiring.

NOTE: Hydrocarbons (i.e., gasoline, diesel and jet fuel, etc.) float on water. If this sensor is fully submerged in water, the polymer will NOT detect hydrocarbon liquid.

- This sensor requires one (1) Controller Interface Module position
- Review the Connections table and the Typical Installation drawing below
- Use the supplied cable gland and silicon wire nuts

Install seal-offs at both ends of the conduit run

Connections	
I.S. Interface Module Position 1 Terminals	**Sensor Wire**
+12 (Power)	Red
Black	Black
(Ground)	No Connection

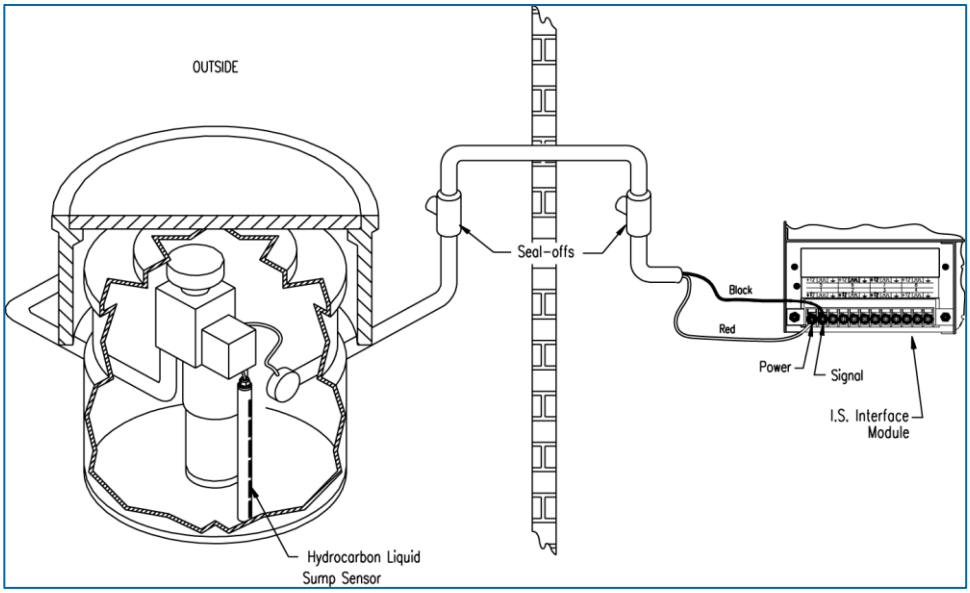


Figure 12-1 Hydrocarbon Liquid Sump Sensor Installation

12.1.2 Controller Setup for Hydrocarbon Liquid Sump Sensor

1. Configure the barrier position to be a **generic** sensor and install that position.
2. Use the controller to take a dynamic reading of the hydrocarbon part of the sensor.
3. Set the **lower** alarm threshold at 0.2 volts lower than the reading taken (if there is no existing hydrocarbon contamination).
4. Set the **upper** alarm threshold at 5.0 volts (this will disable the upper threshold).
5. Program the alarms associated with the **lower** threshold that will activate if the sensor detects hydrocarbon liquid.

12.1.3 Testing and Decontaminating the Hydrocarbon Liquid Sump Sensor

To prevent the possibility of explosion or fire, do not test the sensor in the Hazardous Area.

Work in a well-ventilated area with no hot surfaces or open flames.

Do not use fuel to test the sensor!

- **Test the Sensor**
  - Put the polymer fully into mineral spirits for about 10 minutes
  - Remove the sensor and let it hang to air dry
  - After another 10 minutes any Controller alarms or events associated with the hydrocarbon sensor should start
  - Disconnect this part of the sensor from the Controller. An alarm should occur immediately.
  - Short across these Controller positions. An alarm should occur.
  - If the open lead and/or short lead test results are unsatisfactory, examine all wiring and junction boxes for continuity.

NOTE: If your controller does not sense the alarm conditions simulated here, examine your controller thresholds to make sure they are correct.

- **Clean the Hydrocarbon Sensor.** To clean hydrocarbon contamination (as a result of testing or actual use) from the sensor:
  - Put the contaminated portion fully into denatured alcohol for one hour
  - Flush the sensor with water to remove any residue
  - Allow the sensor to “settle” for another hour

NOTE: The sensor should return to near its original resistance, though it may be necessary to readjust the controller’s thresholds.

Section 13 30-3221-1 Single Level Sump Sensor

About the 30-3221-1

The single-level sump sensor is designed to sense when liquid is in sumps, dispenser pans and other locations where this can indicate that a leak has occurred.

This sensor can also be used to monitor wet wells when a liquid is normally present. The sensor contains a float switch that activates in the presence of liquid. In the event of a break in the cable, the system will activate the alarm.

30-3221-1 Specifications	
Operating Temperature	**–**20°C to +50°C (–4°F to +122°F)
Dimensions	7.4 cm (2.9 in) dia. x 9.5 cm (3.7 in) long
Cable	4.6 m (15 ft) gas & oil resistant

NOTE: To ensure safe operating conditions the sensor has been designed to connect to OPW Fuel Management Systems' controllers only.

13.1.1 Installing the 30-3221-1

CAUTION

See the Local and National Electrical Codes for your location. Make sure that the cabling leading back to the controller (gas/oil resistant Petro Vend number 12-1030) is installed in conduit dedicated to intrinsically safe wiring.

NOTE: If monitoring a normally dry well, use a meter to set the float so the sensor is in the closed state with NO liquid present (float in lower position). If monitoring a normally wet well, use a meter to set the float so that it is in the closed state WITH liquid present (float in upper position).

- This sensor requires one (1) Controller Interface Module position
- Review the Connections table and the Typical Installation drawing below
- Use the supplied cable gland and silicon wire nuts
- Install seal-offs at both ends of the conduit run

Connections	
I.S. Interface Module Position 1 Terminals	**Sensor Wire**
+12 (Power)	Red
(Signal)	Black
(Ground)	No Connection

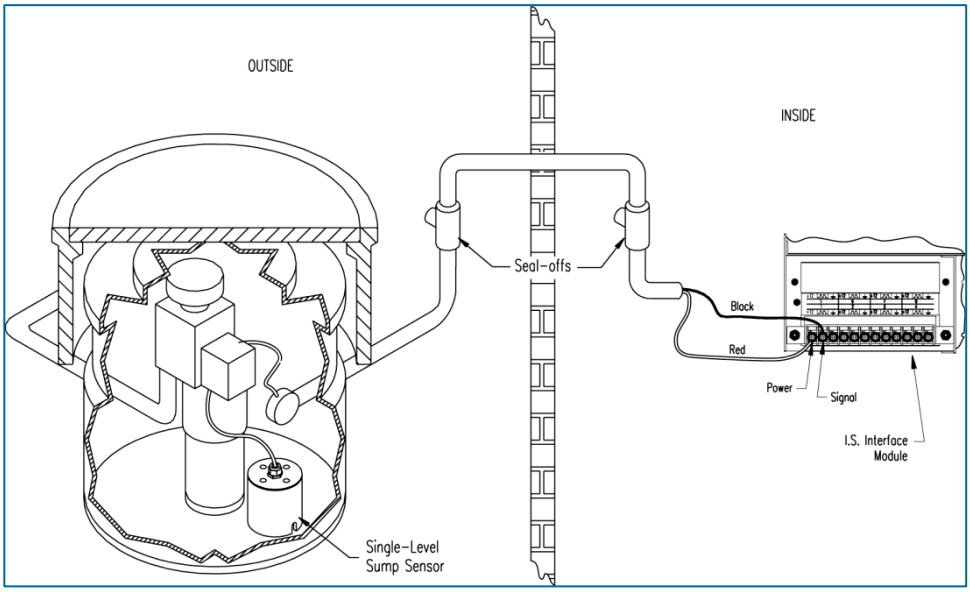


Figure 13-1 Single-Level Sump Sensor Installation

13.1.2 Controller Setup for Single-Level Sump Sensor

1. Configure the barrier position to be a **generic** sensor and install that position.
2. Set the **lower** alarm threshold to 2.5 volts. Set the **upper** alarm threshold to 5.0 volts (this will disable the upper threshold).
3. Program the alarms associated with the **lower** threshold that will activate if the sensor detects hydrocarbon liquid.

13.1.3 Testing the Single-Level Sump Sensor

To prevent the possibility of explosion or fire, do not test the sensor in the Hazardous Area.

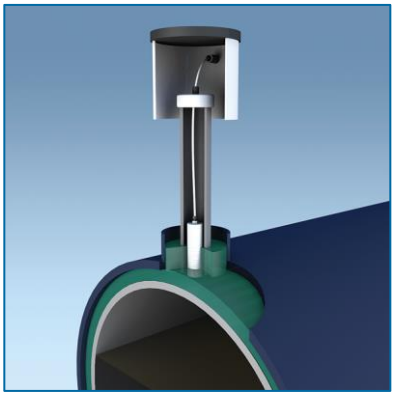
Work in a well-ventilated area with no hot surfaces or open flames.

Do not use fuel to test the sensor!

- **If the sensor is installed in a normally DRY well:**
  - Place the float in the UPPER position. An alarm should occur in the Controller.
  - Put the float back in the LOWER position. The alarm should end.
- **If the sensor is installed in a normally WET well:**
  - Place the float in the LOWER position. An alarm should occur in the Controller.
  - Put the float back in the UPPER position. The alarm should end.

NOTE: If your controller does not sense the alarm conditions simulated here, examine your controller thresholds to make sure they are correct. Check the orientation of the float as described in the Installation note above. An alarm should occur when the sensor is disconnected. The Alarm should end when the sensor is shorted. Examine all wiring and junction boxes to make sure there is continuity without shorts.

Section 14 30-3221-2 Dual Level Reservoir Sensor



About the 30-3221-2

The dual-level reservoir sensor is designed for use in the brine-filled reservoir of the interstitial area of a doubled-walled tank. This sensor contains a dual-level float switch that detects level changes of fluid in the reservoir of the tank. The sensor expects the liquid to be at a constant level. The system will activate the alarm when the brine level in the interstitial space either rises or falls.

It can also be used in other areas (such as dispenser containment pans) that are normally dry and will give a low level warning followed by a high level alarm. In the event of a break in the cable, the system will activate the alarm

30-3221-2 Specifications	
Operating Temperature	–20□C to +50□C (–4□F to +122□F)
Dimensions	6 cm (2.4 in) dia. x 35.6 cm (14 in) long
Cable	4.5 m (15 ft) gas & oil resistant

NOTE: To ensure safe operating conditions the sensor has been designed to connect to OPW Fuel Management systems only.

14.1.1 Installing the 30-3221-2

CAUTION

See the Local and National Electrical Codes for your location. Make sure that the cabling leading back to the controller (gas/oil resistant Petro Vend number 12-1030) is installed in conduit dedicated to intrinsically safe wiring.

NOTE: To change the logic for this sensor the lower float can be reversed.

To remove the lower float:

1. Use needle-nose pliers to remove the bottom clip.
2. Remove the plastic cover and the float clip.
3. Remove the float.

If you are monitoring a normally WET well (brine filled reservoir), orient the float with the CLOSED arrow pointing downward.

If you are monitoring a normally DRY well, make sure to orient the float with the CLOSED arrow pointing upward.

- This sensor requires ONE (1) Controller Interface Module position
- Review the Connections table and the Typical Installation drawing below
- Use the supplied cable gland and silicon wire nuts
- Install seal-offs at both ends of the conduit run

Connections	
I.S. Interface Module Position 1 Terminals	**Sensor Wire**
+12 (Power)	Red
(Signal)	White
(Ground)	No Connection

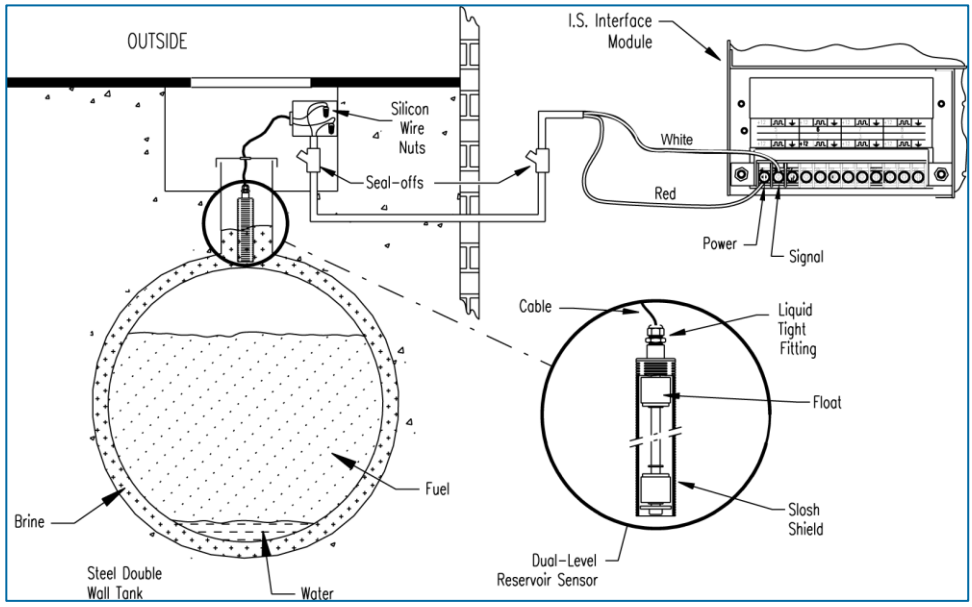


Figure 14-1 Dual-Level Sump Sensor Installation

1. Configure the barrier position to be a **generic** sensor (or, if using SiteConnect, choose the appropriate icon) and install that position.
2. Set the **lower** alarm threshold to 2.2 volts. Set the **upper** alarm threshold to 3.4 volts.
   - If monitoring a **normally wet well**, the 3.4 volt threshold means liquid is too low. The 2.2 volt threshold means liquid is too high.
   - If monitoring a **normally dry well**, the 3.4 volt threshold is where liquid is above the lower float. The 2.2 volt threshold is where liquid is above the upper float.
3. Program the alarms associated with the thresholds you wish to activate if the sensor detects liquid.

14.1.2 Testing the Dual-Level Reservoir Sensor Float

DANGER

To prevent the possibility of explosion or fire, do not test the sensor in the Hazardous Area.

Work in a well-ventilated area with no hot surfaces or open flames.

Do not use fuel to test the sensor!

If the Sensor is Installed in a Normally DRY Well

- Place the LOWER float in its UPPER position and the UPPER float in its LOWER position. This should trigger a low-level alarm in the Controller.
- Place the LOWER float in its UPPER position and the UPPER float in its UPPER position. This should trigger a high-level alarm in the Controller.
- Return BOTH floats to their LOWER positions and check that the Controller is no longer in the alarm state.

If the Sensor is Installed in a Normally WET Well

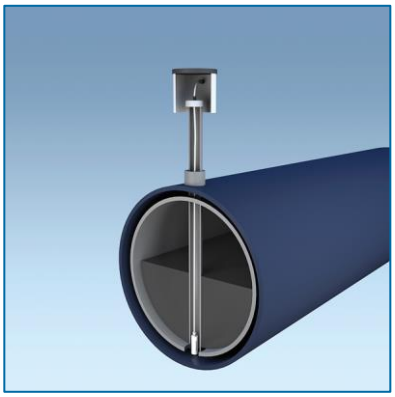
- Place the LOWER float in its LOWER position and the UPPER float in its LOWER position. This should trigger a low-level alarm in the Controller.
- Place the LOWER float in its UPPER position and the UPPER float in its UPPER position. This should trigger a high-level alarm in the Controller.
- Place the LOWER float in its UPPER position and the UPPER float in its LOWER position. Confirm that the Controller is no longer in an alarm state.

If the Controller fails to register the alarm condition, check your programmed thresholds in the Controller.

Check the orientation of the lower float as described on page 29.

Disconnecting the sensor should trigger a high-level alarm. Shorting the sensor should generate a low-level alarm; check all wiring and junction boxes to ensure continuity without shorts.

1.25 30-3221-1A, -1B Interstitial Level Sensors



These two types of interstitial level sensors are used primarily in the interstitial area of a double walled tank. The sensors have a float switch that activates in the presence of a liquid. The **30-3221-1A** is constructed from chemical resistant, non-metallic material and the **30-3221-1B** is constructed from brass.

These sensors can also be used in sumps, dispenser pans and other locations where the presence of a liquid could indicate that a leak has occurred. Combined with a vapor sensor, this interstitial sensor can be used to monitor wet wells to ensure that a liquid is normally present. In the event of a break in the cable the system will activate an alarm.

30-3221-1A, -1B Specifications	
Operating Temperature	–20□C to +50□C (–4□F to +122□F)
Dimensions - 30-3221-1A	3.4 cm (1.3 in) dia. x 10 cm (3.9 in) long
Dimensions - 30-3221-1B	3.5 cm (1.4 in) dia. x 9.0 cm (3.5 in) long
Cable	4.5 m (15 ft) gas & oil resistant

NOTE: To ensure safe operating conditions the sensor has been designed to connect to OPW Fuel Management Systems' controller only.

14.1.3 Installing the 30-3221-1A, -1B

CAUTION

See the Local and National Electrical Codes for your location. Make sure that the cabling leading back to the controller (gas/oil resistant Petro Vend number 12-1030) is installed in conduit dedicated to intrinsically safe wiring.

NOTE: If monitoring a normally dry well, use a meter to set the float so the sensor is in the closed state with NO liquid present (float in the lower position). If monitoring a normally wet well, use a meter to set the float so that it is in the closed state WITH liquid present (float in the upper position).

- This sensor requires one (1) Controller Interface Module position
- Review the Connections table and the Typical Installation drawing below
- Use the supplied cable gland and silicon wire nuts
- Install seal-offs at both ends of the conduit run

Connections	
I.S. Interface Module Position 1 Terminals	**Sensor Wire**
+12 (Power)	Red
(Signal)	Black
(Ground)	No Connection

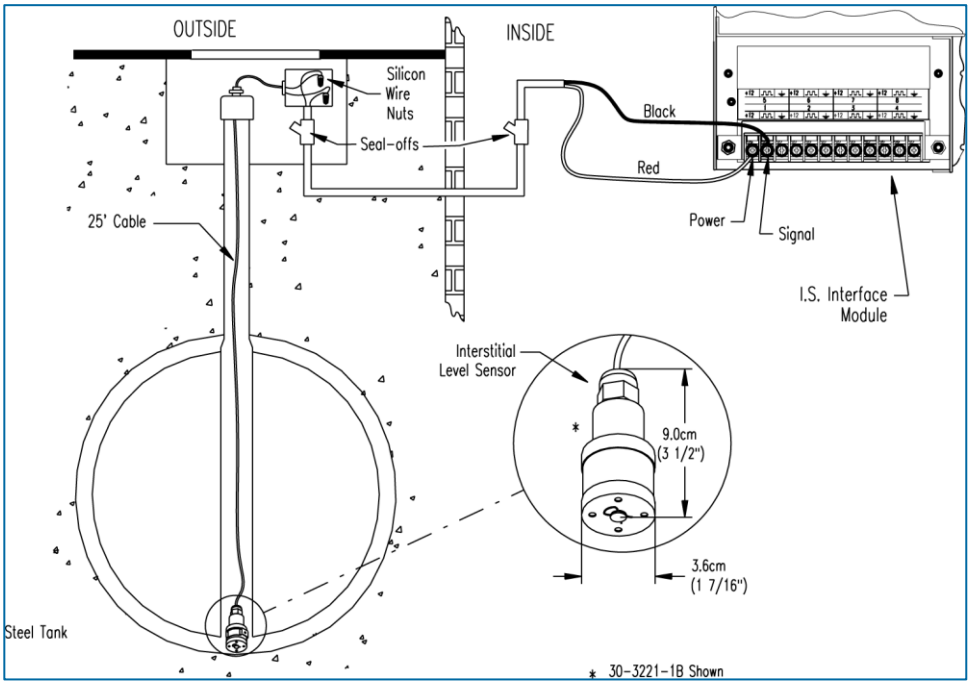


Figure 14-2 Interstitial Level Sensor Installation

14.1.4 Controller Setup for Interstitial Level Sensor

4. Configure the barrier position to be a **generic** sensor and install that position.
5. Set the **lower** alarm threshold to 2.5 volts. Set the **upper** alarm threshold to 5.0 volts (this will disable the upper threshold).
    - If the sensor monitors a **normally wet well** the lower threshold will indicate that the liquid is too low
    - If the sensor monitors a **normally dry well**, the lower threshold indicates that the liquid is too high
6. Program the alarms associated with the **lower** threshold that will activate if the sensor detects hydrocarbon liquid.

14.1.5 Testing the Interstitial Level Sensor

To prevent the possibility of explosion or fire, do not test the sensor in the Hazardous Area.

Work in a well-ventilated area with no hot surfaces or open flames.

Do not use fuel to test the sensor!

- **If the Sensor is installed in a normally DRY well:**
    - Place the float in the UPPER position. An alarm should occur in the Controller.
    - Put the float back in the LOWER position. The alarm should end.
- **If the Sensor is installed in a normally WET well:**
    - Place the float in the LOWER position. An alarm should occur in the Controller.
    - Put the float back in the UPPER position. The alarm should end.

NOTE: If your controller does not sense the alarm conditions simulated here, examine your controller thresholds to make sure they are correct. Check the orientation of the float as described in the Installation note above. An alarm should occur when the sensor is disconnected. The Alarm should end when the sensor is shorted. Examine all wiring and junction boxes to make sure there is continuity without shorts.

1.26 30-3222 Hydrocarbon Vapor Sensor

About the 30-3222

The hydrocarbon vapor sensor is designed to detect hydrocarbon vapors in monitoring wells and the interstitial areas of a double-walled tank. The presence of these vapors could indicate a potentially dangerous leak that could lead to safety and environmental problems.

The sensor is made from a long-life resistive element that increases dramatically in resistance in the presence of hydrocarbon vapors. After the vapors have dissipated, the sensor returns to normal and is ready to detect hydrocarbon vapors again. In the event of a break in the cable, the system will activate the alarm.

30-3222 Hydrocarbon Vapor Sensor Specifications	
Operating Temperature	-20°C to 50°C (-4°F to 122°F)
Dimensions	2.3 cm (0.9 in) dia. x 8.9 cm (3.5 in) long
Cable	4.5 m (12 ft) gas & oil resistant
Nominal Resistance (uncontaminated)	3K – 5K ohms
Nominal Resistance (Contaminated)	10K – 200K ohms

NOTE: To ensure safe operating conditions the sensor has been designed to connect to OPW Fuel Management Systems' controllers only.

14.1.6 Installing the 30-3222

CAUTION

See the Local and National Electrical Codes for your location. Make sure that the cabling leading back to the controller (gas/oil resistant Petro Vend number 12-1030) is installed in conduit dedicated to intrinsically safe wiring.

NOTE: When installing, avoid any immersion in liquid (either hydrocarbon or water). Immersion shortens the sensor's life. Immersion may also prevent the sensor from working properly.

- This sensor requires one (1) Controller Interface Module position
- Review the Connections table and the Typical Installation drawing below
- Use the supplied cable gland and silicon wire nuts
- Install seal-offs at both ends of the conduit run

30-3222 Connections	
I.S. Interface Module Position 1 Terminals	**Sensor Wire**
+12 (Power)	Red
(Signal)	Black
(Ground)	No Connection

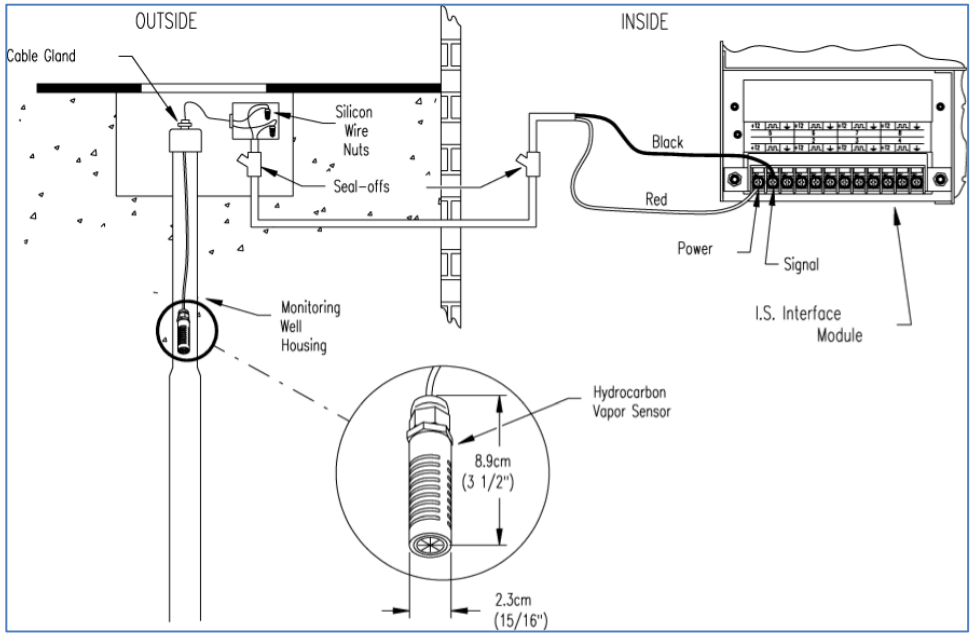


Figure 14-3 Hydrocarbon Vapor Sensor Installation

14.1.7 SiteSentinel iTouch Controller Setup for Hydrocarbon Vapor Sensor

1. Configure the barrier position to be a **generic** sensor (or, if using SiteConnect choose the appropriate icon) and install that position.
2. Using the Controller take a dynamic reading of the hydrocarbon portion of the sensor.
3. Set the **lower** alarm threshold to be 0.1 volts lower than the reading taken (this assumes that there is no current hydrocarbon contamination)
4. Set the **upper** alarm threshold to be 5.0 volts (disables upper threshold).
5. Program your alarms to activate if the sensor detects hydrocarbons.

14.1.8 Testing and Decontaminating the Hydrocarbon Vapor Sensor

To prevent the possibility of explosion or fire, do not test the sensor in the Hazardous Area.

Work in a well-ventilated area with no hot surfaces or open flames.

Do not use fuel to test the sensor!

To test the hydrocarbon vapor sensor:

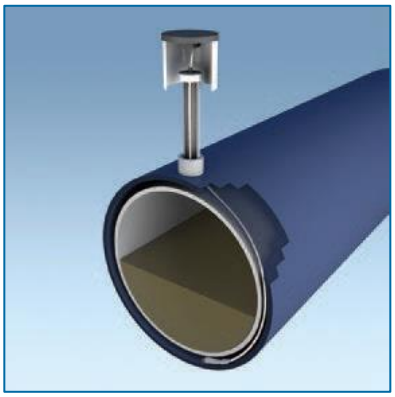
1. Pour some mineral spirits into an empty can or other container.
2. Suspend the hydrocarbon sensor inside the container, in the air above the mineral spirits.
3. Wait approximately 10 minutes. After ten minutes, any Controller alarms or events associated with the sensor should have triggered.

To clean the sensor from hydrocarbon contamination (or after testing):

1. Immerse the sensor in denatured alcohol.
2. Let the sensor soak for one hour.
3. Remove the sensor from the alcohol and let stand for one hour before using.

The sensor should have returned to nearly its original resistance, but it may be necessary to re-adjust the Controller's thresholds. If the Controller fails to register the alarm condition, check your programmed thresholds in the Controller. Disconnecting the sensor should trigger an alarm and shorting the sensor should be out of alarm. Check all wiring and junction boxes to ensuring continuity without shorts.

1.27 30-3223 Interstitial Optical Liquid Sensor



About the 30-3223

The interstitial optical liquid sensor is used primarily to monitor the interstitial area of double-walled tanks. This sensor incorporates a long-life optical prism and can also be used in sumps, dispenser pans and other locations where the presence of a liquid could indicate that a leak has occurred.

The sensor does NOT differentiate water and hydrocarbon liquid. In the event of a break in the cable, the system will activate the alarm.

XXX Specifications	
Operating Temperature	-20°C to 50°C (-4°F to 122°F)
Dimensions	1.8 cm (0.7 in) dia. x 7.0 cm (2.8 in) long
Cable	6.1 m (20 ft) gas & oil resistant

NOTE: To ensure safe operating conditions the sensor has been designed to connect to OPW Fuel Management Systems' controller only.

14.1.9 Installing the 30-3223

CAUTION

See the Local and National Electrical Codes for your location. Make sure that the cabling leading back to the controller (gas/oil resistant Petro Vend number 12-1030) is installed in conduit dedicated to intrinsically safe wiring.

- This sensor requires one (1) Controller Interface Module position
- Review the Connections table and the Typical Installation drawing below
- Use the supplied cable gland and silicon wire nuts
- Install seal-offs at both ends of the conduit run

30-3223 Connections	
I.S. Interface Module Position 1 Terminals	**Sensor Wire**
+12 (Power)	Red
(Signal)	White
(Ground)	Black

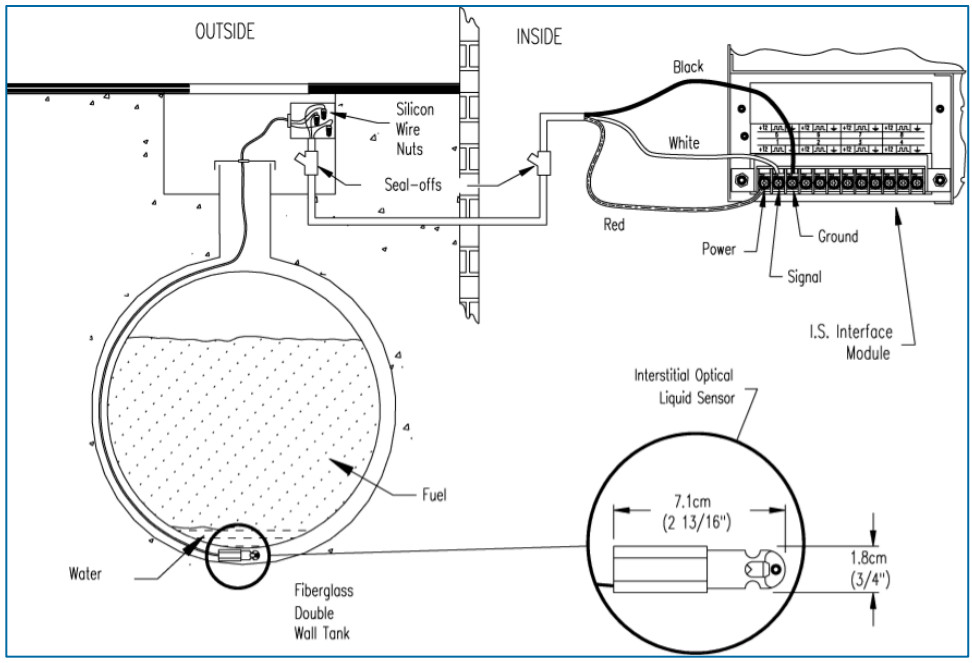


Figure 14-4 Interstitial Optical Liquid Sensor Installation

14.1.10 Controller Setup for Interstitial Optical Liquid Sensor

1. Configure the barrier position to be a **generic** sensor (or, if using SiteConnect choose the appropriate icon) and install that position.

2. Set the **lower** alarm threshold to 0.2 volts and set the **upper** alarm threshold to 5.0 volts (disables upper threshold).
3. Program the alarms associated with the lower threshold that you wish to activate if the sensor detects liquid.

14.1.11 Testing the Interstitial Optical Liquid Sensor

DANGER

To prevent the possibility of explosion or fire, do not test the sensor in the Hazardous Area.

Work in a well-ventilated area with no hot surfaces or open flames.

Do not use fuel to test the sensor!

1. Immerse the sensor in water. This should trigger the alarm in the Controller.
2. Remove the sensor from the water. Confirm that the Controller is no longer in alarm.

If the Controller fails to go in to alarm condition, check that the thresholds programmed in the system are correct. Disconnecting the sensor should trigger an alarm. Shorting the sensor should be out of alarm. Check all wiring and junction boxes to ensuring continuity without shorts.

1.28 30-3224 Combo Single Level/Hydrocarbon Liquid Sump Sensor

About the 30-3224

This combination sensor is made from a Hydrocarbon Liquid Sump Sensor (30-3219-12) with an Interstitial Level Sensor (30-3221-1A) clipped to the side.

The sensor is designed to detect the presence of liquid hydrocarbons and water in sumps, dispenser pans and other locations where the presence of a liquid could indicate that a leak has occurred.

The sensor contains a carbon/polymer material that changes its resistance when exposed to liquid hydrocarbons. A float switch simply clips onto the hydrocarbon sensor and can be positioned at any desired height to activate in the presence of liquid

This sensor can be used to monitor wet wells to ensure that a liquid is normally present. In the event of a break in the cable, the system will activate the alarm.

30-3224 Specifications	
Operating Temperature	-20°C to 50°C (-4°F to 122°F)
Dimensions 30-3221-1A	3.4 cm (1.3 in) dia. x 10 cm (3.9 in) long
Dimensions 30-3219-12	4.4 cm (1.7 in) dia. x 33.5 cm (13.2 in) long
Cable	3.6 m (12 ft) gas & oil resistant
Nominal Resistance (uncontaminated)	1K – 5K ohms
Nominal Resistance (Contaminated)	30K – 200K ohms

NOTE: To ensure safe operating conditions the sensor has been designed to connect to OPW Fuel Management Systems' controllers only.

14.1.12 Installing the 30-3224

See the Local and National Electrical Codes for your location. Make sure that the cabling leading back to the controller (gas/oil resistant Petro Vend number 12-1030) is installed in conduit dedicated to intrinsically safe wiring.

NOTE: If monitoring a normally dry well, use a meter to orient the Single-Level Float portion of the sensor so the sensor is in the closed state with NO liquid present (float in lower position). If monitoring a normally wet well orient the float so that it is in the closed state WITH liquid present (float in upper position).

- This sensor requires TWO (2) Controller Interface Module positions
- Review the Connections table and the Typical Installation drawing below
- Use the supplied cable gland and silicon wire nuts
- Install seal-offs at both ends of the conduit run

NOTE: Only three (3) wires are required to connect the sensor to the Controller positions. Use one wire as the common power connection to each sensor (red wires). The other two wires bring each sensor's data back to the separate Controller data terminal.

30-3224 Connections	
I.S. Interface Module Position 1 Terminals	**Sensor Wire**
+12 (Power)	Red (joined 30-3219-12 and 30-3221-1A red leads, in junction box).
(Signal)	Black (from Hydrocarbon Sensor)
(Ground)	No Connection
I.S. Interface Module Position 2 Terminals	**Sensor Wire**
12 (Power)	No Connection
(Signal)	White (from Liquid Level Sensor)
(Ground)	No Connection

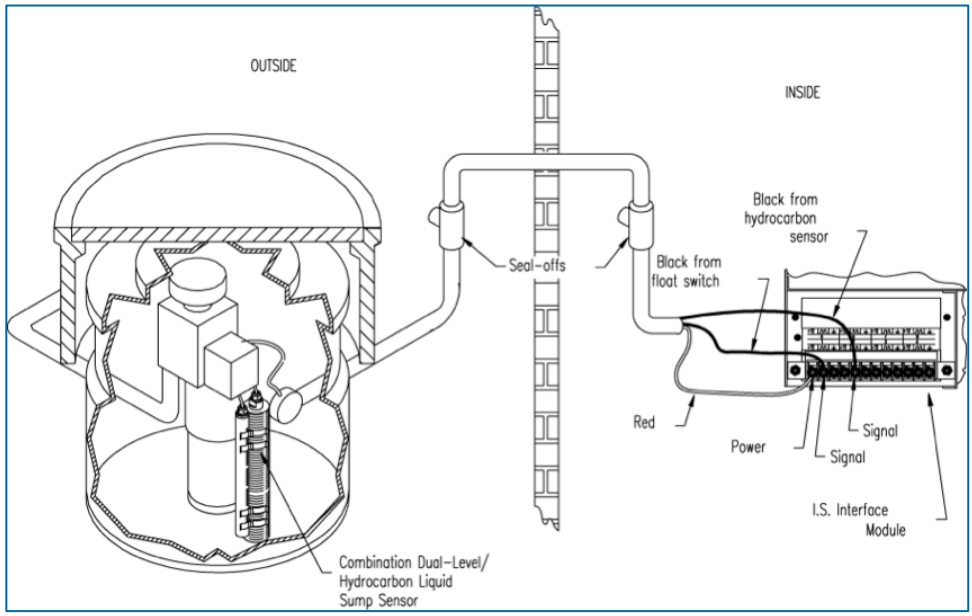


Figure 14-5 Combo Single-Level & Hydrocarbon Liquid Sensor Installation

1st Barrier Position (Float Sensor)

1. Configure the barrier position to be a sensor (or, if using Site Connect chose the appropriate icon) and install that position.
2. Set the **lower** alarm threshold to 2.5 volts.
3. Set the **upper** alarm threshold to 5.0 volts (disables upper threshold).
    - If monitoring a **normally wet well**, the lower threshold will indicate that the liquid is too low.
    - If monitoring a **normally dry well**, the lower threshold indicates that liquid is too high.

4. Program the alarms associated with the lower threshold that you wish to activate if the sensor detects hydrocarbon liquid.

2nd Barrier Position (Hydrocarbon Sensor)

1. Configure the barrier position to be a sensor (or, if using SiteConnect choose the appropriate icon) and install that position
2. Using the Controller, take a dynamic reading of the hydrocarbon portion of the senor.
3. Set the **lower** alarm threshold to 0.2 volts lower than the reading taken (this assumes that there is no current hydrocarbon contamination).
4. Set the **upper** alarm threshold to 5.0 volts (disables upper threshold).
5. Program the alarms associated with the lower threshold that you wish o activate if the sensor detects hydrocarbon liquid.

14.1.13 Testing the Float Sensor Portion of the Combo Sensor

Sensor installed in a normally DRY well

- Place the float in the UPPER position. This should trigger an alarm in the Controller.
- Return the float to its lower position. Confirm that the alarm ends in the Controller.

Sensor installed in a normally WET well

- Place the float in the LOWER position. This should trigger an alarm in the Controller.
- Return the float to the upper position and check that the Controller is no longer in alarm.

If the Controller fails to register the alarm condition, check your programmed thresholds in the Controller.

Check the orientation of the float as described on page **Error! Bookmark not defined.**.

Disconnecting the sensor should trigger an alarm and shorting the sensor should be out of alarm. Check all wiring and junction boxes to ensuring continuity without shorts.

14.1.14 Testing and Decontaminating the Hydrocarbon Sensor Portion of the Combo Sensor

To prevent the possibility of explosion or fire, do not test the sensor in the Hazardous Area.

Work in a well-ventilated area with no hot surfaces or open flames.

Do not use fuel to test the sensor!

If the SiteSentinel iTouch Controller fails to detect alarm conditions simulated here, also check that your Controller thresholds are correct

- **Testing the Hydrocarbon Liquid Sump Sensor.** Immerse the polymer in mineral spirits for about 10 minutes. Remove the sensor and let it hang to air dry. After another 10 minutes any Controller alarms or events associated with the hydrocarbon sensor should trigger. Disconnect this portion of the sensor from the Controller – an immediate alarm should result. Short across these Controller positions – an alarm should also occur. If the open lead and/or short lead test fail, check all wiring and junction boxes for continuity.

Cleaning the Hydrocarbon Liquid Sump Sensor. To clean hydrocarbon contamination from the sensor from testing or actual use, immerse the contaminated portion in denatured alcohol for one hour. Then, flush the sensor with water to remove any residue. Leave the sensor to “settle” for another hour. The sensor should return to nearly its original resistance, but it may be necessary to re-adjust the Controller’s thresholds.

1.29 30-3225 Combo Dual Level/Hydrocarbon Liquid Sump Sensor

About the 30-3225

This sensor is made from the hydrocarbon liquid sump sensor (30-3219-12) and from the dual level reservoir sensor (30-3221-2) clipped to the side. The combination sump sensor is designed to detect the presence of liquid hydrocarbons and water in sumps, dispenser pans and other locations where the presence of a liquid could indicate that a leak has occurred.

The sensor contains a carbon/polymer material that changes its resistance when exposed to liquid hydrocarbons. The dual float switch simply clips onto the hydrocarbon sensor and can activate in the presence or absence of liquid. This sensor can be used to monitor wet wells to ensure that liquid is normally present. In the event of a break in the cable, the system will activate the alarm.

30-3225 Specifications	
Operating Temperature	-20°C to 50°C (-4°F to 122°F)
Dimensions 30-3221-2	6 cm (2.4 in) dia. x 35.6 cm (14 in) long
Dimensions 30-3219-12	4.4 cm (1.7 in) dia. x 33.5 cm (13.2 in) long
Cable	3.6 m (12 ft) gas & oil resistant cable
Nominal Resistance (uncontaminated)	1K – 5K ohms
Nominal Resistance (Contaminated)	30K – 200K ohms

NOTE: To ensure safe operating conditions the sensor has been designed to connect to OPW Fuel Management Systems’ controllers only.

14.1.15 Installing the 30-3225

CAUTION

See the Local and National Electrical Codes for your location. Make sure that the cabling leading back to the controller (gas/oil resistant Petro Vend number 12-1030) is installed in conduit dedicated to intrinsically safe wiring.

NOTE: Hydrocarbons float on water – If this sensor is fully submerged, the polymer will NOT detect hydrocarbon liquid.

- This sensor requires two (2) Controller Interface Module position
- Review the Connections table and the Typical Installation drawing below
- Use the supplied cable gland and silicon wire nuts
- Install seal-offs at both ends of the conduit run

NOTE: For normally dry wells, use a meter to orient the Dual-Level Float portion of the sensor so the sensor is in the closed state with NO liquid present (float in lower position). For normally wet well, orient the float so that it is in the closed state WITH liquid present (float in upper position).

Only three wires are required to connect the sensor to the Controller positions. Use one wire as the common power connection to each sensor (red wires). The other two wires bring each sensor's data back to the separate controller data terminals.

30-3225 Connections	
I.S. Interface Module Position 1 Terminals	**Sensor Wire**
+12 (Power)	Red (joined 30-3219-12 and 30-3221-2 red leads, in junction box).
(Signal)	Black (from Hydrocarbon Sensor)
(Ground)	No Connection
I.S. Interface Module Position 2 Terminals	**Sensor Wire**
+12 (Power)	No Connection
(Signal)	White (from Dual Liquid Level Sensor)
(Ground)	No Connection

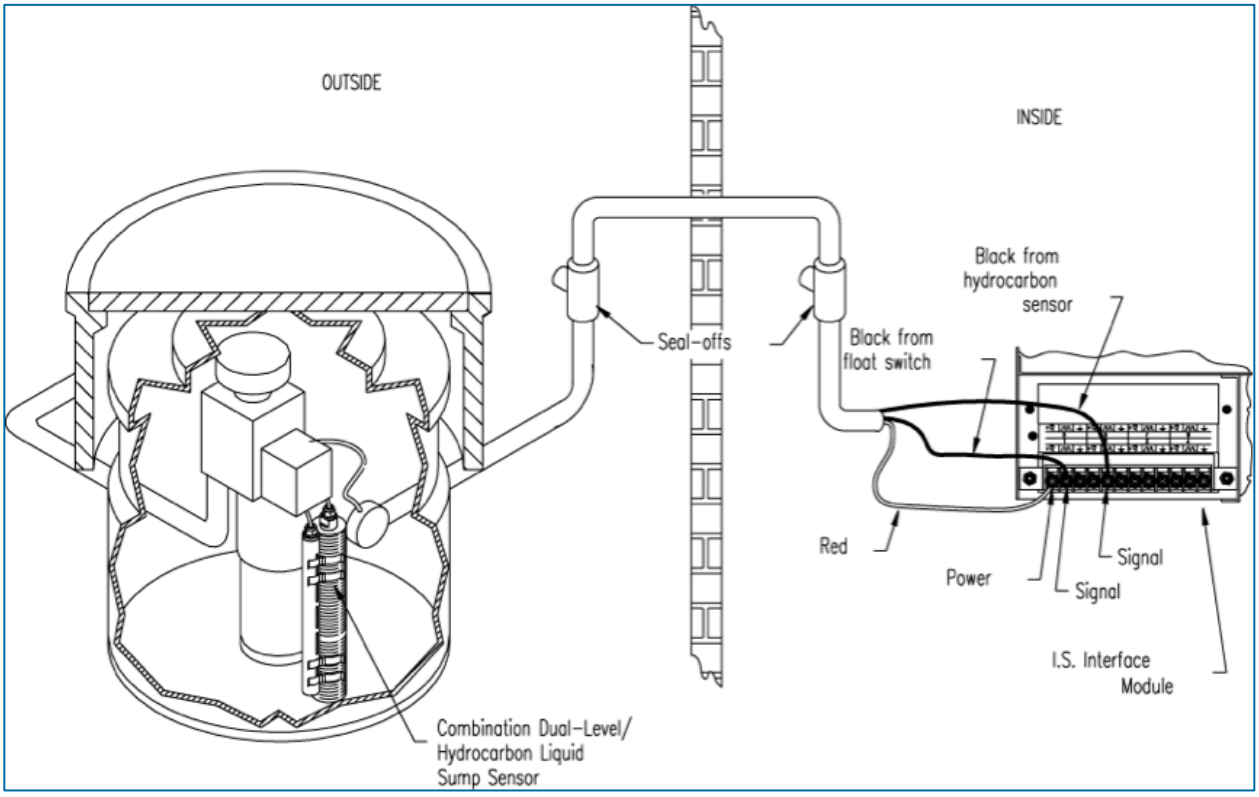


Figure 14-6 Combo Dual-Level & Hydrocarbon Liquid Sensor Installation

14.1.16 Controller Setup for 30-3225

1st Barrier Position (Dual Float Sensor)

1. Configure the barrier position to be a **generic** sensor (or, if using SiteConnect choose the appropriate icon) and install that position.
2. Set the **lower** alarm threshold to 2.2 volts and set the **upper** alarm threshold to 3.4 volts
   - If monitoring a normally wet well, the 3.4 volt threshold indicates will indicate that the liquid is too low, and the 2.2 volt threshold will indicate that the liquid is too high.
   - If monitoring a normally dry well, the 3.4 volt threshold indicates that liquid is above the lower float, and the 2.2 volt threshold indicates that liquid is above the upper float.
3. Use SiteConnect to program all alarms associated with the appropriate thresholds to activate if the sensor detects liquid.

2nd Barrier Position (Hydrocarbon Sensor)

1. Configure the barrier position to be a **generic** sensor (or, if using SiteConnect choose the appropriate icon) and install that position.
2. Using the Controller, take a dynamic reading of the hydrocarbon portion of the sensor.
3. Set the **lower** alarm threshold to 0.2 volts lower than the reading taken (this assumes that there is no current hydrocarbon contamination).
4. Set the **upper** alarm threshold to 5.0 volts (disables upper threshold).

5. Use SiteConnect to program all alarms associated with the lower threshold to activate if the sensor detects hydrocarbon liquid.

14.1.17 Testing the Float Sensor Portion of the Combo Sensor

Sensor Installed in a Normally Dry Well

1. Place the LOWER float in the UPPER position. Place the UPPER float in the LOWER position. This should trigger an alarm in the Controller.
2. Place both the LOWER and UPPER floats in the UPPER position. This should trigger a “High-Level” alarm in the Controller.
3. Return both floats to the LOWER position. Confirm that the alarm ends in the Controller.

Sensor Installed in a Normally WET Well

1. Place the LOWER float in the LOWER position. Place the UPPER float in the LOWER position. This should trigger an alarm in the Controller.
2. Place the LOWER float in the UPPER position and move the UPPER float in the UPPER position. This should trigger an alarm in the Controller.
3. Leave the LOWER float in the UPPER position and move the UPPER float to the LOWER position. Confirm that the Controller is no longer in alarm.

If the Controller fails to register the alarm condition, check your programmed thresholds in the Controller.

Check the orientation of the floats as described on page 28.

Disconnecting the sensor should trigger an alarm and shorting the sensor should defeat an alarm. Check all wiring and junction boxes to ensuring continuity without shorts.

14.1.18 Testing and Decontaminating the Hydrocarbon Portion of the Combo Sensor

To prevent the possibility of explosion or fire, do not test the sensor in the Hazardous Area.

Work in a well-ventilated area with no hot surfaces or open flames.

Do not use fuel to test the sensor!

If the SiteSentinel iTouch Controller fails to detect alarm conditions simulated here, also check that your controller thresholds are correct.

- **Testing the Hydrocarbon Liquid Sump Sensor.** Immerse the polymer in mineral spirits for about 10 minutes. Remove the sensor and let it hang to air dry. After another 10 minutes any Controller alarms or events associated with the hydrocarbon sensor should trigger. Disconnect this portion of the sensor from the Controller – an immediate alarm should result. Short across these Controller positions – an alarm should also occur. If the open lead and/or short lead test fail, check all wiring and junction boxes for continuity.
- **Cleaning the Hydrocarbon Liquid Sump Sensor.** To clean the hydrocarbon contamination from the sensor from testing or actual use, immerse the contaminated portion in denatured alcohol for one hour. Then, flush the sensor with water to remove any residue. Leave the sensor to “settle” for another hour. The sensor should return to nearly its original resistance, but it may be necessary to re-adjust the Controller’s thresholds.

14.1.19 Testing the Water Sensor Portion of the Combo Sensor

Immerse just the water-detecting end of the sensor in tap water. Controller alarms or events associated with the water portion of the sensor should immediately trigger.

Short the water portion of the sensor – an alarm should occur. If the short lead test fails, check all wiring and junction boxes for continuity.

Section 15 External Device Connection

The illustration below shows how to connect all possible devices and accessories to your SiteSentinel iTouch Controller. Not all applications use all connections shown in the drawing.

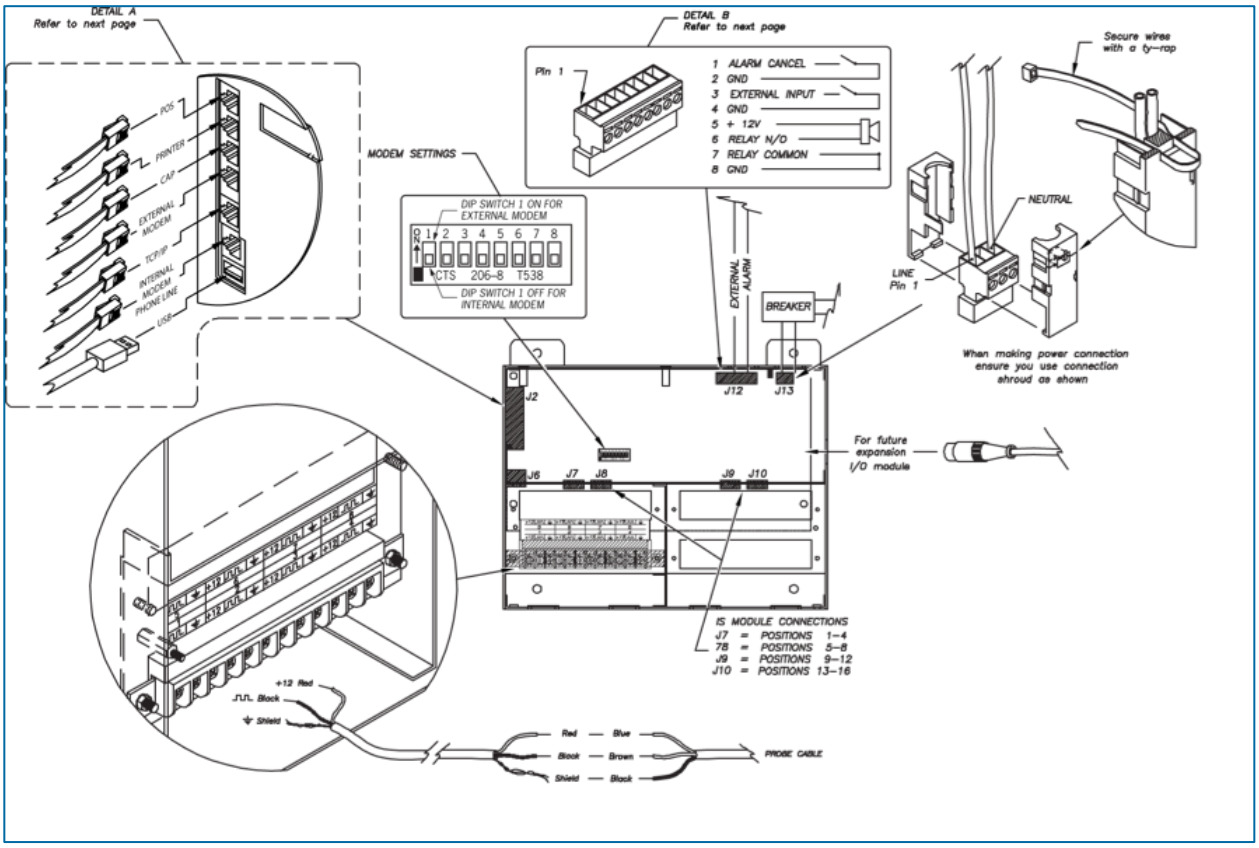


Figure 15-1 Connecting External Devices to the Controller

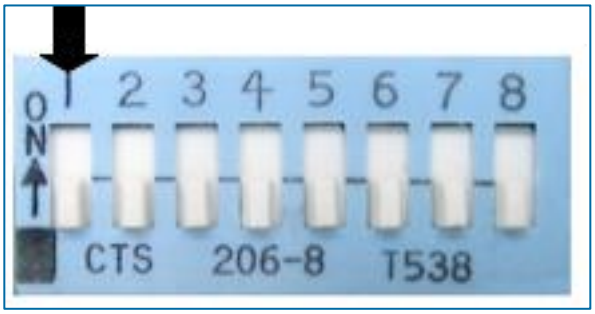


Figure 15-2 Dip-Switch Settings for Modem

> **NOTE**: Dip-Switch 1 is used for internal selection ONLY. Use the “On” position to select external modem; the “off” is for internal modem. Once the dip-switch is changed, the SiteSentinel iTouch controller needs to be restarted.

Section 16 RJ-45 Communication Ports

The SiteSentinel iTouch Controller has five RJ-45 ports as shown in the illustration below. From top to bottom, they are for:

- POS (Point-of-Sale) Device (see Appendix C)
- Printer
- CAP port: configuration port for SiteConnect
- TCP/IP (See Section Built-in TCP/IP Connections)
- External Modem (optional)
- Internal Modem (standard)

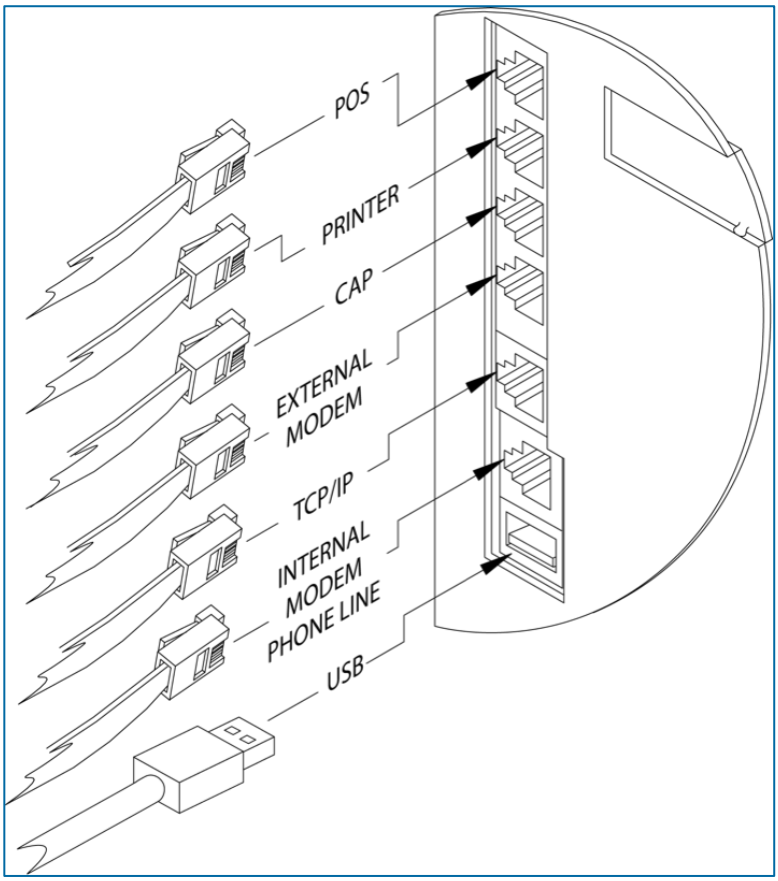


Figure 16-1 SiteSentinel iTouch RJ-45 Communication Ports

Section 17 Terminal Block Detail

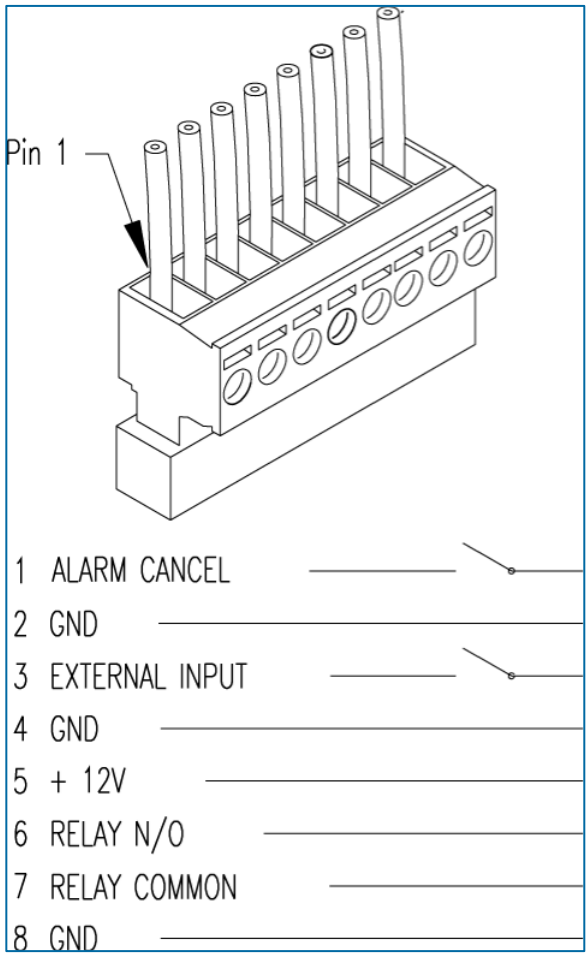


Figure 17-1 SiteSentinel iTouch Terminal Block Connections

> **NOTE**: If using the external alarm option (see Section 21.2), connect an ALARM CANCEL button across terminals 1 and 2.

Section 18 Printer Option

1. Mount the printer bracket (see Section 4.2).
2. Slide the printer into the wall bracket.
3. Attach 9-pin Dsub connector to the printer and the other end to the Controllers RJ-45 connector (see Section 16).
4. Plug in the printer's power cable that exits from the 9-pin Dsub.
5. Set the Dip-switches in the printer (see the tables below). Refer to the printer's operating instructions for paper loading and testing.

The printer is factory-configured with the default settings in the following tables. These settings will allow the printer to function properly. If for any reason you need to re-configure the printer refer to the printer's operating instructions.

Switch #1	Setting	Function
1	OFF	Serial input
2	ON	High printing speed
3	ON	Auto paper loading
4	OFF	No line feed after carriage return
5	ON	DIP SW enabled
6	OFF	Print density 100%
7	ON	
8	ON	

Switch #2	Setting	Function
1	ON	40 columns
2	ON	High printing speed
3	ON	Ordinary characters
4	ON	Normal zero
5	ON	American character set
6	ON	
7	ON	
8	OFF	

Switch #3	Setting	Function
1	ON	8 data bits
2	ON	No parity
3	ON	Odd parity
4	ON	Hardware flow control
5	OFF	Baud Rate 19,200
6	ON	
7	ON	
8	OFF	

1.30 Modem Connections

If you purchased your SiteSentinel iTouch with the internal modem option (OPW Fuel Management Systems part number **75-2042**), the modem will have come pre-installed.

Connect the phone line from the junction box to the Controller using the supplied RJ-11 cable. See Section 16 for the Phone Line port location.

If you are upgrading an existing system with the internal modem you will need to set the dip-switch to **internal modem** before inserting the modem into its socket.

If the internal modem is not installed, or if you are using an external modem, the dip-switch must be set to **external modem**.

When using an external modem, attach the modem to the external modem port using an external modem cable (OPW Fuel Management Systems' part number **20-1517-04**). See Section 16 for the External Modem port location.

Section 19 CAP Connection for SiteConnect Software

> **NOTE**: Plug in the battery before configuring the SiteSentinel iTouch.

The SiteSentinel iTouch Controller is normally configured using the supplied direct connect cable and SiteConnect Windows software. Connect the RJ-45 end of the cable into the CAP port on the Controller and the other end of the cable into one of your PC's serial ports. See RJ-45 Communication Ports on page 76 for the CAP port location.

The SiteSentinel iTouch Controller configuration can be modified remotely using the modem connections described above. SiteConnect is required on the remote PC.

After installing the SiteConnect software, consult the SiteConnect help file for configuration details.
You can also use SiteConnect to send or upgrade SiteSentinel iTouch software (see Appendix D on page **Error! Bookmark not defined.**).

> **NOTE**: If a software upgrade fails, change the connection speed to 19,200 and try to connect to the SiteSentinel iTouch Controller again.

1.31 POS Interface Option

The SiteSentinel iTouch system can be interrogated by an in-store POS device via the SiteSentinel iTouch POS port.

Please contact OPW Fuel Management Systems for details.

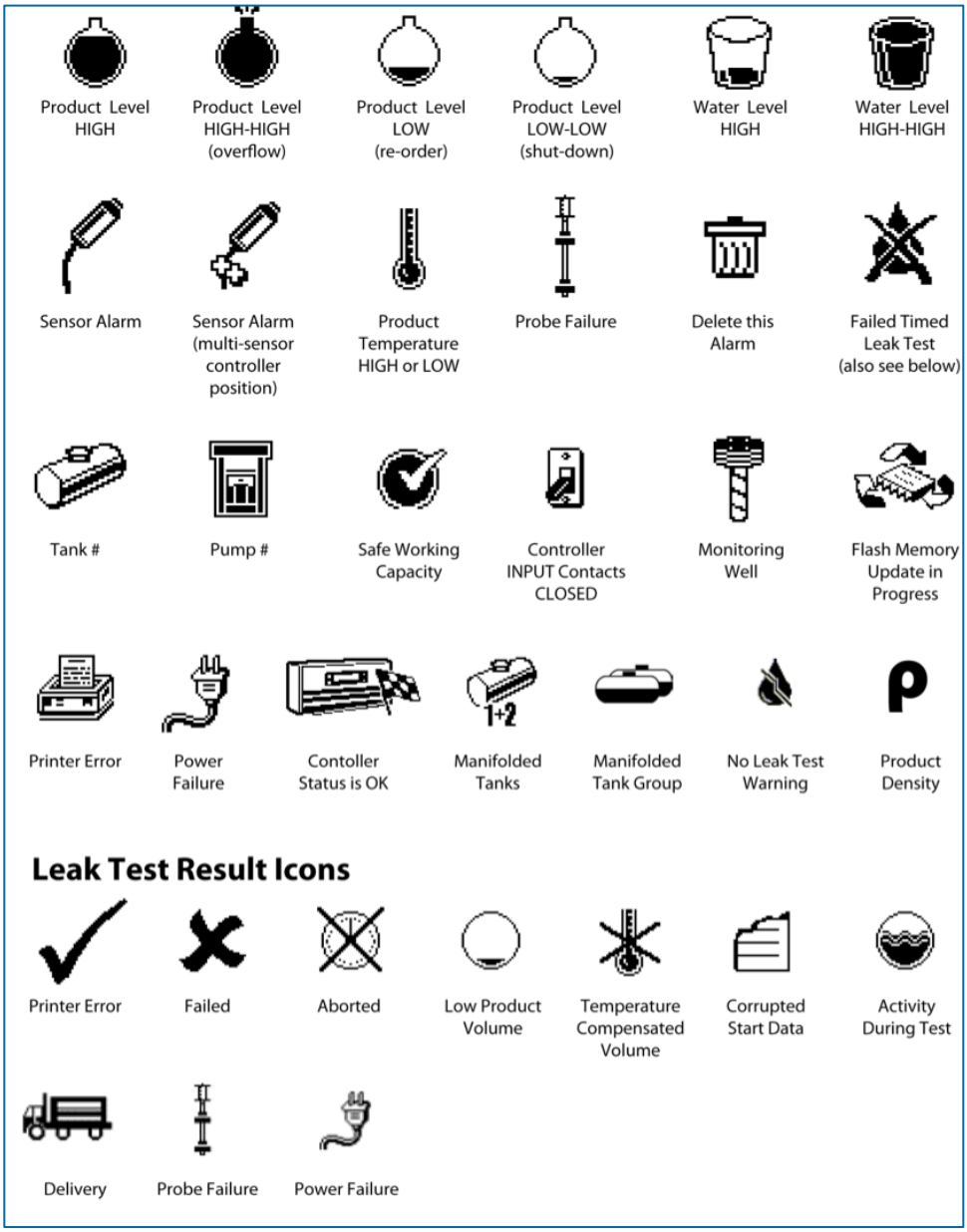
See Appendix C.

1.32 Built-in TCP/IP Connections

SiteSentinel iTouch is equipped with built-in TCP/IP port and supports DHCP function. For port location, please refer to Section 16. The Controller will automatically accept the TCP/IP address assigned by local LAN.

Appendix A – LCD Screen Icons

Sensor, Probe and Controller Status Icons



Appendix B – Alarm Kit Option

Alarm Kit Part Numbers

- 30-2015 (115 VAC)
- 30-2015-230 (230 VAC)

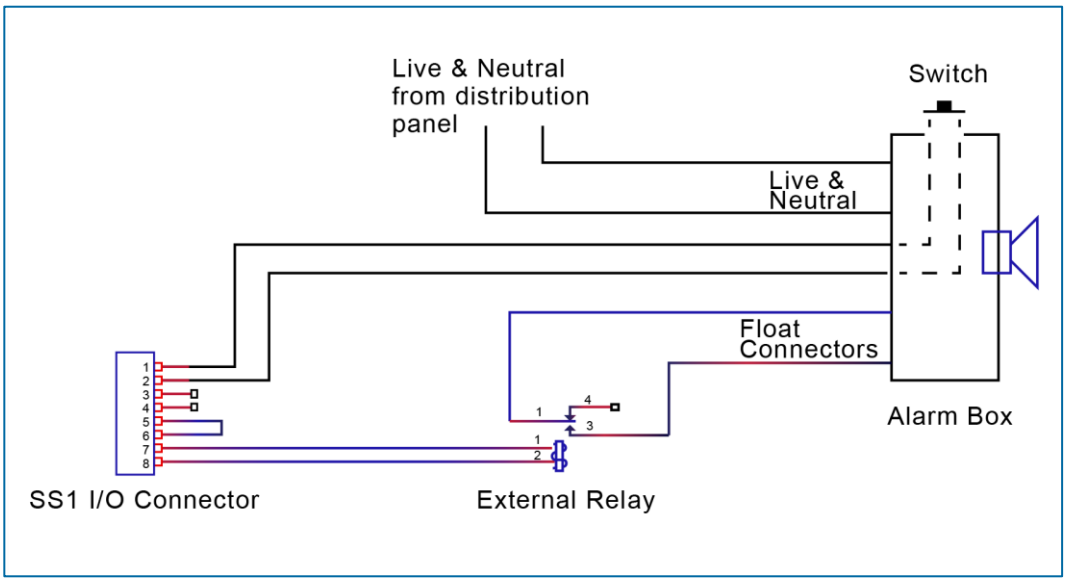
The Alarm Box requires mains/line voltage. Obtain power from the distribution panel and run the wiring through steel conduit. Use 14-gauge gas and oil resistant cable.

The Alarm Box requires an external relay. This relay is not s supplied with the Alarm Kit – obtain a relay with the specifications given in the table below.

External Alarm Relay Specifications (NOT Supplied)	
Coil Rating	12 VDC @ less than 100 mA
Contact Rating	115 or 230 VAC @ greater than 500 mA

Installation

1. Install the relay in an external 4” x 4” electrical box or other suitable enclosure.
2. Run rigid conduit from the SiteSentinel iTouch Controller to the relay enclosure.
3. Run the same kind of conduit from the relay enclosure to the Alarm Box.



The Alarm Box will sound its horn and illuminate its light when the contacts close in the SiteSentinel iTouch Controller.

Press the SILENCE button on the Alarm Box to silence the horn. The Alarm Box light, however, remains illuminated for as log as the contacts in SiteSentinel iTouch Controller are closed or the switch is pressed.

Attach a switch across position 1 and 2 (see the illustration above) to energize or de-energize an external relay.

Alarm Kit Connections

From	To
Switch	Controller I/O connector PINS 1 and 2
Relay Coil	Controller I/O connector PINS 7 and 8
Relay NORMALLY OPEN contacts	Alarm Box **FLOAT** connectors
Live and neutral AC from distribution panel	Alarm Box **AC1** and **AC2** connectors

Appendix C – POS Interface

This Appendix covers the physical connection between the SiteSentine1 and the Tokheim Fuel POS system.

SiteSentinel iTouch POS Port

If you order the SiteSentinel iSite with the POS option, a cable (part number 20-1586) will be included.

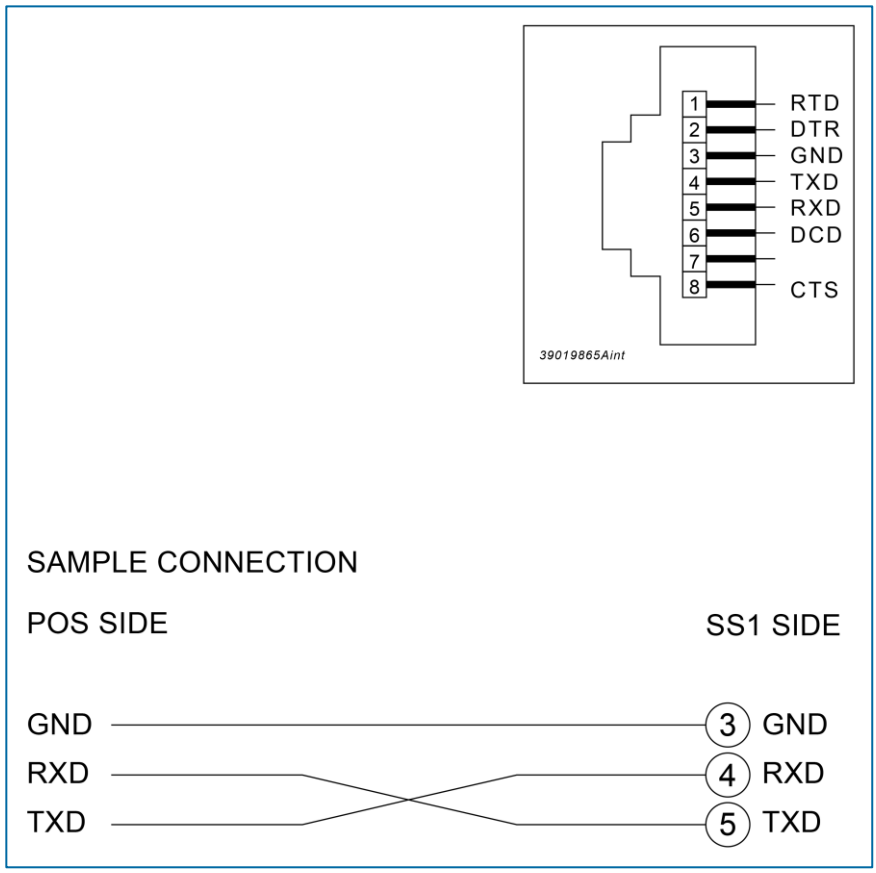
Use SiteConnect (from main menu: **Configuration > SiteSentinel iTouch Port Parameters**) to program the following:

- Data Bits: **8**
- Parity: **NONE**
- Stop Bits: **1**
- Port: **POS**
- Connect Speed: **1200**

Click **OK** when done to save the settings.

Prepare and Attach the Cable

The illustration below shows how to prepare a cable to connect the Enraf to the SiteSentinel iTouch POS port.



Appendix D – Upgrading SiteSentinel iTouch Software Via SiteConnect

The following steps describe the procedure to upgrade Controller's software using the Hardware Flash Update Feature:

1. Connect PC to the Controller (Port C, the 3rd from the top).
2. Launch the SiteConnect application.

> **NOTE**: You must be running SiteConnect version 2.8.10 or higher.

3. Click the **(New Profile)** icon to make a new site profile.
4. Enter "1-2" in the **Site Telephone #** field and click **OK**
5. Give it a **Profile File Name** (in the format xxxxx.pro) and click **OK**.
6. Click the **(Direct Connect)** icon to connect to the Controller
7. Select a **Port** and a **Connect Speed** and click OK.
8. Acknowledge all the dialog boxes that follow.
9. Choose **Controller > Retrieve SiteSentinel iTouch Configuration.**
10. Click **Proceed**
11. Acknowledge all the dialog boxes that follow.
12. Select **File > Save** to save the profile.
13. Select **Configuration > SiteSentinel iTouch Port Parameters**
14. Change the **POS** port to a CAP/Modem port.
15. Change the CAP/Modem speed to 19,200 and then click **OK**.
16. Acknowledge all the dialog boxes that follow
17. Select **Tools > Hardware Flash Update**.
18. Select the new **SS1.bin** file to be downloaded to the Controller and then click **OK**
19. Click **OK** to the **Send Flash Update to SiteSentinel iTouch Controller?** prompt.
20. Click **OK** to the **SiteSentinel iTouch Ready to Receive the Update** prompt.
21. Wait until the download is complete (about 15 minutes).
22. Acknowledge all the dialog boxes that follow.
23. Connect by selecting the **(Direct Connect)** icon and leave 19,200 for the communication speed.
24. Click **OK**.
25. Acknowledge all the dialog boxes that follow.
26. Select **Configuration > SiteSentinel iTouch Port Parameters**
27. Change the POS Port to the CAP/Modem Port
28. Change the CAP/Modem speed to the original 9600 baud connection speed and click **OK.**
29. Acknowledge all the dialog boxes that follow.
30. Select **Tools > Remote Cold Start.**
31. Acknowledge all dialog boxes.
32. Select **File**, then open the profile you saved earlier.

33. Click the **(Direct Connect)** icon to connect to the Controller
34. Select the appropriate communication parameters and click **OK**.
35. Acknowledge all dialog boxes
36. Select **Controller > Restore**.
37. Disconnect from SiteConnect.

The download is now complete. Verify that the system is functioning properly.

Appendix E – OM4 Output Module Option

The **OM4** Output Module expands the tank-gauge console functions by allowing up to 2 (two) OM4 units each with 4 (four) relay positions for a total of 8 relays. The **OM4** communicates with the controller via Petro-Net™ and is powered by a 12 VAC wall pack source that is supplied with the unit. See the wiring instructions inside the **OM4** unit for the correct Petro-Net™ communications and power wiring connections.

> **NOTE**: See the tank-gauge console Configuration Manual for information on programming the alarms, events and Output Module relay associations.

Some common **OM4** functions include:

- Turn off a submersible pump when low product is sensed in a tank.
- Activate an alarm when high product is sensed in a tank.

Safety Precautions

DO NOT connect the **OM4** Output Module directly to a submersible pump! The **OM4** controls pumps INDIRECTLY, through relays or contactors.

High voltages exist inside the **OM4**. Only qualified technicians should open the unit.

Output relays in the **OM4** are not intrinsically safe! Before working on the **OM4** Output Module, disconnect all power, including power to and from the relays.

DO NOT place probe and/or sensor wiring in conduit that contains wiring for devices that are connected to the **OM4** Output Module.

Codes

Relay wiring is classified as Class 1 wiring. Installations must be in accordance with the National Electrical Code (NFPA No. 70) and the Automotive and Marine Service Station Code (NFPA No. 30A). It is the installer's responsibility to investigate and obey any applicable local codes in the country\county of installation.

Hazardous Area Definition

A fuel dispenser is a hazardous area as defined in the National Electrical Code. Do not mount the **OM4** Output Module within a hazardous area. Do not attach this unit to any devices that are located in the hazardous area.

OM4 Specifications	
Field Wiring Rating:	105C, 600V Type RH. TW, RFH-2 or equivalent
Power Requirements:	12 VAC, 0.5A Max.
Dimensions (W x H x D):	6” x 6” x 4” (15 cm x 15 cm x 10 cm)
Temperature Rating:	32°F – 104°F (0°C – 40°C)
Relay Output Rating:	5A @ 240 VAC; 5A @ 24 VDC

Product Certifications

- Electronic Testing Labs Canada (cETL)
- Electronic Testing Labs (ETL)

Installing the OM4

1. Choose a location for the first OM4 Output Module within the six-foot reach of the supplied DIN cable (OPW Fuel Management Systems part number 20-1582).

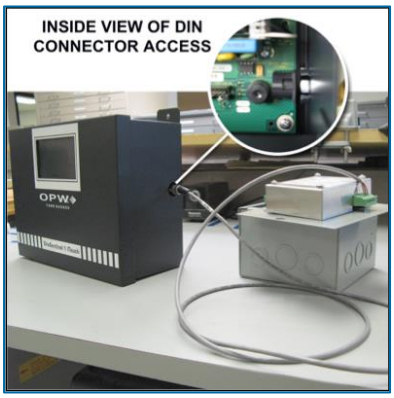
NOTE: If installing a second OM4 Output Module, place it within four feet of the first. Longer distances may cause improper operation. Allow room at the bottom of the module(s) for conduit.

2. Remove the cover/module assembly from each OM4 box.
3. Mount each box to a wall using the box’s four mounting holes.

NOTE: If installing two (2) OM4 Output Module boxes, run dedicated steel conduit between them for the additional power and communication wiring.

NOTE: Run steel conduit for the relays to a knock-out on the bottom of EACH box. When installing two OM4 Output Module boxes, DO NOT route the relay wiring through box to the other! Doing so may cause improper operation Pull all relay wiring through the conduit(s).

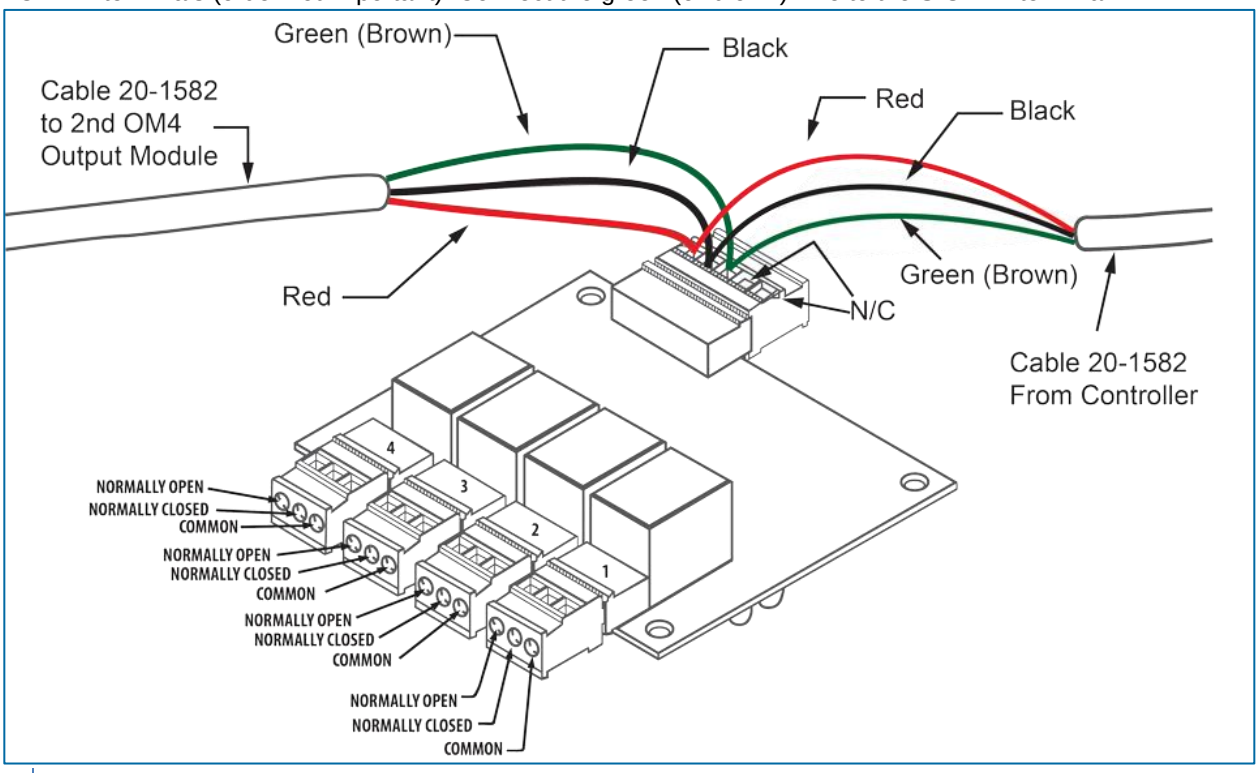
4. See the figure at top-right. Remove the metal plug from the right side of the Controller to expose the DIN connector inside.
5. See the figure at bottom-right. Attach the DIN connector on the 20-1582 cable to the controller
6. Route the other end of the 20-1582 cable through the supplied bushing/strain relief.
7. Insert the bushing into a knockout hole in the first OM4 Output Module box. Secure the busing to the box.



NOTE: The field wiring terminal locks are removable to ease installation.

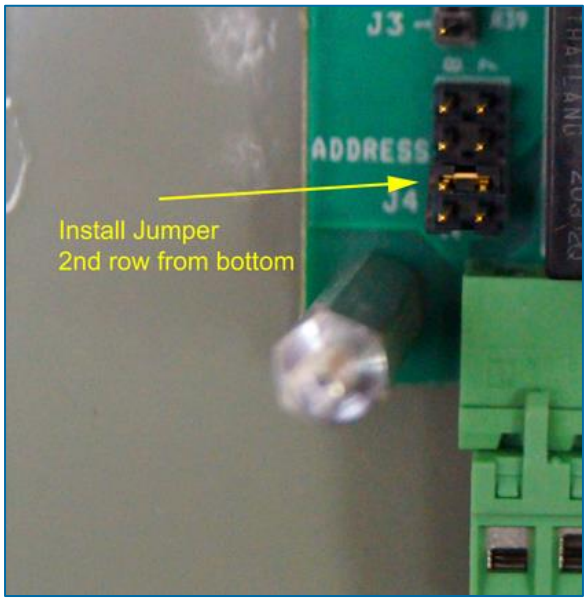
OM4 Output Module Wiring

As shown below, connect the red and black wires from the 20-1582 cable to the first OM4 Output Module's POWER terminals (order not important). Connect the green (or brown) wire to the SIGNAL terminal.



NOTE: When installing two (2) OM4 Output Module boxes, cut off the round DIN end of the remaining 20-1582 cable and use it to daisy-chain the POWER and SIGNAL terminals together. Route this cable through the conduit connecting the boxes installed earlier.

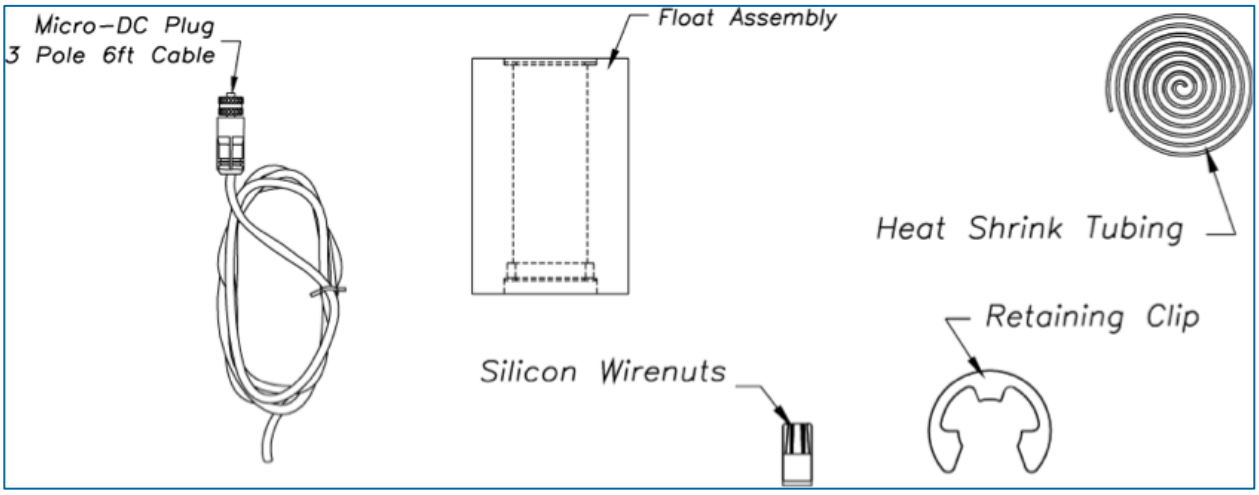
1. Connect all relay field wiring to the correct terminal block(s).
2. When installing two OM4 Output Module boxes, place the address jumper on the second OM4 on the second row of pins as shown at right. To do this, take off the four nuts securing the aluminum cover and remove it, exposing the circuit board. Set the jumper and replace the cover.
3. Reinstall each cover/module assembly to their boxes.



Appendix F – LPG Probe Option

This appendix tells you how to install the optional 30-1510, 30-1511 and 30-1512 kits for LPG probes 30-B-xxx and Q400-xxx.

30.1510 Probe Kit Contents



One (1)– Micro-DC plug pole 6-foot Cable

One (1) – Heat-shrink tubing

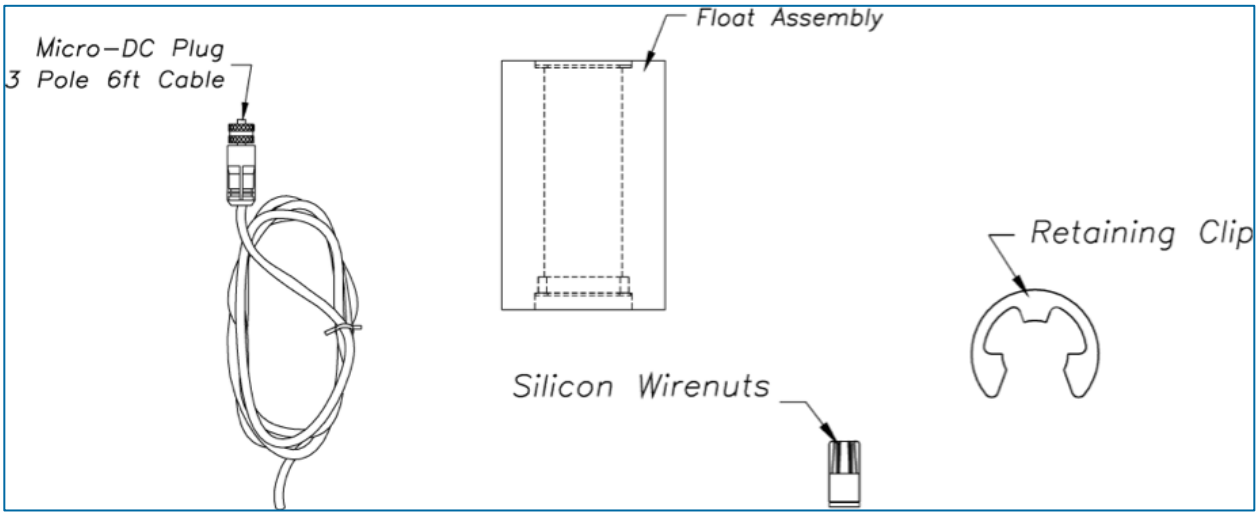
One (1) – Retaining clip

Three (3) – Silicon wire nuts

One (1) – Float

30-1511 Probe Kit Contents

This kit is used with the Q0400-xxx, 1500, 2000, and Galaxy.



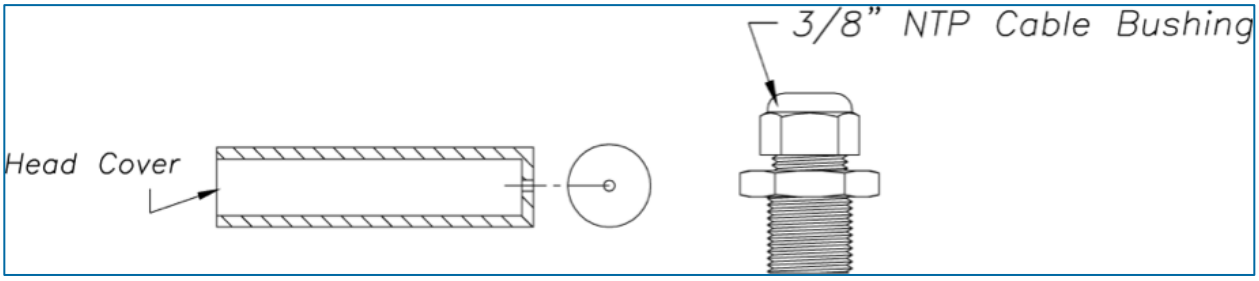
One (1) – Micro-DC Plug Pole 6-foot Cable

One (1) – Retaining Clip

Three (3) – Silicon Wire nuts

One (1) – Float

Head Cover Kit Contents

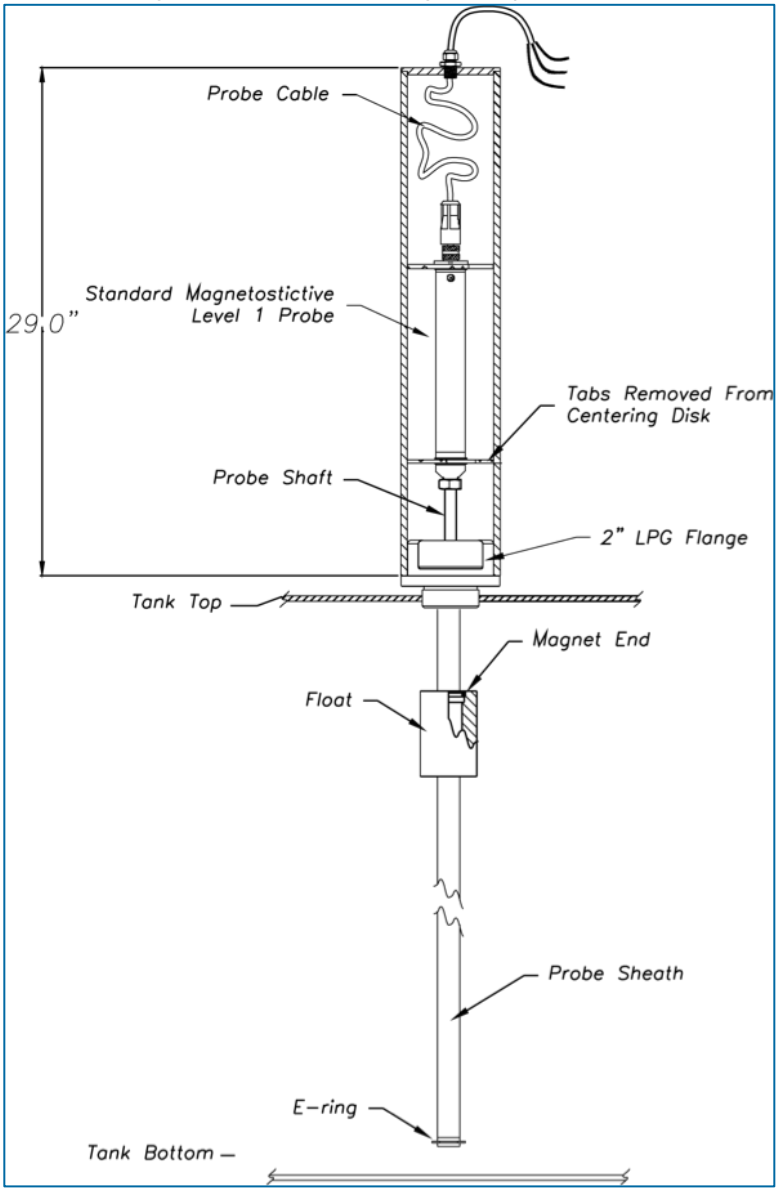


One (1) – 3/8 NTP Cable Busing

One (1) – Head Cover

Installing the LPG Probe

Refer to the figure below while working on he probes. Unless noted, instructions apply to both types of probes.



1. Slide the float onto the bottom of the probe fixture with the magnet pointing up.
2. Place the retaining c-clip ring into the slot on the bottom of the probe fixture shaft.
3. With another person assisting you, carefully raise the probe fixture assembly and insert it into the treaded opening of the tank.

NOTICE

To avoid damage, use care when the float is near the threaded tank opening!

Complete steps 4 and 5 by following local regulations and tank manufacturer recommendations.

4. Apply a sealant (not included) approved for LPG use to the threads of the flange.
5. Firmly tighten the flange to the LPG tank for a proper seal.

The following 3 steps are for 30-B-xxx probe ONLY

- Carefully slide the supplied shrink tubing over the probe outer shaft. Make sure it covers the entire probe shaft.
- Cut the tubing, leaving an extra 2.5 cm (1 in) at the bottom of the probe.
- Carefully heat the shrink tubing using a heat gun or similar approved device until the tubing seals around the probe. Be careful to not over-heat the tubing or it will split.

> **NOTE**: When shrinking the tubing at the bottom of the probe carefully bond the tubing towards the bottom of the probe to ensure that the bottom of the probe is covered.

The following step applies only to the Q0400-xxx probe

> **NOTE**: This probe does not need the shrink tubing.

6. Go to the next step. Remove the protective cap from the open end of the probe fixture assembly.
7. Gently insert the probe into the probe fixture opening. For SiteSentinel probes, make sure the shrink tubing is not damaged during this process.
8. Be sure the probe is completely seated in the bottom of the probe fixture.
9. Make all electrical connections using instructions supplied with the probe. Inspect the head cover assembly BEFORE you complete the electrical connections.

The remaining steps apply to the probe head cover ONLY

The probe head must be covered. Purchase a cover from OPW, order part number 30-1512. You can cut the cover for clearance, but make sure you leave room for connections and cable.

1. Insert the cable through the bushing.
2. Insert the connector end of the probe cable into the threaded hole on the top of the head cover.
3. Thread the bushing into the hole on the top of the head cover.
4. Tighten the bushing with the lower molded nut (not the top compression nut).

Do not over-tighten the nut! It isn't necessary for the bushing to be flush with the top of the head cover.

5. Pull just enough cable through the bushing so that the cable extends from the bottom of the head assembly.
6. Tighten the compression nut to seal the fitting to the cable.

This completes the LPG probe installation.

Appendix G – Probe Comparison

Model 924 and 924B Magnetostrictive Probe Probe Comparison

Starting in October 2006, OPW Fuel Management Systems began switching from the Model 924 magnetostrictive probe to Model 924B probe. While taking on a new physical appearance, the Model 924B probe is fully backward compatible with all SiteSentinel family ATG consoles, as illustrated below:

- Compatible with all current SiteSentinel family ATG controllers.
- Same installation procedures, including wiring, I.S. barrier, floats and cable.
- Same configuration procedures
- Capable of EPA 0.1 GPH (0.36 liter per hour) and 0.2 GPH (0.76 liter per hour) leak detection
- Both certified to UL/US/Canada, ATEX and additionally on the model 924B IECEX

While fully backward compatible with the Model 924, the 924B is engineered with the following improvements:

- Available EPA 0.1 GPH (0.38 liter per hour) leak detection now third-party certified with 2 in (5 cm) diameter floats
- All stainless-steel construction (stainless probe head and probe shaft)
- Conformal-coated circuit board with 100% Surface Mount Components
- Smaller overall head diameter [0.2 in (3 cm) diameter] and shorter probe head [8 in (20 cm) long]

Ordering the New Probe

As for order entry, the same probe length calculation is kept while changing the model/part number from 30-EAxxx to 30-Bxxx. For example, if ordering a probe for a 4 ft (122 cm) diameter tank, instead of part number 30-EA053 for a 924 probe, you should now order 30-B053. Other probe sizes, and their part number correlation, are shown in the table below:

924 (Current)	Equivalent 924B (New)	Descriptions
30-EA053	30-B053	Probe for 4 ft (122 cm) Diameter/Height Tank
30-EA069	30-B069	Probe for 5 ft (152 cm) Diameter/Height Double Wall Tank
30-EA077	30-B077	Probe for 6 ft (183 cm) Diameter/Height Tank
30-EA089	30-B089	Probe for 7 ft (213 cm) Diameter/Height Tank
30-EA101	30-B101	Probe for 8 ft (244 cm) Diameter/Height Tank
30-EA105	30-B105	Probe for 8 ft (244 cm) Diameter/Height Double Wall tank
30-EA113	30-B113	Probe for 9 ft (274 cm) Diameter/Height Tank
30-EA125	30-B125	Probe for 10 ft (305 cm) Diameter/Height Tank
30-EA137	30-B137	Probe for 11 ft (336 cm) Diameter/Height Tank
30-EA149	30-B149	Probe for 12 ft (366 cm) Diameter/Height Tank

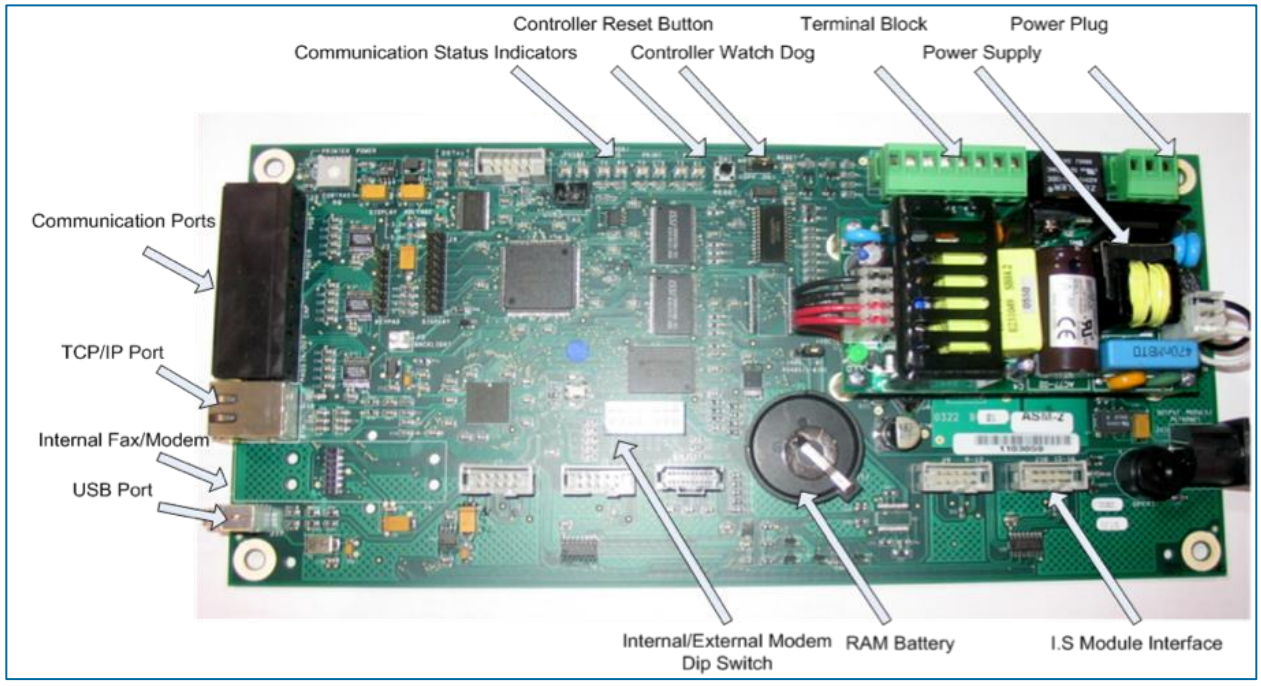
Appendix H – Hardware for SiteSentinel iTouch Controller Main Board

OPW Fuel Management Systems has released a new SiteSentinel iTouch Controller Mai Board (0322 Board). The board is found in Series 2 SiteSentinel Model 1 ATG Consoles.

Hardware Overview

The **SiteSentinel iTouch Controller Main Board (0322)** performs the same functions as the previous SiteSentinel iTouch 0320 board, although it has several hardware differences and can support some enhanced software features when used with the latest release of SiteConnect PC software.

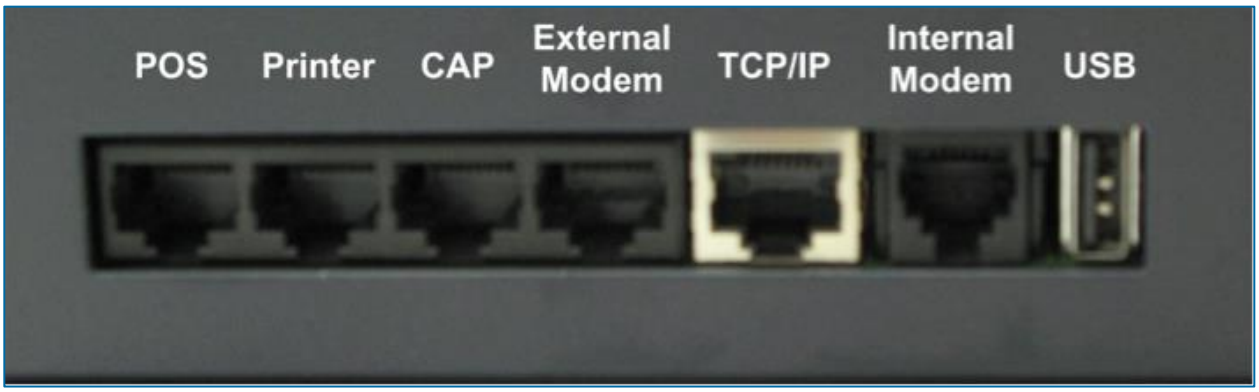
The SiteSentinel iTouch board (0322) is shown in the photo below:



Below is a comparison chart of the old (0320) and newer (0322) SiteSentinel iTouch Main Board:

Items	SS1 0320 Board	New SS1 0322 Board
Display	Current	No Change
Keypad	Current	No Change
Enclosure & Door	Current	No Change
I.S. Barrier	Current	No Change
Probe	924 A & B	924 A & B
Output Relay Module	OM4 Module	No Change
Terminal Block Wiring	Current	No Change
Power Plug Wiring	Current	No Change
Option (ESN) Chips	Current	No Change
Communication Ports		
POS	Current	No Change
Printer	Current	No Change
CAP	Current	No change
External Modem	Current	No Change
TCP/IP	External	Built-in native support
Internal Modem	Current	New (Fax/Modem)
USB	N/A	Available soon
Power Supply	Built-in	Separate
Boot Strap Code	None	New pre-programmed
Boot Loader	On removable chip	New
SS1 Application	On removable chip	New
Site Connect Version	3.0 or above	7.x or above
RAM Battery	2032	3032

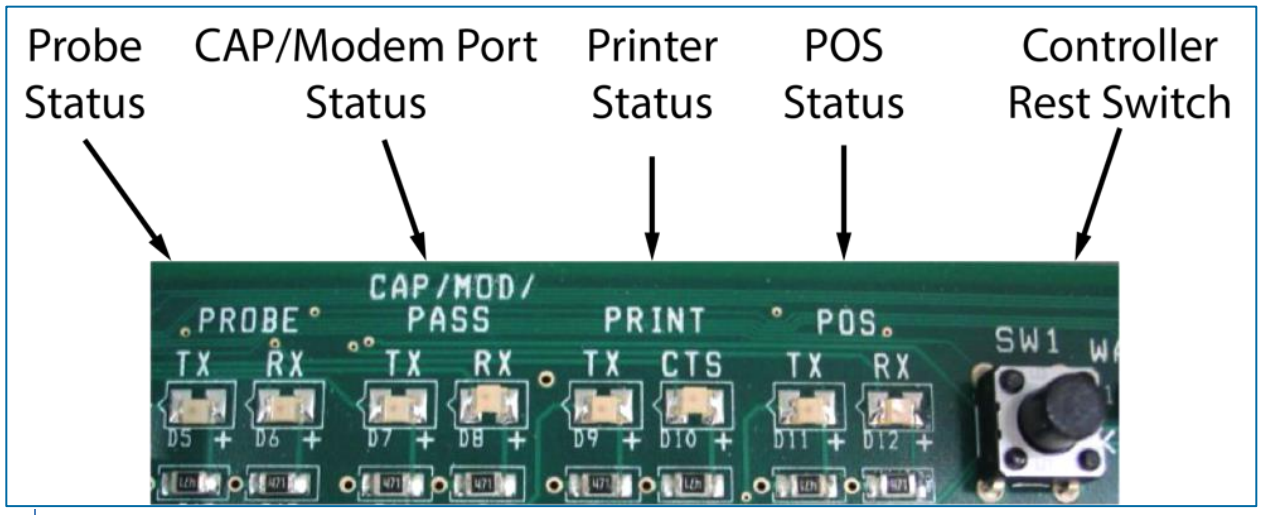
Communication Ports



Power Supply

The power supply board is separate.

Status Indicators



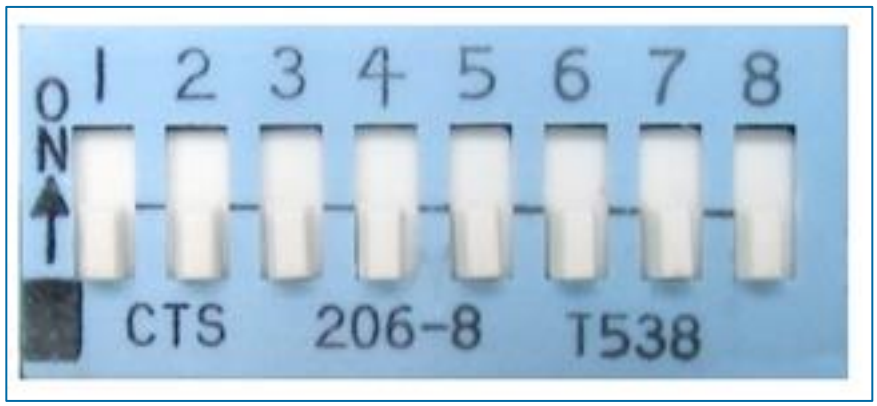
NOTE: Flashing LEDs indicate certain current activities of a specific device, which follows:

RX: Receiving data

TX: Sending data

CTS: Clear to send

Dip-Switch



NOTE: DIP-Switch 1 is used for internal selection ONLY. Use the “On” position to select external modem; the “Off” is for internal modem. Once the dip-switch is changed, the SiteSentinel iTouch controller needs to be restarted. Dip-switch 3 is to select display type. Use “ON” for touch screen and “OFF” for keypad.

Appendix J – EPA Certifications

Results of U.S. EPA Standard Evaluation
Automatic Tank Gauging System (ATGS)

This form tells whether the automatic tank gauging system (ATGS) described below complies with the performance requirements of the federal underground storage tank regulation. The evaluation was conducted by the equipment manufacturer or a consultant to the manufacturer according to the U.S. EPA's "Standard Test Procedure for Evaluating Leak Detection Methods: Automatic Tank Gauging Systems." The full evaluation report also includes a form describing the method and a form summarizing the test data. Tank owners using this leak detection system should keep this form on file to provide compliance with the federal regulations. Tank owners should check with State and local agencies to make sure this form satisfies their requirements.

ATGS Description

Name Site Sentinel 1, Site Sentinel II, Site Sentinel III

Version number Probe Model 924 with 2-inch Floats, 30-Minute Test

Vendor Petro Vend, Inc.

6900 Santa Fe Drive
(street address)

Hodgkins,	IL	60525	(708) 485-4200
(city)	(state)	(zip)	(phone)

Evaluation Results

This ATGS which declares tank to be leaking when the measured leak rate exceeds the threshold of 0.100 gallon per hour, has a probability of false alarms [P_{FA}] of 2.2 %.

The corresponding probability of detection [P_D] of a 0.20 gallon per hour leak is 97.8 %.

The minimum water level (threshold) in the tank that the ATGS can detect is 0.75 inch.

The minimum change in water level that can be detected by the ATGS is 0.080 inches (provided that the water level is above the threshold).

Therefore, this ATGS (**X**) does ( ) does not meet the **federal** performance standards established by the U.S. Environmental Protection Agency (0.20 gallon per hour at P_D of 95% and P_{FA} of 5%), and this ATGS (**X**) does ( ) does not meet the **federal** performance standard of measuring water in the bottom of the tank to the nearest 1/8 inch.

Test Conditions During Evaluation

The evaluation testing was conducted in a 13,700 gallon ( ) steel (X) fiberglass tank that was 120 inches in diameter and 323 inches in length.

The temperature difference between product added to fill the tank and product already in the tank ranged from -6.3 deg F to +7.5 deg F, with a standard deviation of ± 5.8 deg F.

The tests were conducted with the tank product levels 50 to 95 % full.

The product used in the evaluation was Diesel.

ATGS - Results Form

Page 1 of 2

Name of ATGS Site Sentinel 1, Site Sentinel II, Site Sentinel III
Version Probe Model 924 with 2-inch Floats, 30-Minute Test

COPY

Limitations on the Results

The performance estimates above are only valid when:

- The method has not been substantially changed.
- The vendor's instructions for installing and operating the ATGS are followed.
- The tank contains a product identified on the method description form.
- The tank is no larger than 20,000 gallons.
- The depth of the product in the tank is at least 14 percent full.[1]
- The waiting time after adding any substantial amount of product to the tank is 8 hours.
- The temperature of the added product does not differ more than ± 8.7 degrees Fahrenheit from that already in the tank.
- The total data collection time for the test is at least 30 minutes.
- Other limitations specified by the vendor of determined during testing:

None

> **Safety disclaimer: This test procedure only addresses the issue of the ATG system's ability to detect leaks. It does not test the equipment for safety hazards.**

Certification of Results

I certify that the ATGS was installed and operated according to the vendor's instructions and that the results presented on this form are those obtained during the evaluation. I also certify that the evaluation was performed according to one of the following:

(X) standard EPA test procedure for ATGS
( ) alternative EPA test procedure for ATGS

H. Kendall Wilcox, President
(printed name)

Ken Wilcox Associates, Inc.
(organization performing evaluation)

H. Kendall Wilcox
(signature)

Grain Valley, Missouri 64029
(city, state, zip)

November 6, 2000
(date)

(816) 443-2494
(phone number)

[1] The lowest temperature sensor on the Petro Vend probe is located 10% from the bottom of the probe. The procedures for determining the minimum product level limitation are specified in a letter from the ATGS and VTTT Committees of the NWGLDE to Gauge Vendors and other interested parties, April 28, 1997.

Results of U.S. EPA Standard Evaluation
Automatic Tank Gauging System (ATGS)

This form tells whether the automatic tank gauging system (ATGS) described below complies with the performance requirements of the federal underground storage tank regulation. The evaluation was conducted by the equipment manufacturer or a consultant to the manufacturer according to the U.S. EPA's "Standard Test Procedure for Evaluating Leak Detection Methods: Automatic Tank Gauging Systems." The full evaluation report also includes a form describing the method and a form summarizing the test data. Tank owners using this leak detection system should keep this form on file to provide compliance with the federal regulations. Tank owners should check with State and local agencies to make sure this form satisfies their requirements.

ATGS Description

Name Site Sentinel 1, Site Sentinel II, Site Sentinel III

Version number Probe Model 924 with 2-inch Floats, 1-Hour Test

Vendor Petro Vend, Inc.

6900 Santa Fe Drive
(street address)

Hodgkins,	IL	60525	(708) 485-4200
(city)	(state)	(zip)	(phone)

Evaluation Results

This ATGS which declares tank to be leaking when the measured leak rate exceeds the threshold of 0.100 gallon per hour, has a probability of false alarms [P_{FA}] of 0.6 %.

The corresponding probability of detection [P_D] of a 0.20 gallon per hour leak is 99.4 %.

The minimum water level (threshold) in the tank that the ATGS can detect is 0.75 inch.

The minimum change in water level that can be detected by the ATGS is 0.080 inches (provided that the water level is above the threshold).

Therefore, this ATGS (**X**) does ( ) does not meet the **federal** performance standards established by the U.S. Environmental Protection Agency (0.20 gallon per hour at P_D of 95% and P_{FA} of 5%), and this ATGS (**X**) does ( ) does not meet the **federal** performance standard of measuring water in the bottom of the tank to the nearest 1/8 inch.

Test Conditions During Evaluation

The evaluation testing was conducted in a 13,700 gallon ( ) steel (X) fiberglass tank that was 120 inches in diameter and 323 inches in length.

The temperature difference between product added to fill the tank and product already in the tank ranged from -6.3 deg F to +7.5 deg F, with a standard deviation of ± 5.8 deg F.

The tests were conducted with the tank product levels 50 to 95 % full.

The product used in the evaluation was Diesel .

Name of ATGS Site Sentinel 1, Site Sentinel II, Site Sentinel III
Version Probe Model 924 with 2-inch Floats, 1-Hour Test

Limitations on the Results

The performance estimates above are only valid when:

- The method has not been substantially changed.
- The vendor's instructions for installing and operating the ATGS are followed.
- The tank contains a product identified on the method description form.
- The tank is no larger than 20,000 gallons.
- The depth of the product in the tank is at least 50 percent full.
- The waiting time after adding any substantial amount of product to the tank is 8 hours.
- The temperature of the added product does not differ more than ± 8.7 degrees Fahrenheit from that already in the tank.
- The total data collection time for the test is at least 1 hour.
- Other limitations specified by the vendor of determined during testing:

None

> **Safety disclaimer: This test procedure only addresses the issue of the ATG system's ability to detect leaks. It does not test the equipment for safety hazards.**

Certification of Results

I certify that the ATGS was installed and operated according to the vendor's instructions and that the results presented on this form are those obtained during the evaluation. I also certify that the evaluation was performed according to one of the following:

(X) standard EPA test procedure for ATGS
( ) alternative EPA test procedure for ATGS

H. Kendall Wilcox, President (printed name)	Ken Wilcox Associates, Inc. (organization performing evaluation)
H. Kendall Wilcox (signature)	Grain Valley, Missouri 64029 (city, state. zip)
November 6, 2000 (date)	(816) 443-2494 (phone number)

Results of U.S. EPA Standard Evaluation
Automatic Tank Gauging System (ATGS)

This form tells whether the automatic tank gauging system (ATGS) described below complies with the performance requirements of the federal underground storage tank regulation. The evaluation was conducted by the equipment manufacturer or a consultant to the manufacturer according to the U.S. EPA's "Standard Test Procedure for Evaluating Leak Detection Methods: Automatic Tank Gauging Systems." The full evaluation report also includes a form describing the method and a form summarizing the test data. Tank owners using this leak detection system should keep this form on file to provide compliance with the federal regulations. Tank owners should check with State and local agencies to make sure this form satisfies their requirements.

ATGS Description

Name Site Sentinel 1, Site Sentinel II, Site Sentinel III

Version number Probe Model 924 with 2-inch Floats, 2-Hour Test

Vendor Petro Vend, Inc.

6900 Santa Fe Drive
(street address)

Hodgkins,	IL	60525	(708) 485-4200
(city)	(state)	(zip)	(phone)

Evaluation Results

This ATGS which declares tank to be leaking when the measured leak rate exceeds the threshold of 0.100 gallon per hour, has a probability of false alarms [P_{FA}] of 0.3 %.

The corresponding probability of detection [P_D] of a 0.20 gallon per hour leak is 99.7 %.

The minimum water level (threshold) in the tank that the ATGS can detect is 0.75 inch.

The minimum change in water level that can be detected by the ATGS is 0.080 inches (provided that the water level is above the threshold).

Therefore, this ATGS (**X**) does ( ) does not meet the **federal** performance standards established by the U.S. Environmental Protection Agency (0.20 gallon per hour at P_D of 95% and P_{FA} of 5%), and this ATGS (**X**) does ( ) does not meet the **federal** performance standard of measuring water in the bottom of the tank to the nearest 1/8 inch.

Test Conditions During Evaluation

The evaluation testing was conducted in a 13,700 gallon ( ) steel (X) fiberglass tank that was 120 inches in diameter and 323 inches in length.

The temperature difference between product added to fill the tank and product already in the tank ranged from -6.3 deg F to +7.5 deg F, with a standard deviation of ± 5.8 deg F.

The tests were conducted with the tank product levels 50 to 95 % full.

The product used in the evaluation was Diesel.

Name of ATGS Site Sentinel 1, Site Sentinel II, Site Sentinel III
Version Probe Model 924 with 2-inch Floats, 2-Hour Test

COPY

Limitations on the Results

The performance estimates above are only valid when:

- The method has not been substantially changed.
- The vendor's instructions for installing and operating the ATGS are followed.
- The tank contains a product identified on the method description form.
- The tank is no larger than 20,000 gallons.
- The depth of the product in the tank is at least 14 percent full.[1]
- The waiting time after adding any substantial amount of product to the tank is 8 hours.
- The temperature of the added product does not differ more than ± 8.7 degrees Fahrenheit from that already in the tank.
- The total data collection time for the test is at least 2 hours.
- Other limitations specified by the vendor of determined during testing:

  None

> **Safety disclaimer: This test procedure only addresses the issue of the ATG system's ability to detect leaks. It does not test the equipment for safety hazards.**

Certification of Results

I certify that the ATGS was installed and operated according to the vendor's instructions and that the results presented on this form are those obtained during the evaluation. I also certify that the evaluation was performed according to one of the following:

(X) standard EPA test procedure for ATGS
( ) alternative EPA test procedure for ATGS

H. Kendall Wilcox, President
(printed name)

Ken Wilcox Associates, Inc.
(organization performing evaluation)

H. Kendall Wilcox
(signature)

Grain Valley, Missouri 64029
(city, state. zip)

November 6, 2000
(date)

(816) 443-2494
(phone number)

[1] The lowest temperature sensor on the Petro Vend probe is located 10% from the bottom of the probe. The procedures for determining the minimum product level limitation are specified in a letter from the ATGS and VTTT Committees of the NWGLDE to Gauge Vendors and other interested parties, April 28, 1997.

Results of U.S. EPA Standard Evaluation
Automatic Tank Gauging System (ATGS)

This form tells whether the automatic tank gauging system (ATGS) described below complies with the performance requirements of the federal underground storage tank regulation. The evaluation was conducted by the equipment manufacturer or a consultant to the manufacturer according to the U.S. EPA's "Standard Test Procedure for Evaluating Leak Detection Methods: Automatic Tank Gauging Systems." The full evaluation report also includes a form describing the method and a form summarizing the test data. Tank owners using this leak detection system should keep this form on file to provide compliance with the federal regulations. Tank owners should check with State and local agencies to make sure this form satisfies their requirements.

ATGS Description

Name Site Sentinel 1, Site Sentinel II, Site Sentinel III

Version number Probe Model 924 with 2-inch Floats, 3-Hour Test

Vendor Petro Vend, Inc.

6900 Santa Fe Drive
(street address)

Hodgkins,	IL	60525	(708) 485-4200
(city)	(state)	(zip)	(phone)

Evaluation Results

This ATGS which declares tank to be leaking when the measured leak rate exceeds the threshold of 0.100 gallon per hour, has a probability of false alarms [P_{FA}] of 0.1 %.

The corresponding probability of detection [P_D] of a 0.20 gallon per hour leak is 99.9 %.

The minimum water level (threshold) in the tank that the ATGS can detect is 0.75 inch.

The minimum change in water level that can be detected by the ATGS is 0.080 inches (provided that the water level is above the threshold).

Therefore, this ATGS (**X**) does ( ) does not meet the **federal** performance standards established by the U.S. Environmental Protection Agency (0.20 gallon per hour at P_D of 95% and P_{FA} of 5%), and this ATGS (**X**) does ( ) does not meet the **federal** performance standard of measuring water in the bottom of the tank to the nearest 1/8 inch.

Test Conditions During Evaluation

The evaluation testing was conducted in a 13,700 gallon ( ) steel (X) fiberglass tank that was 120 inches in diameter and 323 inches in length.

The temperature difference between product added to fill the tank and product already in the tank ranged from -6.3 deg F to +7.5 deg F, with a standard deviation of ± 5.8 deg F.

The tests were conducted with the tank product levels 50 to 95 % full.

The product used in the evaluation was Diesel.

Name of ATGS Site Sentinel 1, Site Sentinel II, Site Sentinel III
Version Probe Model 924 with 2-inch Floats, 3-Hour Test

COPY

Limitations on the Results

The performance estimates above are only valid when:

- The method has not been substantially changed.
- The vendor's instructions for installing and operating the ATGS are followed.
- The tank contains a product identified on the method description form.
- The tank is no larger than 20,000 gallons.
- The depth of the product in the tank is at least 14 percent full.[1]
- The waiting time after adding any substantial amount of product to the tank is 8 hours.
- The temperature of the added product does not differ more than ± 8.7 degrees Fahrenheit from that already in the tank.
- The total data collection time for the test is at least 3 hours.
- Other limitations specified by the vendor of determined during testing:

None

> **Safety disclaimer: This test procedure only addresses the issue of the ATG system's ability to detect leaks. It does not test the equipment for safety hazards.**

Certification of Results

I certify that the ATGS was installed and operated according to the vendor's instructions and that the results presented on this form are those obtained during the evaluation. I also certify that the evaluation was performed according to one of the following:

(X) standard EPA test procedure for ATGS
( ) alternative EPA test procedure for ATGS

H. Kendall Wilcox, President
(printed name)

Ken Wilcox Associates, Inc.
(organization performing evaluation)

H. Kendall Wilcox
(signature)

Grain Valley, Missouri 64029
(city, state, zip)

November 6, 2000
(date)

(816) 443-2494
(phone number)

[1] The lowest temperature sensor on the Petro Vend probe is located 10% from the bottom of the probe. The procedures for determining the minimum product level limitation are specified in a letter from the ATGS and VTTT Committees of the NWGLDE to Gauge Vendors and other interested parties, April 28, 1997.

Results of U.S. EPA Standard Evaluation
Automatic Tank Gauging System (ATGS)

This form tells whether the automatic tank gauging system (ATGS) described below complies with the performance requirements of the federal underground storage tank regulation. The evaluation was conducted by the equipment manufacturer or a consultant to the manufacturer according to the U.S. EPA's "Standard Test Procedure for Evaluating Leak Detection Methods: Automatic Tank Gauging Systems." The full evaluation report also includes a form describing the method and a form summarizing the test data. Tank owners using this leak detection system should keep this form on file to provide compliance with the federal regulations. Tank owners should check with State and local agencies to make sure this form satisfies their requirements.

ATGS Description

Name Site Sentinel 1, Site Sentinel II, Site Sentinel III

Version number Probe Model 924 with 4-inch Floats, 30-Minute Test

Vendor Petro Vend, Inc.

6900 Santa Fe Drive
(street address)

Hodgkins,	IL	60525	(708) 485-4200
(city)	(state)	(zip)	(phone)

Evaluation Results

This ATGS which declares tank to be leaking when the measured leak rate exceeds the threshold of 0.100 gallon per hour, has a probability of false alarms [P_{FA}] of 2.2 %.

The corresponding probability of detection [P_D] of a 0.20 gallon per hour leak is 97.8 %.

The minimum water level (threshold) in the tank that the ATGS can detect is 0.85 inch.

The minimum change in water level that can be detected by the ATGS is 0.0432 inches (provided that the water level is above the threshold).

Therefore, this ATGS (**X**) does ( ) does not meet the **federal** performance standards established by the U.S. Environmental Protection Agency (0.20 gallon per hour at P_D of 95% and P_{FA} of 5%), and this ATGS (**X**) does ( ) does not meet the **federal** performance standard of measuring water in the bottom of the tank to the nearest 1/8 inch.

Test Conditions During Evaluation

The evaluation testing was conducted in a 13,700 gallon ( ) steel (X) fiberglass tank that was 120 inches in diameter and 323 inches in length.

The temperature difference between product added to fill the tank and product already in the tank ranged from -6.3 deg F to +7.5 deg F, with a standard deviation of ± 5.8 deg F.

The tests were conducted with the tank product levels 50 to 95 % full.

The product used in the evaluation was Diesel.

Name of ATGS Site Sentinel 1, Site Sentinel II, Site Sentinel III
Version Probe Model 924 with 4-inch Floats, 30-Minute Test

Limitations on the Results

The performance estimates above are only valid when:

- The method has not been substantially changed.
- The vendor's instructions for installing and operating the ATGS are followed.
- The tank contains a product identified on the method description form.
- The tank is no larger than 20,000 gallons.
- The depth of the product in the tank is at least 14 percent full.[1]
- The waiting time after adding any substantial amount of product to the tank is 8 hours.
- The temperature of the added product does not differ more than ± 8.7 degrees Fahrenheit from that already in the tank.
- The total data collection time for the test is at least 30 minutes.
- Other limitations specified by the vendor of determined during testing:

None

> **Safety disclaimer: This test procedure only addresses the issue of the ATG system's ability to detect leaks. It does not test the equipment for safety hazards.**

Certification of Results

I certify that the ATGS was installed and operated according to the vendor's instructions and that the results presented on this form are those obtained during the evaluation. I also certify that the evaluation was performed according to one of the following:

(X) standard EPA test procedure for ATGS
( ) alternative EPA test procedure for ATGS

H. Kendall Wilcox, President
(printed name)

Ken Wilcox Associates, Inc.
(organization performing evaluation)

H. Kendall Wilcox
(signature)

Grain Valley, Missouri 64029
(city, state. zip)

November 3, 2000
(date)

(816) 443-2494
(phone number)

[1] The lowest temperature sensor on the Petro Vend probe is located 10% from the bottom of the probe. The procedures for determining the minimum product level limitation are specified in a letter from the ATGS and VTTT Committees of the NWGLDE to Gauge Vendors and other interested parties, April 28, 1997.

Results of U.S. EPA Standard Evaluation
Automatic Tank Gauging System (ATGS)

This form tells whether the automatic tank gauging system (ATGS) described below complies with the performance requirements of the federal underground storage tank regulation. The evaluation was conducted by the equipment manufacturer or a consultant to the manufacturer according to the U.S. EPA's "Standard Test Procedure for Evaluating Leak Detection Methods: Automatic Tank Gauging Systems." The full evaluation report also includes a form describing the method and a form summarizing the test data. Tank owners using this leak detection system should keep this form on file to provide compliance with the federal regulations. Tank owners should check with State and local agencies to make sure this form satisfies their requirements.

ATGS Description

Name Site Sentinel 1, Site Sentinel II, Site Sentinel III

Version number Probe Model 924 with 4-inch Floats, 1-Hour Test

Vendor Petro Vend, Inc.

6900 Santa Fe Drive
(street address)

Hodgkins,	IL	60525	(708) 485-4200
(city)	(state)	(zip)	(phone)

COPY

Evaluation Results

This ATGS which declares tank to be leaking when the measured leak rate exceeds the threshold of 0.100 gallon per hour, has a probability of false alarms [P_{FA}] of 1.1 %.

The corresponding probability of detection [P_D] of a 0.20 gallon per hour leak is 98.9 %.

The minimum water level (threshold) in the tank that the ATGS can detect is 0.85 inch.

The minimum change in water level that can be detected by the ATGS is 0.0432 inches (provided that the water level is above the threshold).

Therefore, this ATGS (X) does ( ) does not meet the **federal** performance standards established by the U.S. Environmental Protection Agency (0.20 gallon per hour at P_D of 95% and P_{FA} of 5%), and this ATGS (X) does ( ) does not meet the **federal** performance standard of measuring water in the bottom of the tank to the nearest 1/8 inch.

Test Conditions During Evaluation

The evaluation testing was conducted in a 13,700 gallon ( ) steel (X) fiberglass tank that was 120 inches in diameter and 323 inches in length.

The temperature difference between product added to fill the tank and product already in the tank ranged from -6.3 deg F to +7.5 deg F, with a standard deviation of ± 5.8 deg F.

The tests were conducted with the tank product levels 50 to 95 % full.

The product used in the evaluation was Diesel.

Name of ATGS Site Sentinel 1, Site Sentinel II, Site Sentinel III
Version Probe Model 924 with 4-inch Floats, 1-Hour Test

Limitations on the Results

The performance estimates above are only valid when:

- The method has not been substantially changed.
- The vendor's instructions for installing and operating the ATGS are followed.
- The tank contains a product identified on the method description form.
- The tank is no larger than 20,000 gallons.
- The depth of the product in the tank is at least 14 percent full.[1]
- The waiting time after adding any substantial amount of product to the tank is 8 hours.
- The temperature of the added product does not differ more than ± 8.7 degrees Fahrenheit from that already in the tank.
- The total data collection time for the test is at least 1 hour.
- Other limitations specified by the vendor of determined during testing:

  None

> **Safety disclaimer: This test procedure only addresses the issue of the ATG system's ability to detect leaks. It does not test the equipment for safety hazards.**

Certification of Results

I certify that the ATGS was installed and operated according to the vendor's instructions and that the results presented on this form are those obtained during the evaluation. I also certify that the evaluation was performed according to one of the following:

(X) standard EPA test procedure for ATGS
( ) alternative EPA test procedure for ATGS

H. Kendall Wilcox, President (printed name)	Ken Wilcox Associates, Inc. (organization performing evaluation)
H. Kendall Wilcox (signature)	Grain Valley, Missouri 64029 (city, state. zip)
November 3, 2000 (date)	(816) 443-2494 (phone number)

[1] The lowest temperature sensor on the Petro Vend probe is located 10% from the bottom of the probe. The procedures for determining the minimum product level limitation are specified in a letter from the ATGS and VTTT Committees of the NWGLDE to Gauge Vendors and other interested parties, April 28, 1997.

COPY

Results of U.S. EPA Standard Evaluation
Automatic Tank Gauging System (ATGS)

This form tells whether the automatic tank gauging system (ATGS) described below complies with the performance requirements of the federal underground storage tank regulation. The evaluation was conducted by the equipment manufacturer or a consultant to the manufacturer according to the U.S. EPA's "Standard Test Procedure for Evaluating Leak Detection Methods: Automatic Tank Gauging Systems." The full evaluation report also includes a form describing the method and a form summarizing the test data. Tank owners using this leak detection system should keep this form on file to provide compliance with the federal regulations. Tank owners should check with State and local agencies to make sure this form satisfies their requirements.

ATGS Description

Name Site Sentinel 1, Site Sentinel II, Site Sentinel III

Version number Probe Model 924 with 4-inch Floats, 3-Hour Test

Vendor Petro Vend, Inc.

6900 Santa Fe Drive
(street address)

Hodgkins,	IL	60525	(708) 485-4200
(city)	(state)	(zip)	(phone)

Evaluation Results

This ATGS which declares tank to be leaking when the measured leak rate exceeds the threshold of 0.100 gallon per hour, has a probability of false alarms [P_{FA}] of 0.5 %.

The corresponding probability of detection [P_D] of a 0.20 gallon per hour leak is 99.5 %.

The minimum water level (threshold) in the tank that the ATGS can detect is 0.85 inch.

The minimum change in water level that can be detected by the ATGS is 0.0432 inches (provided that the water level is above the threshold).

Therefore, this ATGS (**X**) does ( ) does not meet the **federal** performance standards established by the U.S. Environmental Protection Agency (0.20 gallon per hour at P_D of 95% and P_{FA} of 5%), and this ATGS (**X**) does ( ) does not meet the **federal** performance standard of measuring water in the bottom of the tank to the nearest 1/8 inch.

Test Conditions During Evaluation

The evaluation testing was conducted in a 13,700 gallon ( ) steel (X) fiberglass tank that was 120 inches in diameter and 323 inches in length.

The temperature difference between product added to fill the tank and product already in the tank ranged from -6.3 deg F to +7.5 deg F, with a standard deviation of ± 5.8 deg F.

The tests were conducted with the tank product levels 50 to 95 % full.

The product used in the evaluation was Diesel.

Name of ATGS Site Sentinel 1, Site Sentinel II, Site Sentinel III
Version Probe Model 924 with 4-inch Floats, 3-Hour Test

Limitations on the Results

The performance estimates above are only valid when:

- The method has not been substantially changed.
- The vendor's instructions for installing and operating the ATGS are followed.
- The tank contains a product identified on the method description form.
- The tank is no larger than 20,000 gallons.
- The depth of the product in the tank is at least 14 percent full.[1]
- The waiting time after adding any substantial amount of product to the tank is 8 hours.
- The temperature of the added product does not differ more than ± 8.7 degrees Fahrenheit from that already in the tank.
- The total data collection time for the test is at least 3 hours.
- Other limitations specified by the vendor of determined during testing:

  None

> **Safety disclaimer: This test procedure only addresses the issue of the ATG system's ability to detect leaks. It does not test the equipment for safety hazards.**

Certification of Results

I certify that the ATGS was installed and operated according to the vendor's instructions and that the results presented on this form are those obtained during the evaluation. I also certify that the evaluation was performed according to one of the following:

(X) standard EPA test procedure for ATGS
( ) alternative EPA test procedure for ATGS

H. Kendall Wilcox, President
(printed name)

Ken Wilcox Associates, Inc.
(organization performing evaluation)

H. Kendall Wilcox
(signature)

Grain Valley, Missouri 64029
(city, state, zip)

November 3, 2000
(date)

(816) 443-2494
(phone number)

[1] The lowest temperature sensor on the Petro Vend probe is located 10% from the bottom of the probe. The procedures for determining the minimum product level limitation are specified in a letter from the ATGS and VTTT Committees of the NWGLDE to Gauge Vendors and other interested parties, April 28, 1997.

Results of U.S. EPA Standard Evaluation
Volumetric Tank Tightness Testing Method

This form tells whether the tank tightness testing method described below complies with the performance requirements of the federal underground storage tank regulation. The evaluation was conducted by the equipment manufacturer or a consultant to the manufacturer according to the U.S. EPA's "Standard Test Procedure for Evaluating Leak Detection Methods: Volumetric Tank Tightness Testing Methods." The full evaluation report also includes a form describing the method and a form summarizing the test data.

Tank owners using this leak detection system should keep this form on file to provide compliance with the federal regulations. Tank owners should check with State and local agencies to make sure this form satisfies their requirements.

Method Description

Name Site Sentinel 1, Site Sentinel II, Site Sentinel III

Version Probe Model 924 with 4-inch Floats, 2-Hour Test

Vendor Petro Vend, Inc.

6900 Santa Fe Drive
(street address)

Hodgkins,	IL	60525	(708) 485-4200
(city)	(state)	(zip)	(phone)

Evaluation Results

This Method which declares tank to be leaking when the measured leak rate exceeds the threshold of 0.053 gallon per hour, has a probability of false alarms [P_{FA}] of 1.9 %.

The corresponding probability of detection [P_D] of a 0.10 gallon per hour leak is 96.9 %.

Therefore, this Method **(X)** does ( ) does not meet the **federal** performance standards established by the U.S. Environmental Protection Agency (0.10 gallon per hour at P_D of 95% and P_{FA} of 5%).

Test Conditions During Evaluation

The evaluation testing was conducted in a 13,700 gallon ( ) steel (X) fiberglass tank that was 120 inches in diameter and 323 inches in length.

The tests were conducted with the tank 90 to 95 percent full.

The temperature difference between product added to fill the tank and product already in the tank ranged from -5.8 deg F to +7.9 deg F, with a standard deviation of ± 5.2 deg F.

The product used in the evaluation was diesel .

Volumetric TTT Method Site Sentinel 1, Site Sentinel II, Site Sentinel III
Version Probe Model 924 with 4-inch Floats, 2-Hour Test

COPY

Limitations on the Results

The performance estimates above are only valid when:

- The method has not been substantially changed.
- The vendor's instructions for using the method are followed.
- The tank is no larger than 20,000 gallons.
- The tank contains a product identified on the method description form.
- The tank is at least 90 percent full.
- The waiting time after adding any substantial amount of product to the tank is at least 12 hours.
- The temperature of the added product does not differ more than ± 7.9 degrees Fahrenheit from that already in the tank.
- The waiting time between the end of topping off, if any, and the start of the test data collection is at least N/A hours.
- The total data collection time for the test is at least 2 hours.
- Large vapor pockets are identified and removed (for methods that overfill the tank).
- This method (X) can ( ) cannot be used if the ground-water level is above the bottom of the tank.
- Other limitations specified by the vendor of determined during testing:

  None

> **Safety disclaimer: This test procedure only addresses the issue of the methods ability to detect leaks. It does not test the equipment for safety hazards.**

Certification of Results

I certify that the volumetric tank tightness testing method was operated according to the vendor's instructions. I also certify that the evaluation was performed according to the standard EPA test procedure for volumetric tank tightness testing methods and that the results presented above are those obtained during the evaluation.

H. Kendall Wilcox, President
(printed name)

H. Kendall Wilcox
(signature)

October 12, 2000
(date)

Ken Wilcox Associates, Inc.
(organization performing evaluation)

Grain Valley, Missouri 64029
(city, state. zip)

(816) 443-2494
(phone number)

Results of U.S. EPA Standard Evaluation
Volumetric Tank Tightness Testing Method

This form tells whether the tank tightness testing method described below complies with the performance requirements of the federal underground storage tank regulation. The evaluation was conducted by the equipment manufacturer or a consultant to the manufacturer according to the U.S. EPA's "Standard Test Procedure for Evaluating Leak Detection Methods: Volumetric Tank Tightness Testing Methods." The full evaluation report also includes a form describing the method and a form summarizing the test data.

Tank owners using this leak detection system should keep this form on file to provide compliance with the federal regulations. Tank owners should check with State and local agencies to make sure this form satisfies their requirements.

Method Description

Name Site Sentinel 1, Site Sentinel II, Site Sentinel III

Version Probe Model 924 with 4-inch Floats, 3-Hour Test

Vendor Petro Vend, Inc.

6900 Santa Fe Drive
(street address)

Hodgkins,	IL	60525	(708) 485-4200
(city)	(state)	(zip)	(phone)

Evaluation Results

This Method which declares tank to be leaking when the measured leak rate exceeds the threshold of 0.05 gallon per hour, has a probability of false alarms [P_{FA}] of 1.0 %.

The corresponding probability of detection [P_D] of a 0.10 gallon per hour leak is 98.2 %.

Therefore, this Method (**X**) does ( ) does not meet the **federal** performance standards established by the U.S. Environmental Protection Agency (0.10 gallon per hour at P_D of 95% and P_{FA} of 5%).

Test Conditions During Evaluation

The evaluation testing was conducted in a 13,700 gallon ( ) steel (X) fiberglass tank that was 120 inches in diameter and 323 inches in length.

The tests were conducted with the tank 90 to 95 percent full.

The temperature difference between product added to fill the tank and product already in the tank ranged from -5.8 deg F to +7.9 deg F, with a standard deviation of ± 5.2 deg F.

The product used in the evaluation was diesel .

Volumetric TTT Method Site Sentinel 1, Site Sentinel II, Site Sentinel III
Version Probe Model 924 with 4-inch Floats, 3-Hour Test

Limitations on the Results

The performance estimates above are only valid when:

- The method has not been substantially changed.
- The vendor's instructions for using the method are followed.
- The tank is no larger than 20,000 gallons.
- The tank contains a product identified on the method description form.
- The tank is at least 90 percent full.
- The waiting time after adding any substantial amount of product to the tank is at least 12 hours.
- The temperature of the added product does not differ more than ± 7.9 degrees Fahrenheit from that already in the tank.
- The waiting time between the end of topping off, if any, and the start of the test data collection is at least N/A hours.
- The total data collection time for the test is at least 3 hours.
- Large vapor pockets are identified and removed (for methods that overfill the tank).
- This method (**X**) can ( ) cannot be used if the ground-water level is above the bottom of the tank.
- Other limitations specified by the vendor of determined during testing:

  None

> **Safety disclaimer: This test procedure only addresses the issue of the methods ability to detect leaks. It does not test the equipment for safety hazards.**

Certification of Results

I certify that the volumetric tank tightness testing method was operated according to the vendor's instructions. I also certify that the evaluation was performed according to the standard EPA test procedure for volumetric tank tightness testing methods and that the results presented above are those obtained during the evaluation.

H. Kendall Wilcox, President
(printed name)

H. Kendall Wilcox
(signature)

October 12, 2000
(date)

Ken Wilcox Associates, Inc.
(organization performing evaluation)

Grain Valley, Missouri 64029
(city, state, zip)

(816) 443-2494
(phone number)

Appendix K Declaration of Conformity

ONE COMPANY. ONE WORLD. ONE SOURCE.

DECLARATION OF CONFORMITY

In accordance with the Council Directive 2014/34/EU, equipment intended for use in potentially explosive atmospheres. Given in Annex II to the Directive.

Standard (s) to which conformity is declared:	EN 60079-0: 2012+A11:2013 EN 60079-11: 2012 EN 60079-26: 2015
Manufacturers Name:	OPW Fuel Management Systems, Inc.
Manufacturers Address:	6900 Santa Fe Drive Hodgkins, IL. 60525 USA
Type of Equipment:	Magnetostrictive Probes
Model:	Model 924B & Model TLM-B
Marking:	Ex II 1 G Ex ia IIA T4
Notified Body:	UL International Demko A/S. Notified Body Number 0539
EC Type Certificates:	DEMKO 11 ATEX 1012670X

I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive (s) and Standard (s).

Place: Hodgkins, IL.

Date: 30 March 2018

Nicole Chavez
Engineering Compliance Technician

OPW FUEL MANAGEMENT SYSTEMS
ONE COMPANY
ONE WORLD.
ONE SOURCE.

DECLARATION OF CONFORMITY

In accordance with Article 9 of the Council Directive 2014/34/EU, equipment intended for use in potentially explosive atmospheres. Given in Annex II to the Directive.

Standard (s) to which conformity is declared:	EN 60079-0:2012+A11:2013 EN 60079-11: 2012 EN 60079-26: 2015
Manufacturers Name:	OPW Fuel Management Systems, Inc.
Manufacturers Address:	6900 Santa Fe Drive Hodgkins, IL. 60525 USA
Type of Equipment:	Intrinsic Safety Barriers
Model:	Models 0324, 0347 & 0348
Marking:	Ex II (1) G [Ex ia]
Notified Body:	UL International Demko A/S. Notified Body Number 0539
EC Type Certificates:	DEMKO 07 ATEX 0522559U

I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive (s) and Standard (s).

Place: Hodgkins, IL.

Date: 30 December 2019

Nicole Chavez
Engineering Compliance Technician

OPW FUEL MANAGEMENT SYSTEMS
A DOVER COMPANY

OPW FUEL MANAGEMENT SYSTEMS | ONE COMPANY. ONE WORLD. ONE SOURCE.

DECLARATION OF CONFORMITY

In accordance with the Council Directive 2014/34/EU, equipment intended for use in potentially explosive atmospheres.

Standard (s) to which conformity is declared:	EN 60079-0: 2012+A11:2013 EN 60079-11: 2012 EN 60079-26: 2015
Manufacturers Name:	OPW Fuel Management Systems, Inc.
Manufacturers Address:	6900 Santa Fe Drive Hodgkins, IL. 60525 USA
Type of Equipment:	Tank Gauge/Sensor Controller
Model:	Model VSMART Module Model SiteSentinel iTOUCH Model SiteSentinel 1 Model SiteSentinel SSEM Smart Module
Marking:	Ⓔx II (1)G [Ex ia] IIA
Notified Body:	UL International Demko A/S. Notified Body Number 0539
EC Type Certificates:	DEMKO 09 ATEX 0861746X

I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive (s) and Standard (s).

Place: Hodgkins, IL.

Date: 30 December 2019

Nicole Chavez
Engineering Compliance Technician

European Compliance

DEVICE	AGENCY	STANDARDS	MARKING	CERTIFICATE NUMBER
Model 924 Probe	BASEEFA	EN 50014 (1997) + Amds 1 & 2 EN 50020 (2002) EN 50284: 1999	 II (1) G EEx ia IIA T4	BASEEFA03ATEX0349X (See below for Conditions of Safe Use)
Model 4323 Intrinsically Safe Module	BASEEFA	EN 50014 (1997) + Amds 1 & 2 EN 50020 (2002)	 II (1) G [EEx ia] IIA	BASEEFA03ATEX0348X (See below for Conditions of Safe Use)

BASEEFA03ATEX0349X Conditions of Safe Use:

1.) The apparatus enclosure may contain light metals. The apparatus must be installed in such a manner as to eliminate the risk of impact or friction with other metal surfaces.
2.) Items of the apparatus are made of plastic. The apparatus must not be installed in a position where it may be subjected to an excessive air/fluid flow or be subjected to rubbing that may cause an electrostatic build-up.

BASEEFA03ATEX0348X Conditions of Safe Use:

1.) When installed, the terminals must be afforded a degree of protection of at least IP20.

Appendix L - iTouch Control Drawing

NOTES:

1. Associated Apparatus Entity Parameters: Group /IA:

   Uo=14.85Vdc
   Io=305mA
   Po=974mW
   Co=3.0uF, Lo = 1.52mH
   or
   Co=5.0uF, Lo = 600uH

2. The voltage current of this associated apparatus is limited by a resistor such that the output voltage-current plot is a straight line drawn between open-circuit voltage and short-circuit current.

3. Selected intrinsically safe apparatus must be ATEX and/or IECEx Certified as intrinsically safe for the application and have intrinsically safe entity parameters conforming with the following:

TABLE 1 Group IIA		
I.S. EQUIPMENT		**ASSOCIATED APPARATUS**
Ui	≥	Uo= 14.85V
Ii	≥	Io = 305mA
Pi	≥	Po = 974mW
Ci + Ccable -or- Ci + Ccable	≤ ≤	Co = 3.0uF, Li + Lcable </= Lo = 1.52mH Co = 5.0uF, Li + Lcable </= Lo = 600uH

4. This associated apparatus may also be connected to simple apparatus as defined in Clause 5.7 of IEC60079-11:2012 and or EN60079-11:2012 and installed in accordance with applicable local codes.

5. Capacitance and inductance of the field wiring from the intrinsically safe equipment to the associated apparatus shall be calculated and must be included in the system calculations as shown in Table 1. Cable capacitance, Ccable, plus intrinsically safe equipment capacitance, Ci must be less than the marked capacitance, Co, shown on any associated apparatus used. The same applies for inductance (Lcable, Li, Lo, respectively. Where the cable capacitance and inductance per foot are not known, the following values shall be used: Ccab/e = 197pF/m., Lcable = 0.66uH/m.

6. The associated apparatus must be connected to a suitable ground electrode or other local installation codes, as applicable. The resistance of the ground path must be less than 1 ohm.

7. Where multiple circuits extend from the same piece of associated apparatus, they must be installed in separate cables or in one cable having suitable insulation.

8. Intrinsically safe circuits must be wired and separated in accordance with applicable local codes.

9. This associated apparatus has not been evaluated for use in combination with another associated apparatus.

10. Conditions for Safe Use:
    a. Um must not exceed 250V.
    b. Must be installed in accordance with the applicable control drawings.
    c. All openings (slots) must be provided with an intrinsic safety barrier or (plates) which must be firmly screwed in place.
11. Unit must be mounted to the wall using mounting holes integral to the enclosure. See installation manual for details.
12. Standards to which conformity is declared:

    EN 60079-0:2012+A11:2013

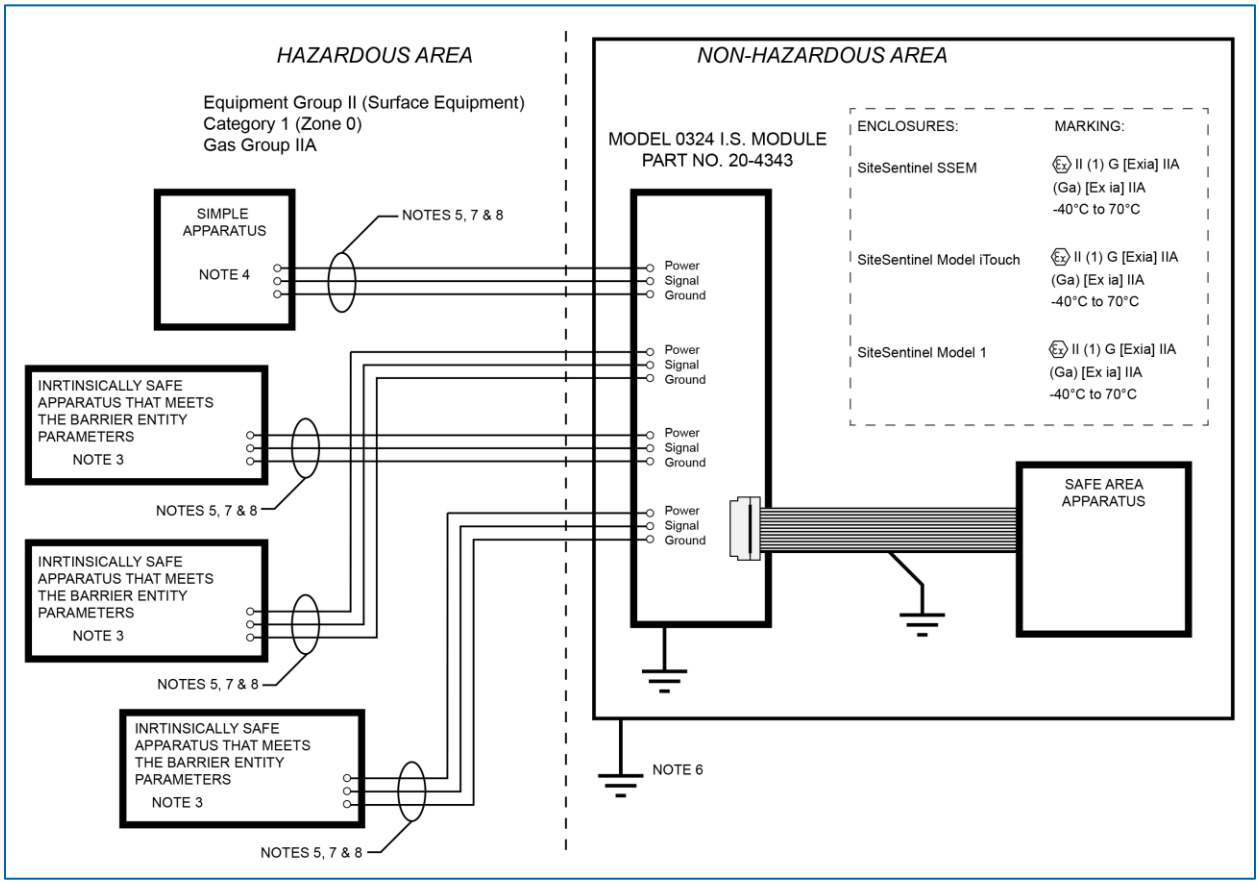
    EN 60079-11:2012

    EN 60079-26:2007

    IEC 60079-0: Edition 6

    IEC 60079-11: Edition 6

    IEC60079-26: Edition 2



Appendix M - 924B Probe Control Drawing

NOTES:

1. Entity Parameters:

   (Vmax), Ui = 14.9V (Imax), Ii = 362mA
   Ci = 0uf Li = 363uH
   For Pi ≤ 1.3W -40°C ≤ Tamb ≤ 40°C
   For Pi ≤ 1.2W -40°C ≤ Tamb ≤ 60°C
   For Pi ≤ 1.0W -40°C ≤ Tamb ≤ 70°C

2. Associated Apparatus output current must be limited by a resistor such that the output voltage-current plot is a straight line between open-circuit voltage and short-circuit current.

3. Selected Associated Apparatus must be third party listed as providing intrinsically safe circuits for the application and have Voc or Vt not exceeding Vmax (or Uo not exceeding Ui), Isc or It not exceeding Imax (or Io not exceeding Ii), and the Po of the associated apparatus must be less than or equal to the Pmax or Pi of the intrinsically safe equipment as shown below.

4. Capacitance and inductance of the field wiring from the intrinsically safe equipment to the Associated Apparatus shall be calculated and must be included in the system calculations as shown below. Cable capacitance, Ccable, plus intrinsically safe equipment capacitance, Ci must be less than the marked capacitance, Ca (or Co), shown on any associated apparatus used. The same applies for inductance (Lcable, Li and La or Lo, respectively). Where the cable capacitance of inductance per foot are known, the following values shall be used: Ccable = 60pF /ft., Lcable = 0.2uH/ft.

   Use the following to determine the suitability of connections:

924B entity parameters		Associated Apparatus
14.9V (Ui)	≥	Voc or Vt or Uo
362mA (Ii)	≥	Isc or It or Io
1.3W (Pi)	≥	Po
0uF (Ci)+Ccable	≤	Ca or Co
363uH (Li)+Lcable	≤	La or Lo

   If Po of the associated apparatus is not known, it may be calculated using the following formula, Po=(Uo*Io)/4

Example of a single 924B probe connected to a single position on the Associated Apparatus:

EXAMPLE:

Example Associated Apparatus 14.28V (Uo), 361mA (Io), 6.4uF (Co), 2,100uH (Lo)

Cable 1,000 feet, 60pF/ft, 0.2uH/ft = 0.060uF (60,000pf), 200uH

924B entity parameters		Associated Apparatus
14.9V (Ui)	≥	14.28V (Uo)
362mA (Ii)	≥	361mA (Io)
1.3W (Pi)	≥	(14.28*0.361)/4 = 1.29W (Po)
0uF (Ci)+0.060uF(Ccable)=0.060uF	≤	6.4uF (Co)
363uH (Li)+200uH (Lcable) = 563uF	≤	2,100uH (Lo)

If the above statements are true (which they are) then it is safe to connect.

Example of 4 x 924B probes connected to a single position an the Associated Apparatus:

EXAMPLE:

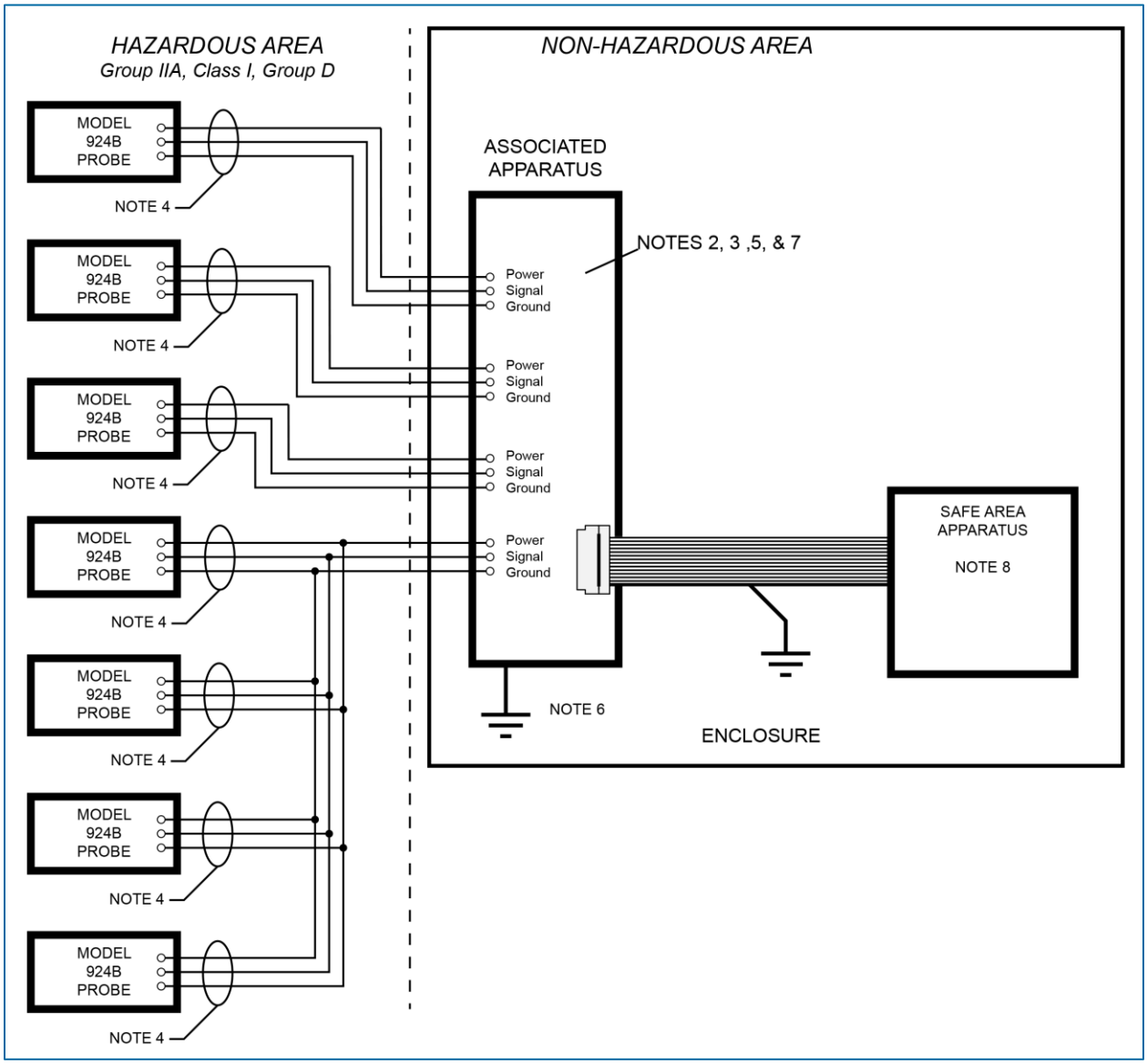
Example Associated Apparatus 14.28V (Uo), 338mA (Io), 16.1 uF (Co), 2,240uH (Lo)

Cable 2,000 feet, 60pF/ft, 0.2uH/ft = 0.120uF (120,000pf), 400uH

924B entity parameters		Associated Apparatus
14.9V (Ui)	≥	14.28V (Uo)
362mA (Ii)	≥	338mA (Io)
1.3W (Pi)	≥	(14.28*0.338)/4 = 1.21W (Po)
0uF (Ci)+0.060uF (Ccable)=0.060uF	≤	16.1uF (Co)
363uHx4(Li)400uH (Lcable)= 1,852uF	≤	2,240uH (Lo)

If the above statements are true (which they are) then it is safe to connect.

5. Associated apparatus must be installed in accordance with its manufacturer's control drawing and 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. other local codes, as applicable.
6. When required by the manufacturer's control drawing, the associated apparatus must be connected to a suitable ground electrode per the National Electrical Code (ANSI/NFPA 70), the Canadian Electrical Code, or other local installation codes as applicable. The resistance of the ground path must be less than 1 ohm7
7. Associated apparatus must not be used in combination unless permitted by the associated apparatus certification.
8. Control equipment must not use or generate more than 250Vrms or dc with respect to earth.


HAZARDOUS AREA
Group IIA, Class I, Group D
NON-HAZARDOUS AREA
MODEL 924B PROBE
NOTE 4
ASSOCIATED APPARATUS
NOTES 2, 3 ,5, & 7
Power
Signal
Ground
SAFE AREA APPARATUS
NOTE 8
NOTE 6
ENCLOSURE

Section 20 Warranty

OPW Fuel Management Systems warrants that all OPW Tank Gauge and Petro Vend Fuel Control systems supplied by OPW Fuel Management Systems to the Original Purchaser will be free from defects in material and/or workmanship under normal use and service for a period of 12 months from the date of installation or 15 months from the date of shipment from OPW. Additionally, OPW Fuel Management Systems warrants that all upgrades and replacement parts (new and remanufactured) supplied by OPW Fuel Management Systems will be free from defects in material and workmanship under normal use and serviced for a period of 90 days from the date of installation or for the remainder of the system's original warranty, whichever is greater, as set forth in the first sentence of this statement. The foregoing warranties will not extend to goods subjected to misuse, neglect, accident or improper installation or maintenance, or which have been altered or repaired by anyone other than OPW Fuel Management Systems or its authorized representative(s). The buyer's acceptance of delivery of the goods constitutes acceptance of the foregoing warranties and remedies, and all conditions and limitations thereof.

If a claim is made within the warranted time period that any equipment and/or remanufactured part is defective in material or workmanship under normal use and service, such equipment and/or remanufactured part shall be returned to OPW Fuel Management Systems, freight prepaid. If such equipment or remanufactured part is found by OPW Fuel Management Systems in its sole judgment to be defective in material or workmanship under normal use and service, OPW Fuel Management Systems shall, at its sole option, repair or replace such equipment and/or remanufactured part (excluding, in all instances, fuses, ink cartridges, batteries, other consumable items, etc.) OPW Fuel Management Systems shall not be held responsible for data loss or retrieval on returned products.

The warranties, as set forth above, are made expressly in lieu of all other warranties, either expressed or implied (including, without limitation, warranties of merchantability and fitness for any particular purpose and of all other obligations or liabilities on OPW Fuel Management Systems' part.) Further, OPW Fuel Management Systems neither assumes nor authorizes any other person to assume for it any other liability in connection with the sale of the systems or any new/replacement part that has been subject to any damage from any act of nature or any force majeure. Any terms proposed by the Original Purchaser either orally or in writing are expressly rejected. The terms and conditions expressed in this document may only be changed upon the express written consent of OPW Fuel Management Systems.

The term "Original Purchaser" as used in these warranties shall be deemed to mean the authorized OPW Fuel Management Systems' distributor to which the system or any new/replacement part was originally sold. These warranties may be assigned by the original purchaser to any of its customers who purchase any OPW Fuel Management Systems' systems or new/replacement parts. This document shall be governed by and construed in accordance with the law of the State of Illinois. OPW Fuel Management Systems and Original Purchaser agree that any legal action or proceeding under or with respect to this document may ONLY be brought in the courts of the State of Illinois, or the United States District Court having jurisdiction in the City of Hodgkins, IL. Original Purchaser expressly consents to personal jurisdiction in any of the above-mentioned forums and agrees to waive all defenses based on improper venue or inconvenient form should an action be brought therein.

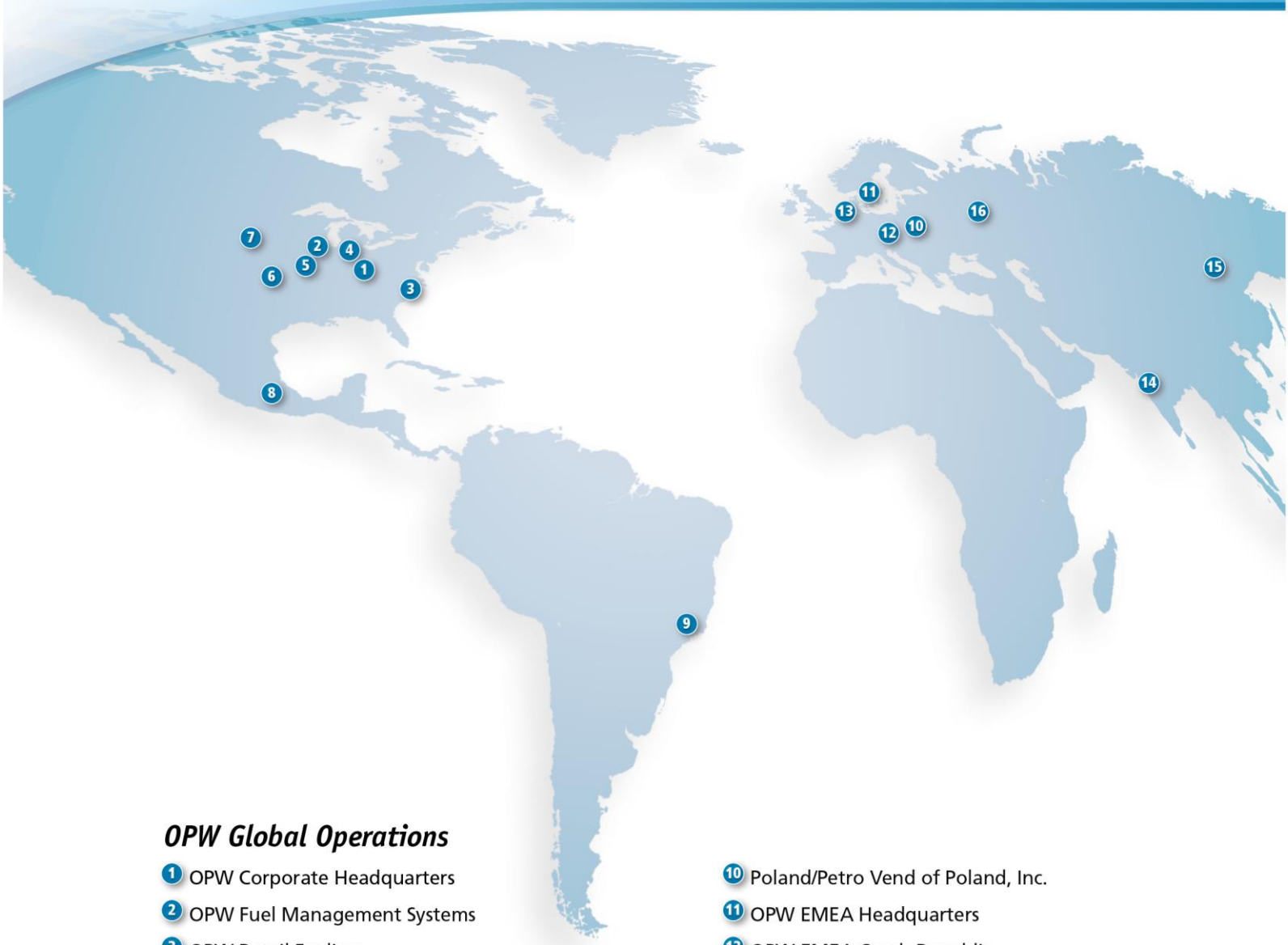
The sole liability of OPW Fuel Management Systems, for any breach of warranty, shall be as set forth above. OPW Fuel Management Systems does not warrant against damage caused by accident, abuse, faulty or improper installation or operation. In no event shall manufacturer's liability on any claim for damages arising out of the manufacture, sale, delivery or use of the goods exceed the original purchase price of the goods. In no event shall OPW Fuel Management Systems be liable for any direct, indirect, incidental or consequential damage or loss of product.

TERMS

Ex-works our factory, Hodgkins, Illinois, USA
Installation not included.
All trade names are registered. Patents pending.
Subject to engineering improvement and/or other changes.

OPW
A DOVER COMPANY

Leading The Way in Fluid Handling Solutions Worldwide



OPW Global Operations

1. OPW Corporate Headquarters
2. OPW Fuel Management Systems
3. OPW Retail Fueling
4. OPW Engineered Systems
5. Midland Manufacturing
6. Civacon
7. PDQ Manufacturing Inc.
8. OPW Mexico
9. OPW Latin America
10. Poland/Petro Vend of Poland, Inc.
11. OPW EMEA Headquarters
12. OPW EMEA Czech Republic
13. OPW FTG Europe
14. OPW India
15. OPW Asia Pacific
16. OPW Russia

OPW
FUEL MANAGEMENT SYSTEMS
A DOVER COMPANY

6900 Santa Fe Dr. ◆ Hodgkins, Illinois, USA 60525
Phone: (708) 485-4200 ◆ Fax: (708) 485-7137
www.opwglobal.com