Leading The Way in Fueling Innovation Worldwide

SiteSentinel® iTouch™
Tank Monitoring System
Installation Manual

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Document Number: M1500, Revision 4
Issue Date: April 20, 2012
Supersedes: August 14, 2009

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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

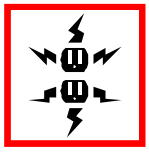
When working in an environment containing fuel and fuel vapors, there is ALWAYS a risk of fire and explosion.

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

1.1.2 Fire and Explosion Hazard

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).

1.1.3 Dangerous Voltages



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

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.**

1.1.4 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.**

1.1.5 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.

1.1.6 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.

1.1.7 Connect Internal Battery

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

2 Specifications

"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."

2.1 SiteSentinel® iTouch™ Controller

Figure 2-1 SiteSentinel® iTouch™ Controller

Physical Dimensions:	Height: 23.5 cm (9.25 in) Width: 31.1 cm (12.25 in) Depth: 13.3 cm (5.25 in)
Power Input:	100-250 VAC, 50/60 HZ, 1.0A
Operating Temperature Range:	0°C - 40°C (32°F - 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 on page 88.

MOUNT THE CONTROLLER AND PRINTER OUTISDE 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.

2.2 Printer

A thermal printer, the Seiko Model DPU-414, is available for reports and other printouts. See Figure 4-2 on page18 for mounting instructions.

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:	0C° - 40°C (32F° - 104°F)

3 Magnetostrictive Probe (Model 924B)

3.1 About the Probe

The 924B probe uses magnetostrictive principles to derive product and water levels, and product temperatures. These probes are primarily used in underground 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 produce net corrected product volume.

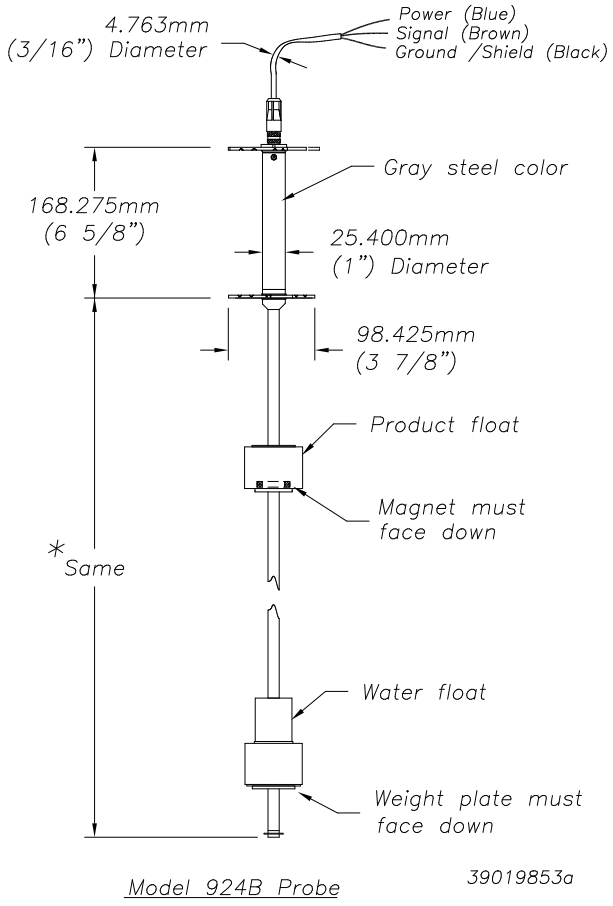


Figure 3-1 924B Probe

3.2 Probe Specifications

Operating Temp. Range:	-40°C - 60°C (-40°F - 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:

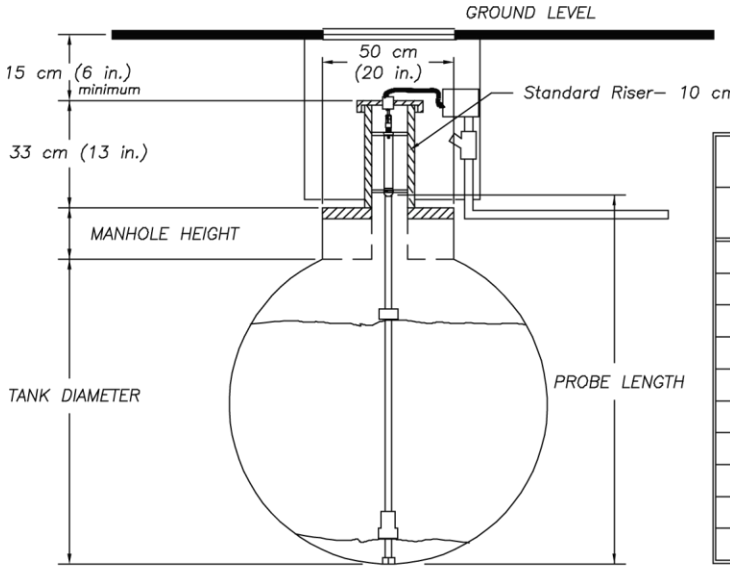
On devices supplied with 4-inch floats: to avoid build-up of static charge, do not rub with a dry cloth or clean in any manner that would result in a charge build-up. Discharge outside of hazardous area before putting into service.

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.

A probe for LPG tanks is also available. See Appendix F – LPG Probe Option on page 91.

3.3 Probe Lengths/Installation Scenarios

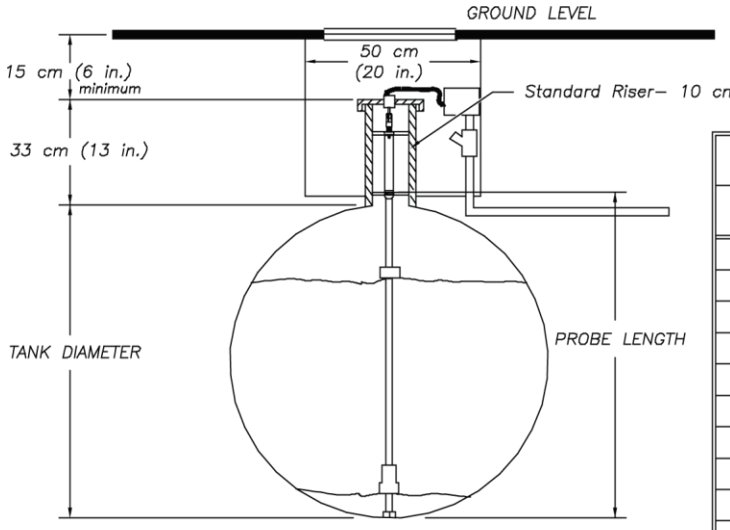


LEVEL 1 PROBE LENGTH		
PART NUMBER	PROBE LENGTH	
30–B053	135 cm	53 in.
30–B069	175 cm	69 in.
30–B077	196 cm	77 in.
30–B089	226 cm	89 in.
30–B101	257 cm	101 in.
30–B105	267 cm	105 in.
30–B113	287 cm	113 in.
30–B125	317 cm	125 in.
30–B137	348 cm	137 in.
30–B149	376 cm	149 in.

TANK DIAMETER + MANHOLE HEIGHT * + 8 cm (3 in.) Minimum= PROBE LENGTH

* (top of tank cover to top of manhole)

Figure 3-2 Probe in Manhole-Equipped Tank



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

TANK DIAMETER + 8 cm (3 in.) Minimum= PROBE LENGTH

Figure 3-3 Probe in Tank With No Manhole

4 Controller Installation

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.

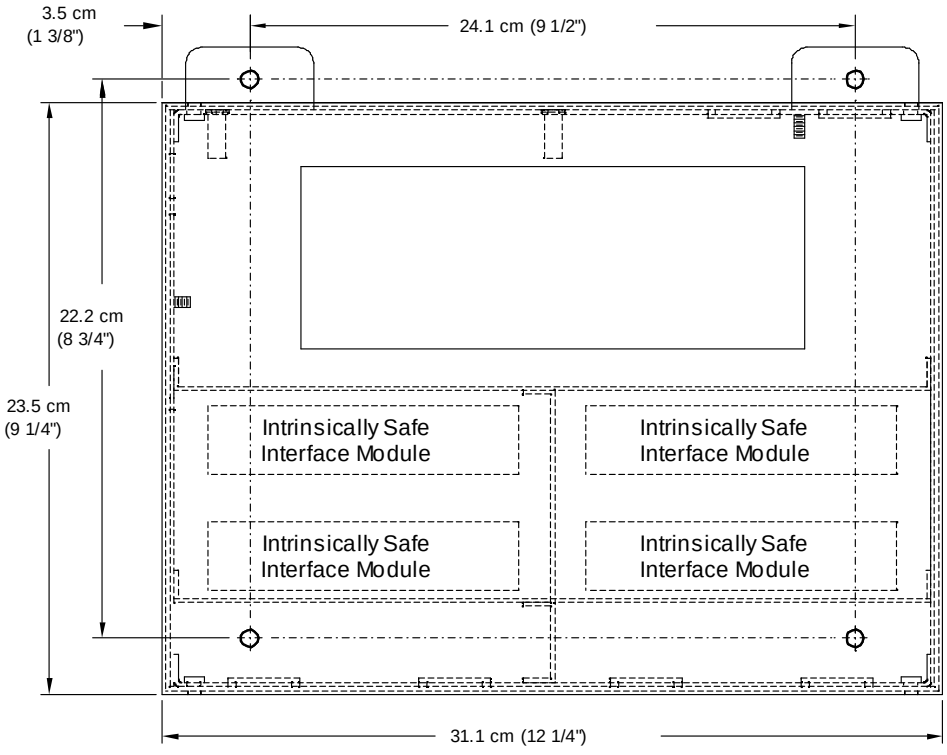
If purchased, also leave room for the optional printer that normally mounts to the left of the controller.

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

4.1 Mounting the Controller

Mount the controller to the wall using the dimensions shown in Figure 4-1 below. The four mounting holes are 0.80 cm (0.315 in) diameter. Use as large a fastener as possible.

Do not drill holes in the SiteSentinel® iTouch™ cabinet.



FRONT VIEW
with door attached

Figure 4-1 Mounting Footprint

4.2 Mounting the Optional Printer Bracket

Mount the printer bracket to the wall using Figure 4-2, below. Holes are 0.56 cm (0.22 in). Use as large a fastener as possible, but ensure that the fastener does not protrude past the recess in the bracket.

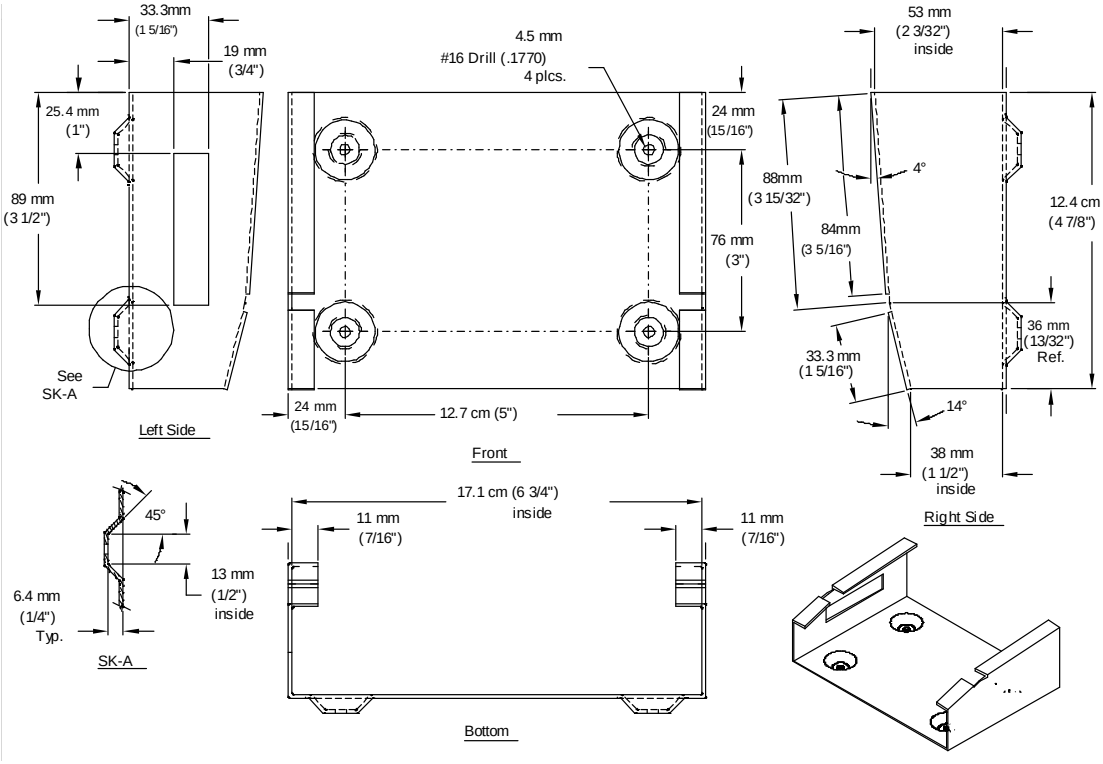


Figure 4-2 Printer Bracket Mounting Dimension

4.3 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 4-3 below.

The left knockout is reserved for optional external alarm wiring.

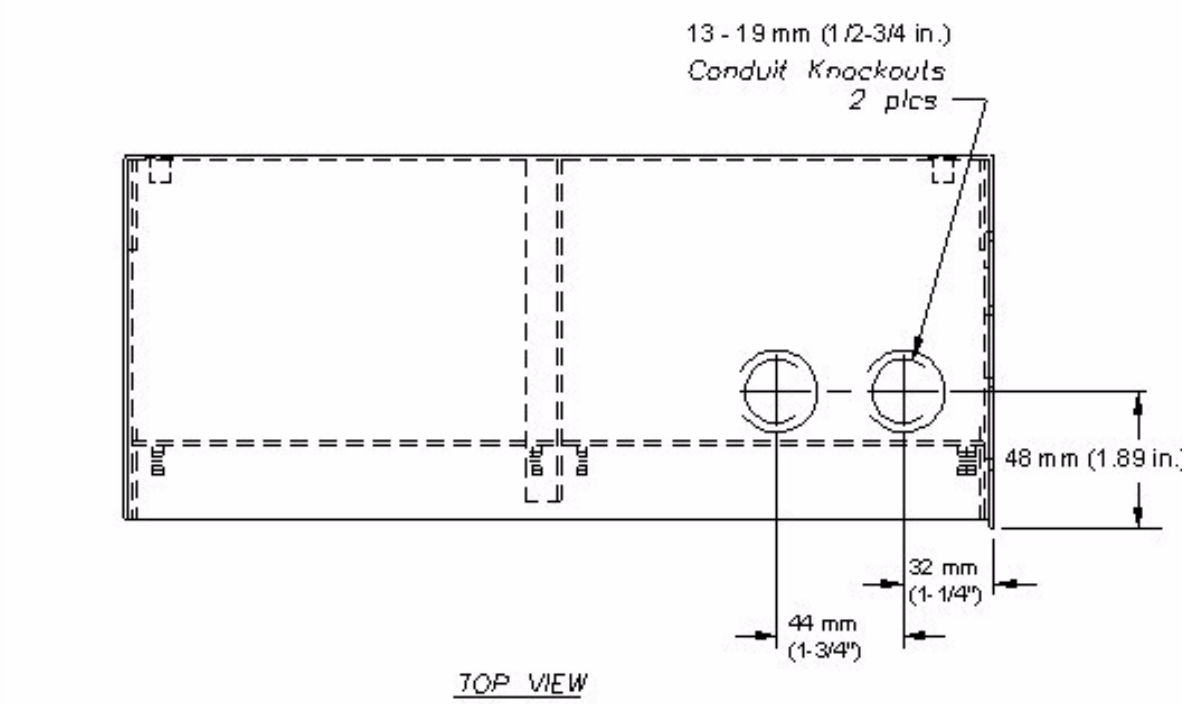


Figure 4-3 Controller Conduit Knockouts

Do not connect the controller to equipment that exceeds the maximum ratings of voltage and current as specified in Specifications on page 13. Probe cables and sensor wiring must not share conduit with any other wiring.

4.4 Wiring the Controller Power Supply

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. Pull just enough wire through the bushing to attach to the 3-pin green terminal block located on the right of the controller circuit board.
   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.
4. 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.

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 12 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.

4.4.1 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™ Ground Lugs

4.4.2 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 supply an external surge suppressor (Part # 75-0104), see Figure 4-5 to the right. This device will help protect the ports from power surges or lightning strikes.

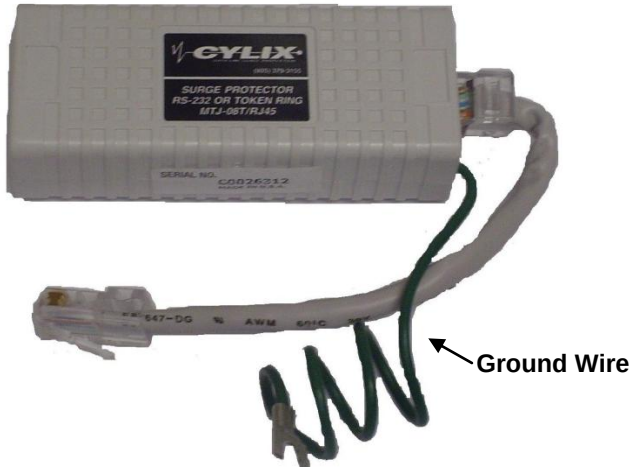


Figure 4-5 SiteSentinel® iTouch™ External Surge Protector (75-0104)

To install, simply insert the surge protector in series between the incoming communication lines and the I/O port of the SiteSentinel® iTouch™ (See **Error! eference source not found.**). 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.

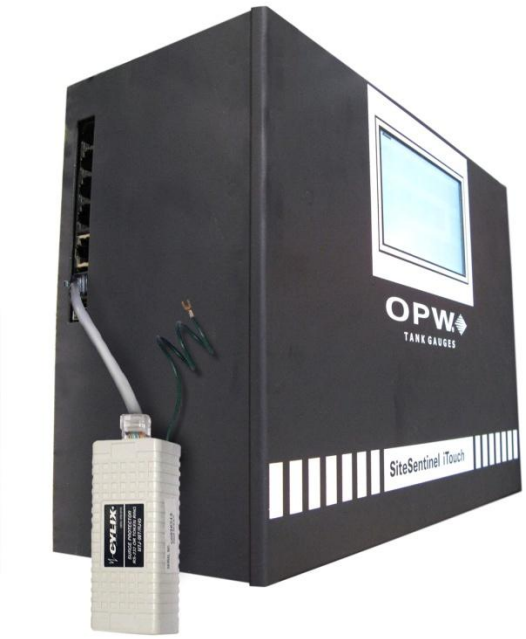


Figure 4-6 SiteSentinel® iTouch™ External Surge Protector I/O Port Connection (75-0104)

5 Preparing for Probe and Sensor Installation

5.1 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 the 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.

> **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 (984 ft) to meet intrinsic safety standards. Also, wire lengths of 300 m (984 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.

5.2 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.

> **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.

See Table 5-1 below. Try to group probe wires into separate conduits for each SiteSentinel® iTouch™ Controller I.S. Interface Module position.

Table 5-1 Probe Quantity vs. Conduit Capacity

Number of Probes	Number & Size of Conduits
1 to 2	
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)

6 Seal-Offs

Seal off probe and sensor cables at both ends of the conduit run (Figure 6-1 below). Seal-offs prevent explosive vapors from entering the controller or the building. Remove enough of the outer wire jacket to allow approximately three (3) inches of wire leads to extend past each seal-off.

> **DO NOT nick the wire insulation.**

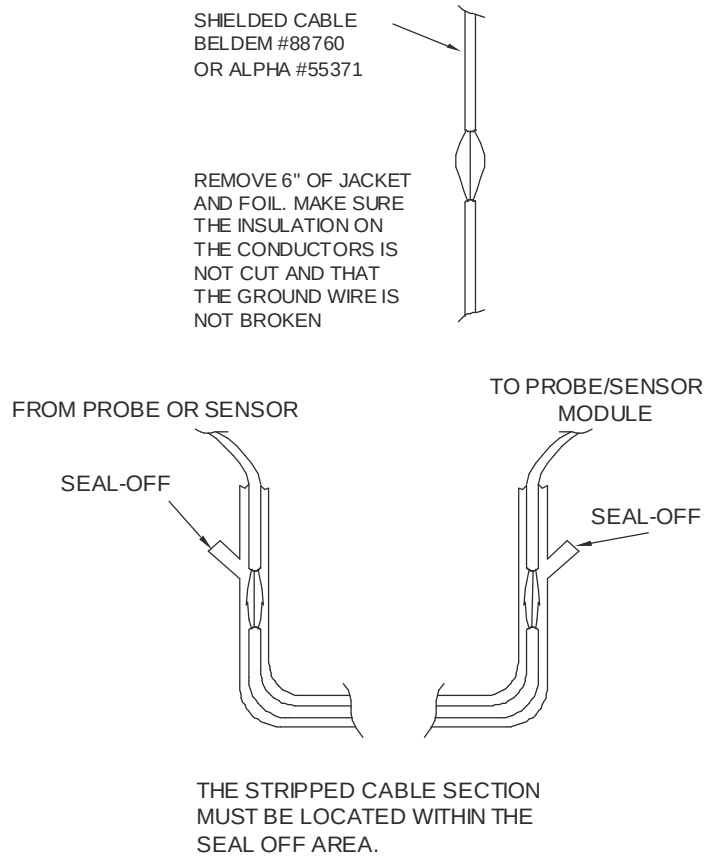


Figure 6-1 Creating a Seal-Off

6.1 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 an NPT bushing 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.

7 Preparing Your Tanks for Probes

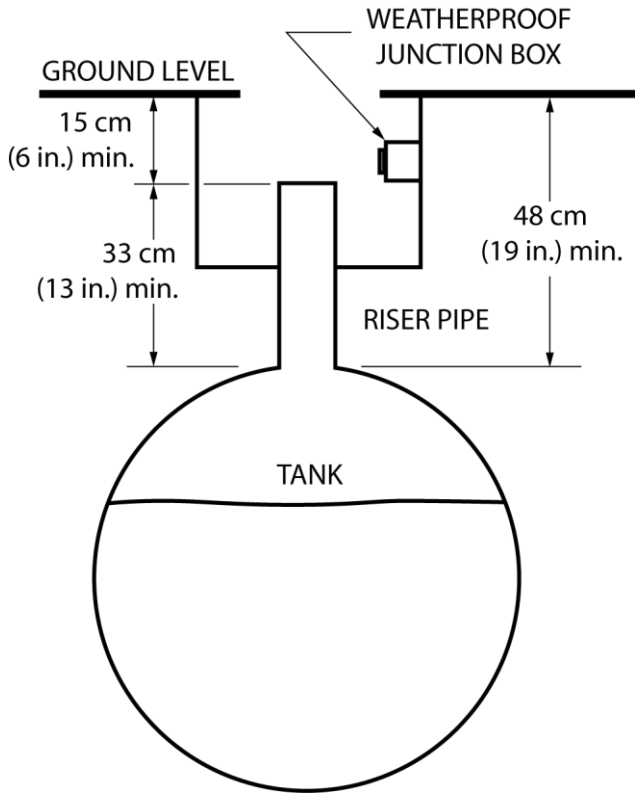


Figure 7-1 Underground Tank Manholes

7.1 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 Product Float and Water Float Offsets on page 28).
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. Five 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 the probe cable to reach.
4. Install a 13 mm (0.5 in) bushing in the junction box.
5. Install an adapter collar onto the tank's riser pipe.

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 (0.43 in). For next-generation 924, use bushings with an inner diameter of 5 mm (0.2 in).

7.2 Precision Leak Test

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

7.3 Probe Placement

Try to install the probe as close to the **center** of the tank (Figure 7-2, below) as possible. Locate the probe at least 91 cm (about 3 ft) from the tank fill pipe. Adjust the drop tube of the fill pipe so that the product flow is diverted away from the probe.

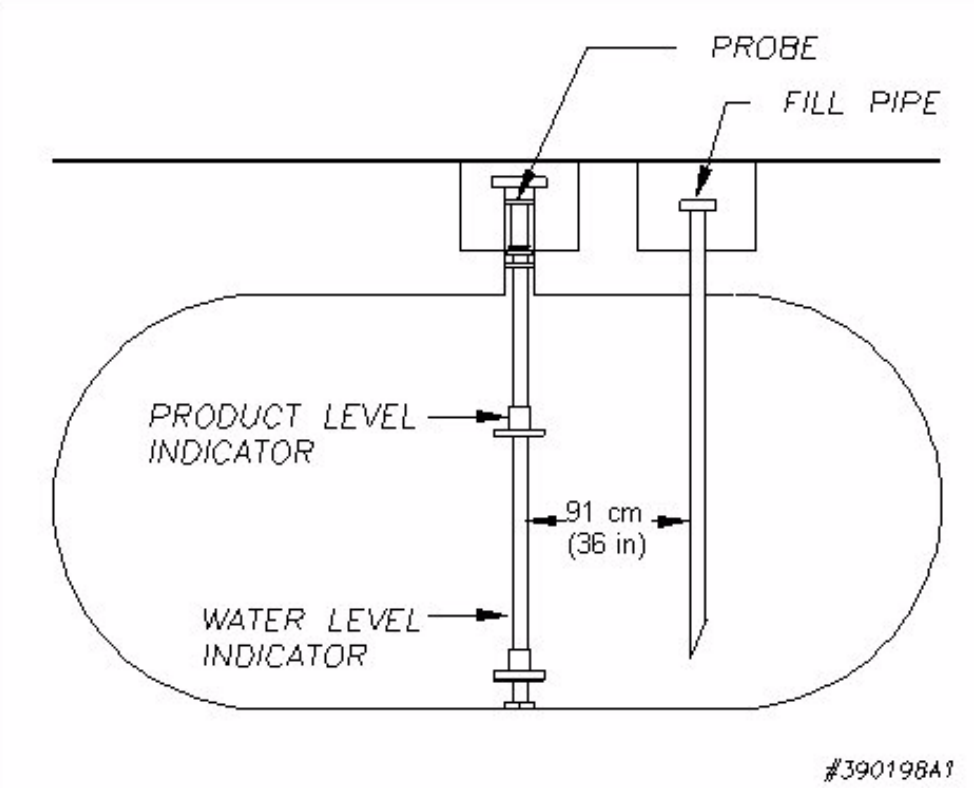


Figure 7-2 Probe Placement in Tank

8 Product Float and Water Float Offsets

The 924 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**.

8.1 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**.

> **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

8.2 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 Figure 8-1 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”.

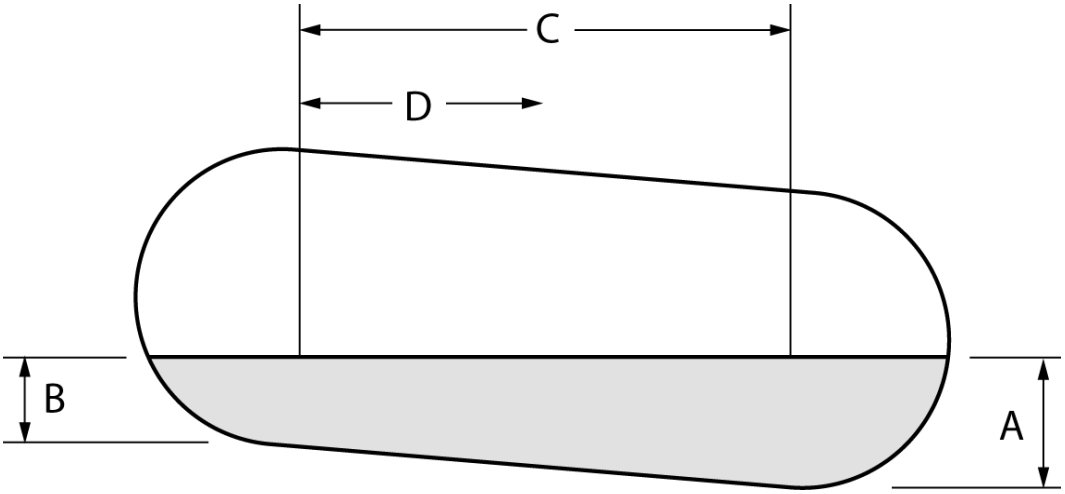


Figure 8-1 Calculating Tank Tilt

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™’s Help for details about entering the product offset.

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 on page 91.

9.1 Probe Floats

The terms “float” and “level indicator” are completely interchangeable.

9.1.1 Product Level vs. Water Level

Figure 9-1 on page 31 shows how the probe components work together. The Product Level Indicator floats atop 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.

The Water Level Indicator features one of two different ballast weights (color-coded for gasoline or diesel – see Figure 10-1 on page 33). Because fuel products are less dense than water, the weight plate forces the Water Level Indicator to sink through the product and float on the water. Water height at the product/water boundary can thus be determined.

9.1.2 Water Float Weight Specification

If you ordered a Water Level Indicator the weight and fluid product group will be on a label affixed in the area below. Each weight is certified by an OPW Fuel Management Systems technician for use with its Water Level Indicator. The listed weight is the complete weight of the level indicator.

9.1.3 Installing the Float(s)

1. Review Figure 9-1 on page 31.
2. Remove the retaining ring from the probe shaft.
3. Install the level indicator(s) as shown.
4. Make sure the Water Level Indicator (if used) magnet faces UP.
5. Install probe end boot.
6. Make sure the Product Level Indicator magnet faces DOWN.
7. Replace the retaining ring through the slot in the probe end boot.

If the wrong type of water float 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 the OPW Fuel Management Systems customer sales department for recommendations.

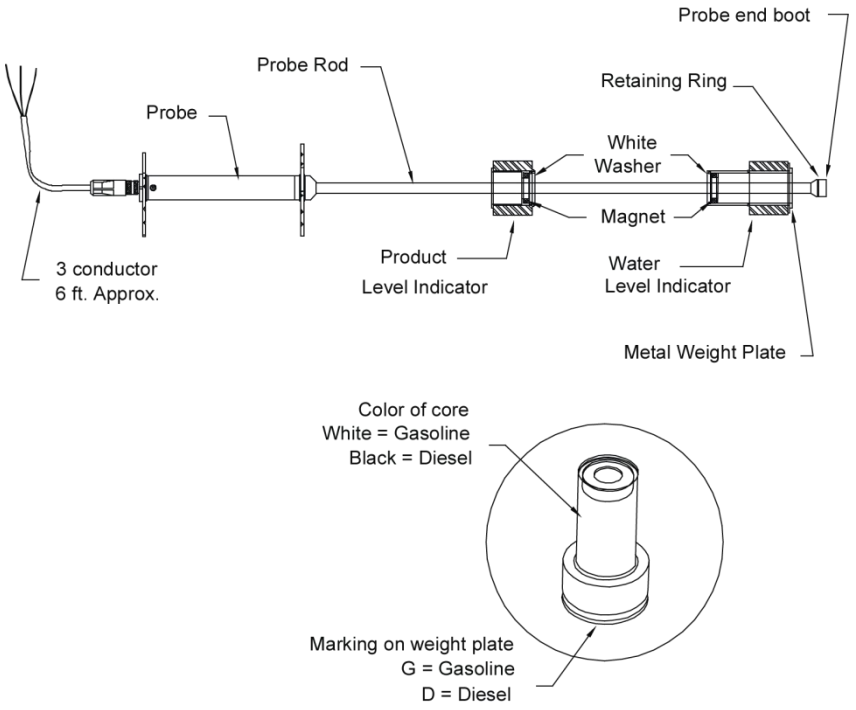


Figure 9-1 Probe Component Locator

10 Product Density & Chemical Compatibility

Table 10-1 Product Compatibility

Product Group	Compatibility	API	Specific Gravity
Gasoline (white core)	Gasoline	45 < API < 78	0.68 < d < 0.80
	Aviation Gasoline		
	Regular Unleaded		
	Regular Leaded		
	Premium Unleaded		
	Gasoline/Methanol blend, less than 5% methanol		
	Gasohol, less than 40% ethanol		

Table 10-2 Product Compatibility (continued)

Product Group	Compatibility	API	Specific Gravity
Diesel (Black core)	Diesel	26 < API < 45	0.80 < d < 0.90
	Jet Fuel		
	Kerosene		
	Motor Oil		
	Toluene		
	Gear Oil		
	Transmission Oil		

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

10.1 Determining Water Float Product Group

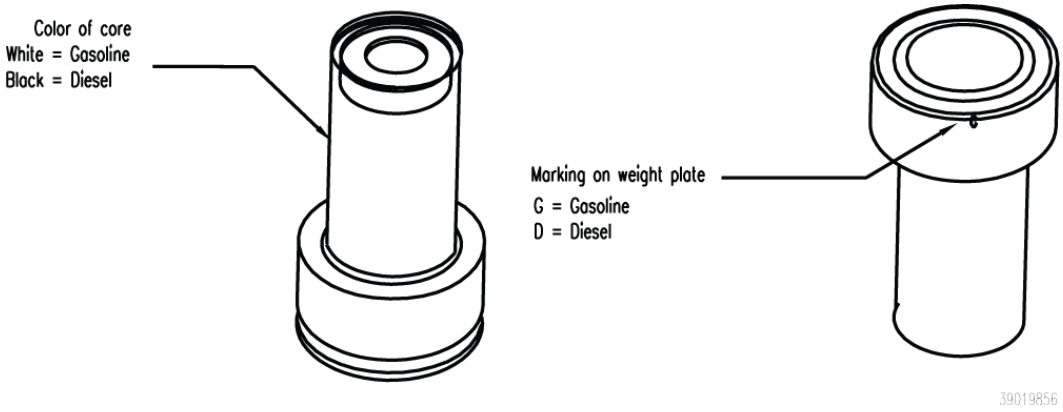


Figure 10-1 Determining Water Level Indicator Type

The Water Float/Level Indicator (Figure 10-1 above) features a ballast weight plate. This weight permits the level indicator to sink through the product, but to float on the water, thus registering the height of the water at the product/water boundary. The weight is certified by OPW Fuel Management Systems for use with one of the two groups – gasoline group OR diesel group. You can tell which product the Water Level Indicator is for by the color of the core (Figure 10-1). White cores are for gasoline, black cores are for diesel. There is also a mark on the ballast weight plate (“G” for gasoline, “D” for diesel).

11 Part Numbers

Table 11-1 Part Numbers

Item and Part #	30-1508-01	30-1508-02	30-1508-03	30-1509-01	30-1509-02	30-1509-03
Product level indicator assembly, 2 in (30-0113)				X	X	X
Water level indicator assembly, 2 in gas (30-0111)		X			X	
Water level indicator assembly, 2 in diesel (30-0112)	X			X		
Cable, 3 pole, 22 gauge, 6 ft, Blue (10-1185)	X	X	X	X	X	X
Wire nut silicon-filled (10-5014)	X	X	X	X	X	X
Probe end boot (50-3092)	X	X	X	X	X	X

12 Probes Wiring

Probe conduit must be dedicated to intrinsically safe wiring.

Use Table 12-1 below and Figure 12-1 on page 36 (for two-conductor cable) or Table 12-2 below and (for three-conductor cable) to connect the probe to the Controller IS Interface Module terminal blocks.

See Figure 2-1 on page 12 for a probe drawing.

Table 12-1 I.S. 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

Table 12-2 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

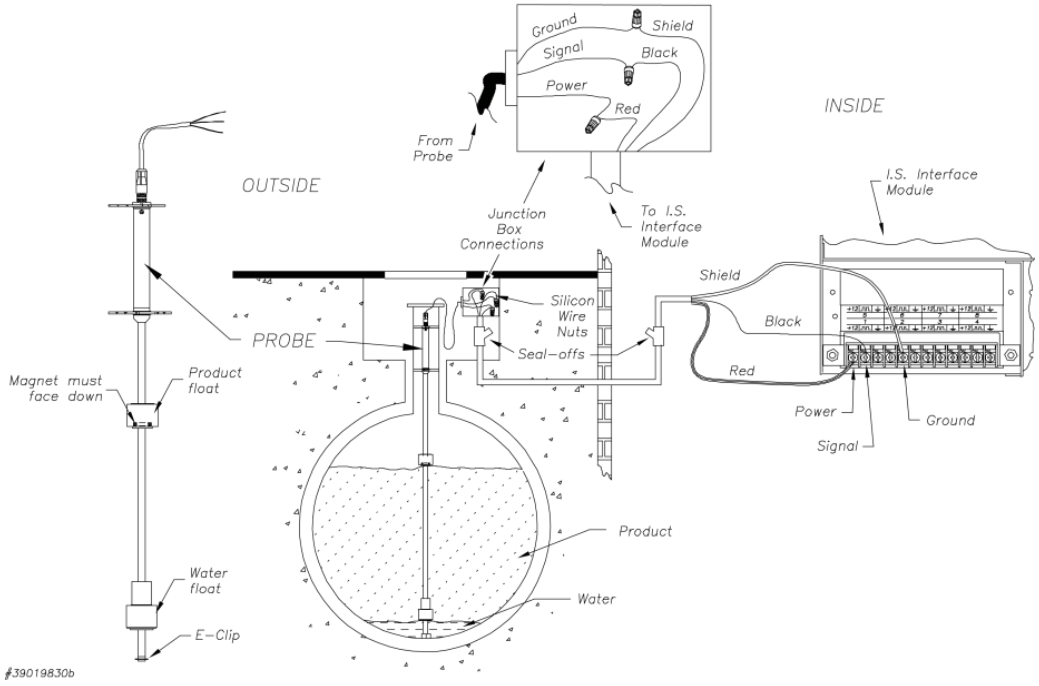


Figure 12-1 Probe Connections – TWO Conductor Shielded Cable

With three-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.

Step-by-Step Procedure

1. Feed the blue probe cable through the bushing in the 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.

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.

13 Sensors

13.1 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.

13.2 30-3206 Interstitial Hydrocarbon Liquid/Water Sensor

13.2.1 About the 30-3206

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.

Figure 13-1 Interstitial Hydrocarbon Liquid/Water Sensor

13.2.2 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

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

13.2.3 Installing the 30-3206

Hydrocarbons (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 Figure 13-2 on page 40. Use the supplied cable gland and silicone wire nuts.
- Install seal-offs at both ends of the conduit run.

13.2.4 Connections

Table 13-1 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	
+12	No connection
⎍	White (water)
⏚	No connection

13.2.5 Typical Interstitial Hydrocarbon Liquid/Water Sensor Installation

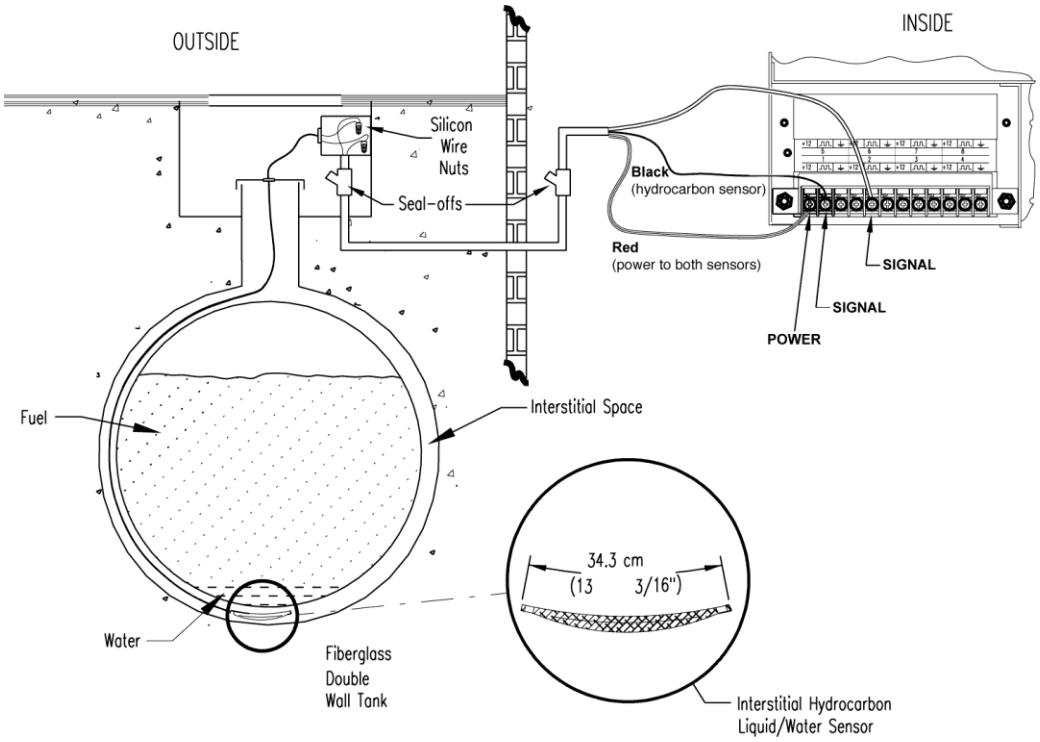


Figure 13-2 Interstitial (IS) Hydrocarbon Liquid/Water Sensor Installation

13.2.6 SiteSentinel® iTouch™ Controller Setup for Interstitial ("IS") Hydrocarbon Liquid/Water Sensor

13.2.7 1st IS 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).

SiteConnect™ will ask to adjust the lower threshold automatically, to 0.1 V below the current voltage reading. Answer YES.

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 to activate if the sensor detects hydrocarbon liquid.

13.2.8 2nd IS 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. Program the alarms associated with the upper threshold that you wish to activate if the sensor detects water.

13.2.9 Testing and Decontaminating the Interstitial Hydrocarbon Liquid/Water Sensor

> **When working in the hazardous area use caution to avoid a hazardous situation.**

When testing or decontaminating the sensor, work in a well-ventilated area with no hot surfaces or open flames. 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.** 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.

13.3 30-3207 Hydrocarbon Liquid Sensor

Figure 13-3 Hydrocarbon Liquid Sensor

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

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

13.3.2 Specifications

Operating Temperature	-20°C to 50°C (-4°F to 122°F)
Dimensions (depends on part #)	1.8 cm (0.7 in) dia. x 1.8-4.6 m (6-15 ft)
Cable	3.1 m (10 ft) gas & oil-resistant cable
Nominal Resistance	
Uncontaminated	1K – 3K ohms per foot
Contaminated	30K – 200K ohms

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

13.3.3 Installing the 30-3207-06, -10, or -15

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

This sensor requires ONE Controller Interface Module position.

- Review Figure 13-4 on page 43.
- Use Table 13-2 below to connect the sensor to the Controller I.S. Interface Module terminals.
- Use the supplied cable gland and silicone wire nuts.
- Install seal-offs at both ends of the conduit run

13.3.4 Connections

Table 13-2 Hydrocarbon Liquid Sensor Wiring

I.S. Interface Module Position Terminal	Sensor Wire
+12	Red
⎍⎍⎍	Black
⏚	White – No connection

13.3.5 Typical Hydrocarbon Liquid Sensor Installation

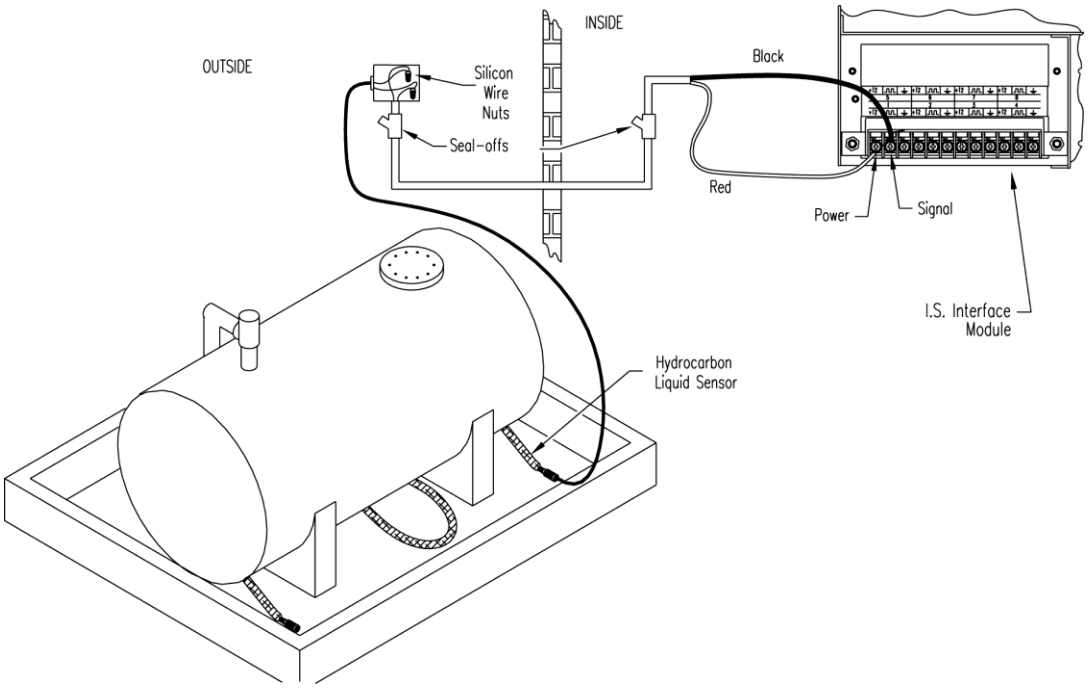


Figure 13-4 Hydrocarbon Liquid Sensor Installation

13.3.6 SiteSentinel® iTouch™ Controller Setup for Hydrocarbon 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. 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).

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

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

13.3.7 Testing and Decontaminating the Hydrocarbon Liquid Sensor

> **When working in the hazardous area use caution to avoid a hazardous situation.**

When testing or decontaminating the sensor, work in a well-ventilated area with no hot surfaces or open flames.

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.** 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 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.

13.4 30-3210-06, -10, -15 Hydrocarbon Liquid/Water Sensor

13.4.1 About the 30-3210-nn

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

Figure 13-5 Hydrocarbon Liquid/Water Sensor

The 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.

The sensor also alerts the system to the absence of groundwater in a monitoring well or the presence of water in containment areas. 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.

13.4.2 Specifications

Operating Temperature	-20°C to 50°C (-4°F to 122°F)
Dimensions (depends on part #)	1.8 cm (0.7 in) dia. x 1.8 - 4.5 m (6 – 20 ft)
Cable	3.1 m (10 ft) gas & oil-resistant
Nominal Polymer Resistance	
Uncontaminated	1K – 3K ohms per foot
Contaminated	30K – 200K ohms

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

13.4.3 Installing the 30-3210-06, -15, -20

This sensor requires TWO Controller Interface Module positions.

- Review Figure 13-6 on page 46.
- Use Table 13-3 below to connect the sensor to the Controller I.S. Module.
- Use the supplied cable gland and silicone wire nuts.
- Install seal-offs at both ends of the conduit run.

13.4.4 Connections

Table 13-3 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

13.4.5 Typical Hydrocarbon Liquid/Water Sensor Installation

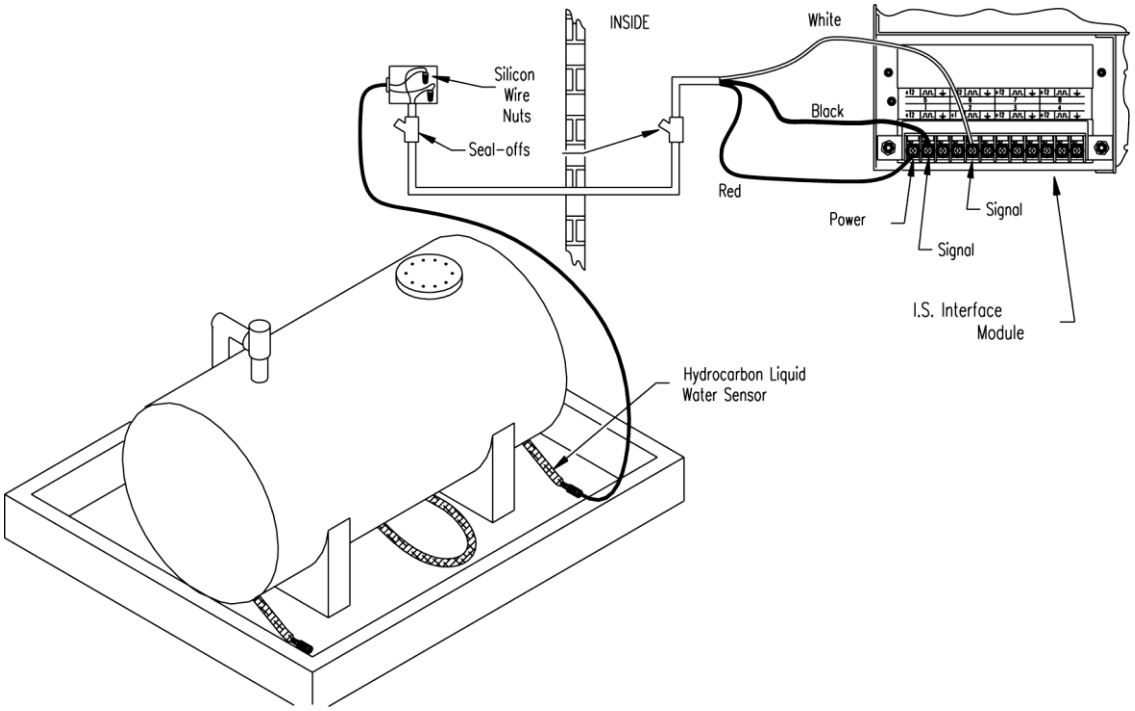


Figure 13-6 Hydrocarbon Liquid & Water Sensor Installation

13.4.6 SiteSentinel® iTouch™ Controller Setup for Hydrocarbon Liquid/Water Sensor

13.4.7 Hydrocarbon Sensor Configuration

1. Configure the barrier position for the hydrocarbon sensor portion to be a **generic** sensor (or if using SiteConnect™ choose the appropriate icon) and install that position.
2. With the controller, take a dynamic reading of the hydrocarbon portion of the sensor.
3. Set the lower alarm threshold to 0.5 volts lower than the reading you obtained in Step 2 (assumes no current hydrocarbon contamination).
4. Set the upper threshold to 5.0 volts (disables upper threshold).
5. Program the alarms associated with the lower threshold that will activate in the presence of liquid hydrocarbons.

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

13.4.8 Water Sensor Configuration

1. Configure the barrier position for the water sensor portion to be a **generic** sensor (or if using SiteConnect™ choose the appropriate icon) and install that position.
2. Set the **upper** alarm threshold to 0.5 volts. Set the **lower** alarm threshold to 0.0 volts (disables lower threshold).

13.4.9 Testing the Sensor

When working in the hazardous area use caution to avoid a hazardous situation. When testing or decontaminating a hydrocarbon sensor, work in a well-ventilated area with no hot surfaces or open flames.

- **Testing and Cleaning the Hydrocarbon 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.

  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.

- **Testing the Water Sensor.** 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.

13.5 30-3219-12 Hydrocarbon Liquid Sump Sensor

13.5.1 About the 30-3219-12

Figure 13-7 Hydrocarbon Liquid Sump Sensor

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.

13.5.2 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
Normal Resistance	
Uncontaminated	1K – 5K ohms
Contaminated	30K – 200K ohms

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

13.5.3 Installing the 30-3219-12

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

This sensor requires ONE Controller Interface Module positions.

- Review Figure 13-8 on page 50.
- Use Table 13-4 below to connect the sensor to the Controller I.S. module.
- Use the supplied cable gland and silicone wire nuts.
- Install seal-offs at both ends of the conduit run.

13.5.4 Connections

Table 13-4 Hydrocarbon Liquid Sump Sensor Wiring

I.S. Interface Module Position	Sensor Wire
+12	Red
⎍	Black
⏚	No Connection

13.5.5 Typical Hydrocarbon Liquid Sump Sensor Installation

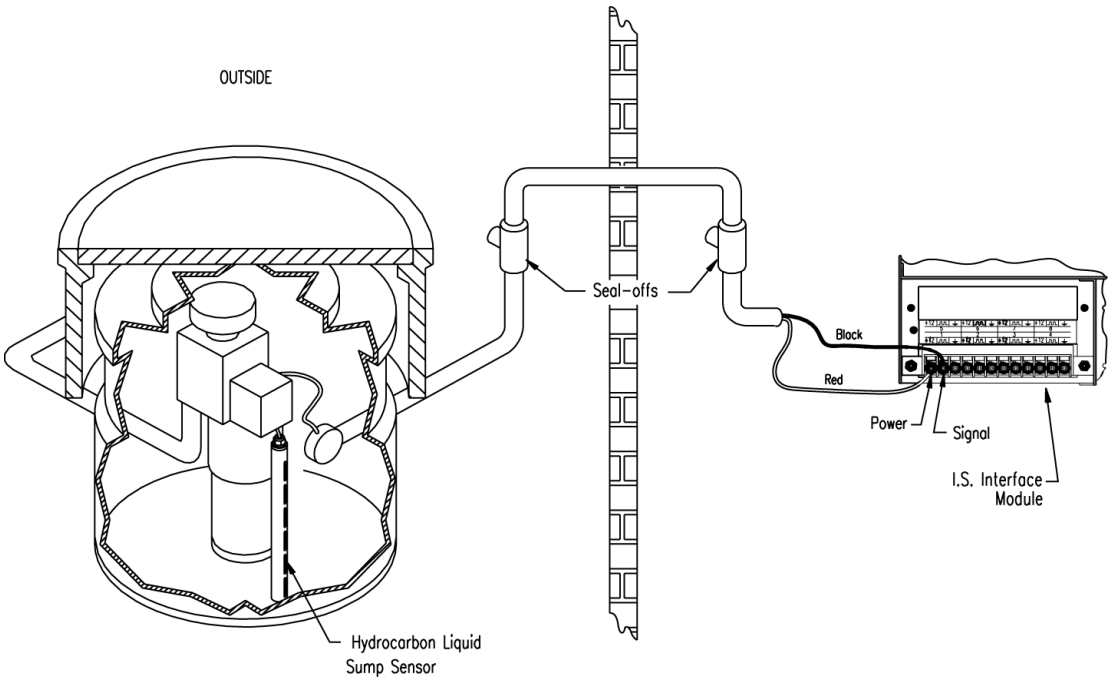


Figure 13-8 Hydrocarbon Liquid Sump Sensor Installation

13.5.6 SiteSentinel® iTouch™ Controller Setup for Hydrocarbon Liquid Sump 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 0.2 volts lower than the reading taken (this assumes that there is no current hydrocarbon contamination).

SiteConnect™ will ask to adjust the lower threshold automatically, to 0.1 V below the current voltage reading. Answer YES.

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

13.5.7 Testing and Decontaminating the Hydrocarbon Liquid Sump Sensor

When working in the hazardous area use caution to avoid a hazardous situation.

When testing or decontaminating the sensor, work in a well-ventilated area with no hot surfaces or open flames.

If the SiteSentinel® ITouch™ Controller fails to detect alarms 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 readjust the controller's thresholds.

13.6 30-3221-1 Single-Level Sump Sensor

13.6.1 About the 30-3221-1

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

This sensor can also be used to monitor wet wells to ensure that 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.

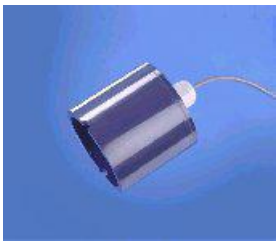


Figure 13-9 Single-Level Sump Sensor

13.6.2 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

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

13.6.3 Installing the 30-3221-1

If monitoring a normally dry well, use a meter to orient 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 orient the float so that it is in the closed state WITH liquid present (float in upper position).

This sensor requires ONE Interface Module position.

- Review Figure 13-10 on page 53.
- Use Table 13-5 below to connect the sensor to the Controller I.S. Interface Module terminals.
- Use the supplied cable gland and silicone wire nuts.
- Install seal-offs at both ends of the conduit run

13.6.4 Connections

Table 13-5 Single-Level Sump Sensor Wiring

I.S. Interface Module Position	Sensor Wire
+12	Red
⎍	Black
⏚	No Connection

13.6.5 Typical Single-Level Sump Sensor Installation

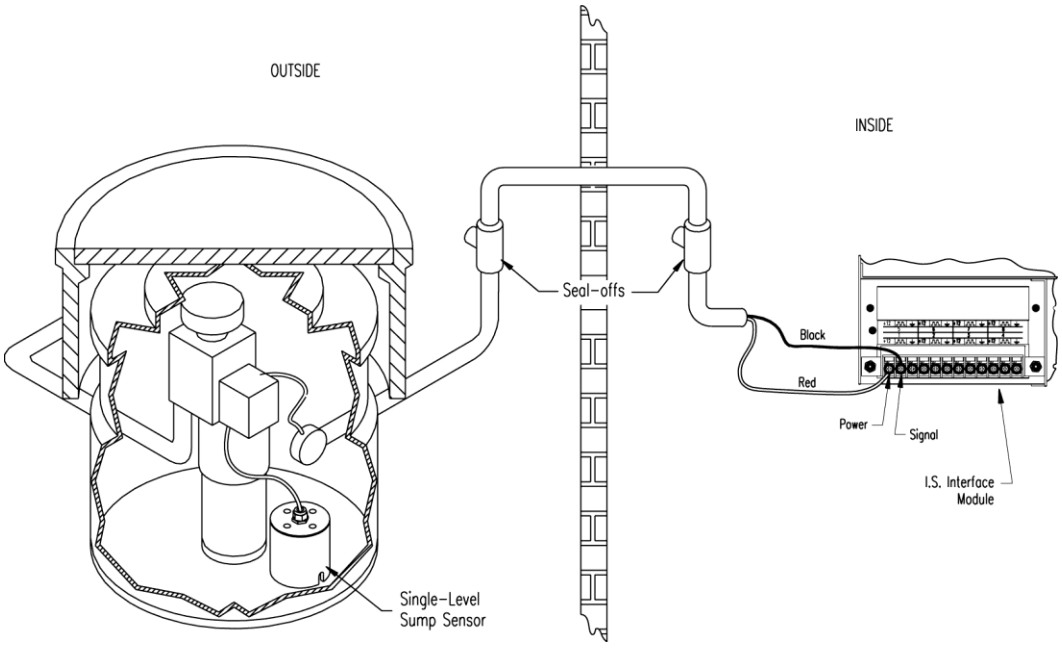


Figure 13-10 Single-Level Sump Sensor Installation

13.6.6 SiteSentinel® iTouch™ Controller Setup for Single-Level Sump Sensor

1. Configure the barrier position to be a **generic** sensor (of if using SiteConnect™ choose the appropriate icon) and install that position.
2. Set the **lower** alarm threshold to 2.5 volts set the **upper** alarm threshold to 5.0 volts (disables upper threshold).
3. Program the alarms associated with the lower threshold to the lower threshold that you wish to activate if the sensor detects hydrocarbon liquid.

13.6.7 Testing the Single-Level Sump Sensor Float

When working in the hazardous area use caution to avoid a hazardous situation.

When testing the senor, work in a well-ventilated area with no hot surfaces or open flames.

If 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 the LOWER position – the alarm should end.

If 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 – the alarm should end.

If the controller fails to register the alarm conditions, check your programmed thresholds in the controller. Check the orientation of the float as described on page 58. 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.

13.7 30-3221-2 Dual-Level Reservoir Sensor

13.7.1 About 30-3221-2

The dual-level reservoir sensor is designed for use in the brine-filled reservoir of the interstitial area of a double-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.

Figure 13-11 Dual-Level Reservoir Sensor

13.7.2 Specifications

Operating Temperatures	-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

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

13.7.3 Installing the 30-3221-2

> **The logic for this sensor can be changed by simply flipping the lower float. To remove the lower float, use needle-nose pliers to remove the bottom clip. Then, remove the plastic cover and the float clip, followed by the float itself.**

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 Interface Module position.

- Review Figure 13-12 on page 56.
- Use Table 13-6 below to connect the sensor to the Controller I.S. Interface Module terminals.
- Use the supplied cable gland and silicone wire nuts.
- Install seal-offs at both ends of the conduit run

13.7.4 Connections

Table 13-6 Dual-Level Reservoir Sensor Connections

I.S. Interface Module Position Terminal	Sensor Wire
+12	Red
⎍⎍⎍	White
⏚	No connection

13.7.5 Typical Dual-Level Reservoir Sensor Installation

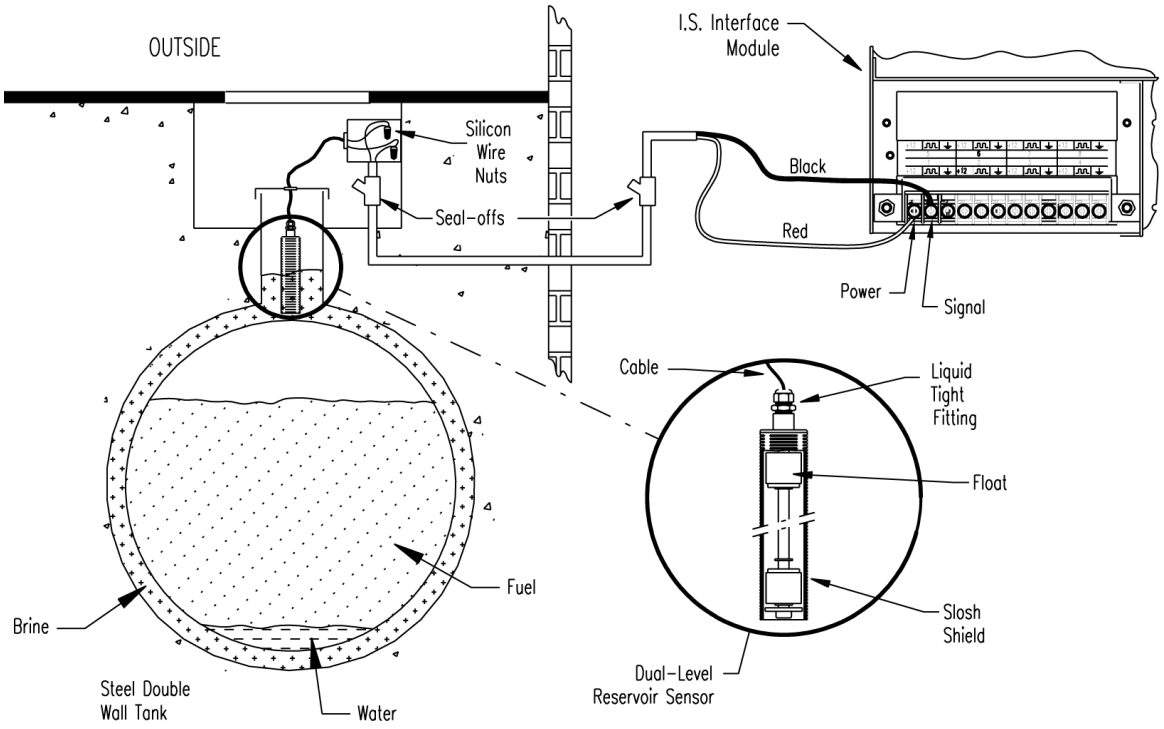


Figure 13-12 Dual-Level Sump Sensor Installation

13.7.6 SiteSentinel® iTouch™ Controller Setup for Dual-Level Reservoir 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. 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.

13.7.7 Testing the Dual-Level Reservoir Sensor Float

> **When working in the hazardous area use caution to avoid a hazardous situation.**

When testing the sensor, work in a well-ventilated area with no hot surfaces or open flames.

If Sensor 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 Sensor 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 54.

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.

13.8 30-3221-1A, -1B Interstitial Level Sensors

13.8.1 About the 30-3221-1A, 1B

The two types of interstitial level sensor are used primarily in the interstitial area of a double-walled tank. The sensor contains a float switch that activates in the presence of a liquid. The **30-3221-1A** is constructed from a chemical-resistant non-metallic material and the **B30-3221-1B** is constructed from brass.

It can also be used in sumps, dispenser pans and other locations where the presence of a liquid could indicate that a leak has occurred. In combination with a vapor sensor, 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.

Figure 13-13 Part # 30-3221-1B

Figure 13-14 Part # 30-3221-1A

13.8.2 Specifications

To ensure safe operating conditions, the sensor has been designed to connect to OPW Fuel Management Systems only.

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

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

If monitoring a normally dry well, use a meter to orient 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 orient the float so that it is in the closed state WITH liquid present (float in upper position).

This sensor requires ONE Interface Module position.

- Review Figure 13-15 on page 60.
- Use Table 13-7 below to connect the sensor to the Controller I.S. Interface Module terminals.
- Use the supplied cable gland and silicone wire nuts.
- Install seal-offs at both ends of the conduit run.

13.8.4 Connections

Table 13-7 Interstitial Level Sensor Wiring

I.S. Interface Module Position	Sensor Wire
+12	Red
	Black
	No Connection

13.8.5 Typical Interstitial Level Sensor Installation

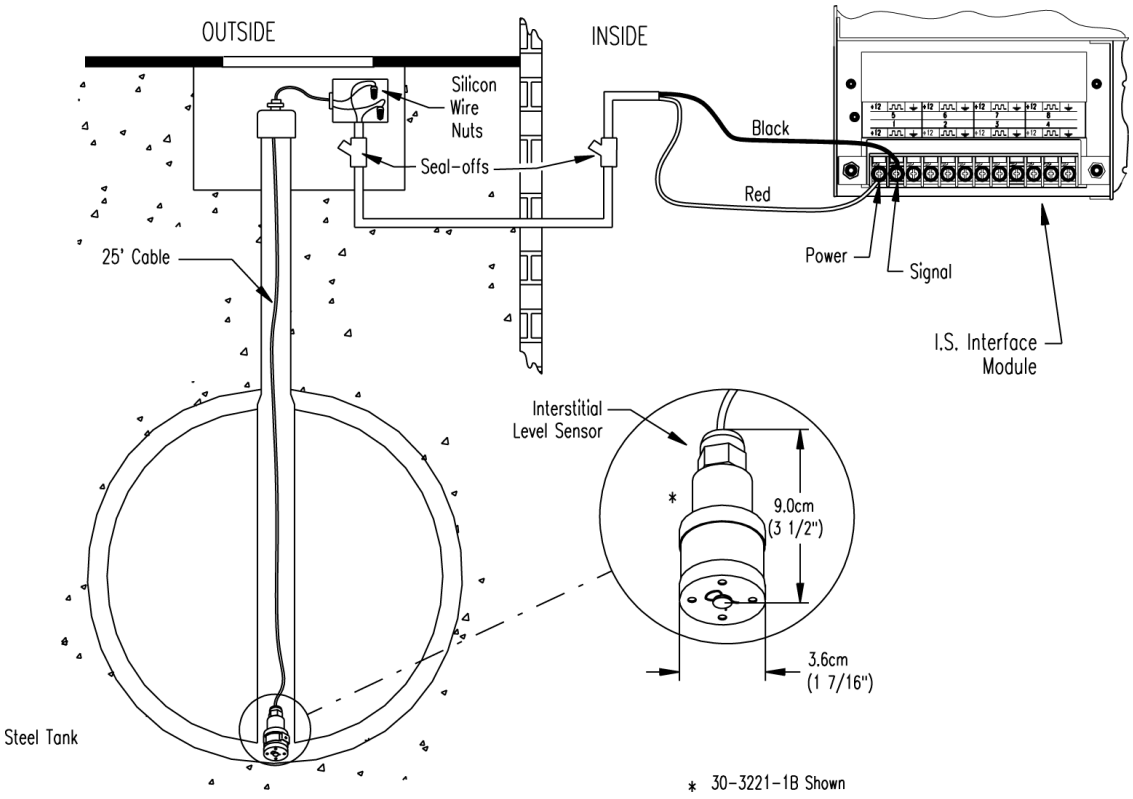


Figure 13-15 Interstitial Level Sensor Installation

13.8.6 SiteSentinel® iTouch™ Controller Setup for Interstitial Level 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 2.5 volts and 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.
3. Program the alarms associated with the lower threshold that you wish to activate if the sensor detects hydrocarbon liquid.

13.8.7 Testing the Float Sensor

When working in the hazardous area use caution to avoid a hazardous situation.

When testing the sensor, work in a well-ventilated area with no hot surfaces or open flames.

If 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 the LOWER position – the alarm should end.

If 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 – the alarm should end.

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 59. 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.

13.9 30-3222 Hydrocarbon Vapor Sensor

13.9.1 About Part #30-3222

Figure 13-16 Hydrocarbon Vapor Sensor

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.

13.9.2 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
Contaminated	10K – 200K ohms

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

13.9.3 Installing the 30-3222

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.

The sensor requires ONE Interface Module position.

- Review Figure 13-17 on page 64.
- Use Table 13-8 below to connect the sensor to the Controller I.S. Interface Module terminals.
- Use the supplied cable gland and silicone wire nuts.
- Install seal-offs at both ends of the conduit run

13.9.4 Connections

Table 13-8 Hydrocarbon Vapor Sensor Wiring

I.S. Interface Module Position	Sensor Wire
+12	Red
⎍	Black
⏚	No Connection

13.9.5 Typical Hydrocarbon Vapor Sensor Installation

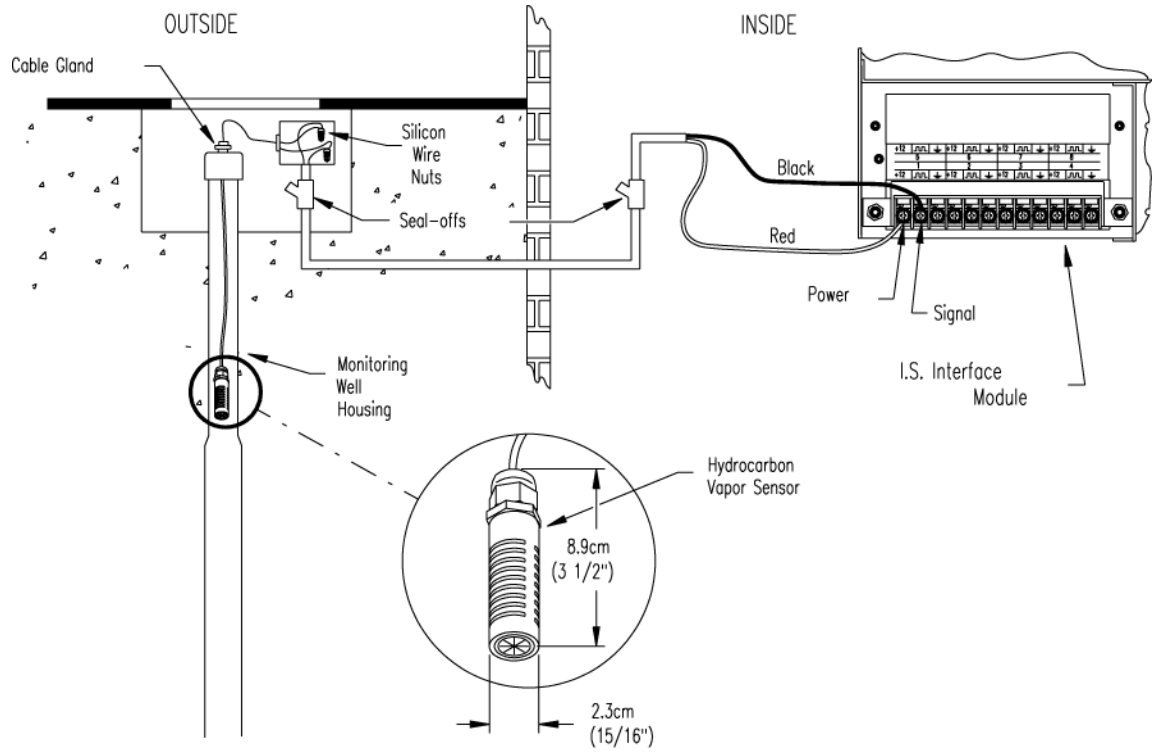


Figure 13-17 Hydrocarbon Vapor Sensor Installation

13.9.6 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.

13.9.7 Testing and Decontaminating the Hydrocarbon Vapor 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 10 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.

13.10 30-3223 Interstitial Optical Liquid Sensor

13.10.1 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.

Figure 13-18 Interstitial Optical Liquid Sensor

13.10.2 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

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

13.10.3 Installing the 30-3223

This sensor requires ONE Interface Module position.

- Review Figure 13-19 on page 67.
- Use Table 13-9 below to connect the sensor to the Controller I.S. Interface Module terminals.
- Use the supplied cable gland and silicone wire nuts.
- Install seal-offs at both ends of the conduit run.

13.10.4 Connections

Table 13-9 Interstitial Optical Liquid Sensor Wiring

I.S. Interface Module Position	Sensor Wire
+12	Red
⎍	White
⏚	Black

13.10.5 Typical Interstitial Optical Liquid Sensor Installation

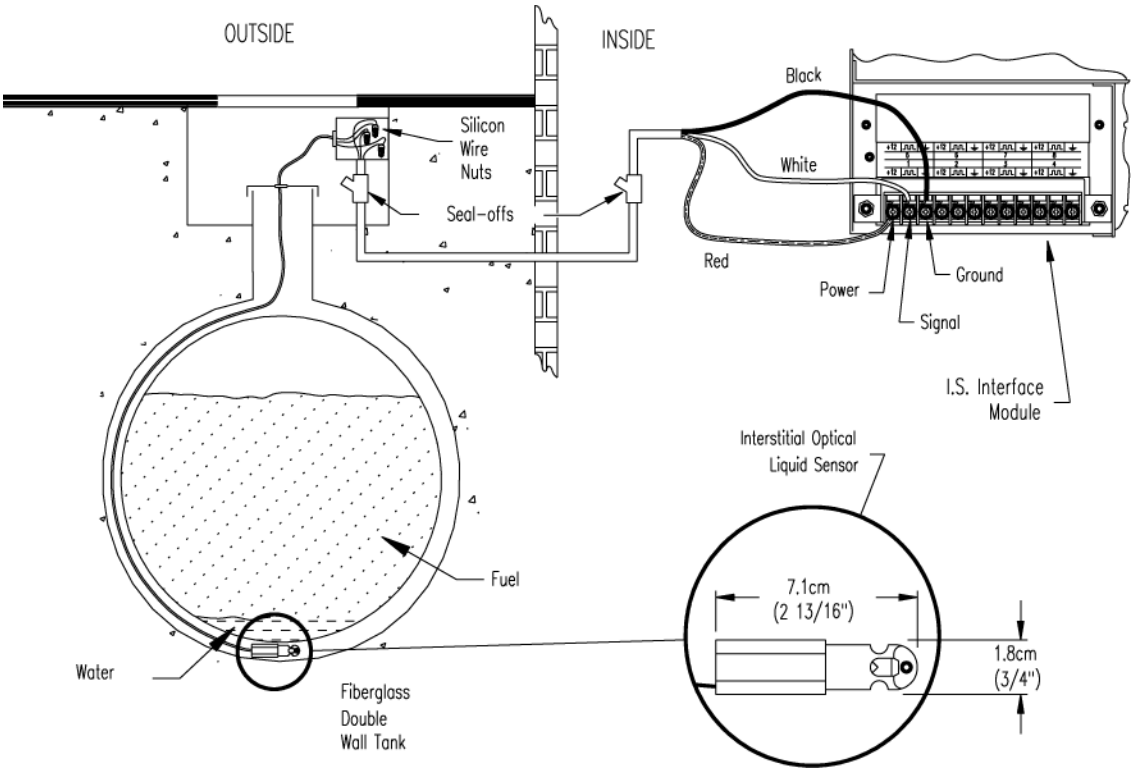


Figure 13-19 Interstitial Optical Liquid Sensor Installation

13.10.6 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.

13.10.7 Testing the Interstitial Optical Liquid 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 ensure continuity without shorts.

13.11 30-3224 Combo Single Level/Hydrocarbon Liquid Sump Sensor

13.11.1 About the 30-3224

This combination sensor is made from a Hydrocarbon Liquid Sump Sensor (page 48) with an Interstitial Level Sensor (page 58) 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 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

Figure 13-20 Combo Single Level/Hydrocarbon liquid Sump Sensor

a

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.

13.11.2 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
30-3221-12	4.4 cm (1.7 in) dia x 33.5 cm (13.2 in) long
Nominal Resistance	
Uncontaminated	1K – 5K ohms
Contaminated	30K – 200K ohms
Cable	3.6 m (12 ft) gas & oil-resistant

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

13.11.3 Installing the 30-3224

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 Interface Module positions.

- Review Figure 13-21 on page 70.
- Use Table 13-10 below to connect the sensor to the Controller I.S. Interface Module terminals.
- Use the supplied cable gland and silicone wire nuts.
- Install seal-offs at both ends of the conduit run.

13.11.4 Connections

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.

Table 13-10 Combo Single-Level/Hydrocarbon Sensor Wiring

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

13.11.5 Typical Combo Single-Level/Hydrocarbon Liquid Sump Sensor Installation

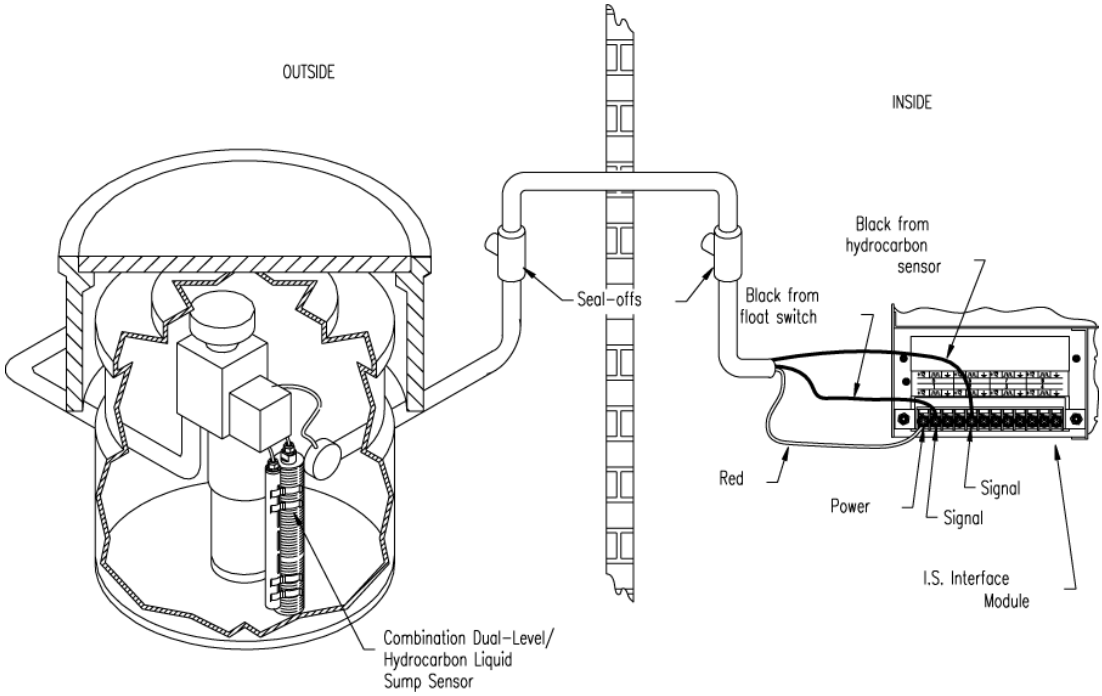


Figure 13-21 Combo Single-Level & Hydrocarbon Liquid Sensor Installation

13.11.6 Controller Setup for Combo Single-Level/Hydrocarbon Sump Sensor

1st Barrier Position (Float Sensor)

1. Configure the barrier position to be a sensor (or if using SiteConnect™ 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 to activate if the sensor detects hydrocarbon liquid.

13.11.7 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 69.

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

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

> **When working in the hazardous area use caution to avoid a hazardous situation. When testing or decontaminating the sensor, work in a well-ventilated area with no hot surfaces or open flames.**

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.

13.12 30-3225 Combo Dual Level/Hydrocarbon Liquid Sump Sensor

13.12.1 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.

Figure 13-22 Combo Dual Level/Hydrocarbon Liquid Sump Sensor

13.12.2 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
30-3219-12	4.4 cm (1.7 in) dia x 33.5 cm (13.2 in) long
Nominal Resistance	
Uncontaminated	1K – 5K ohms
Contaminated	30K – 200K ohms
Cable	3.6 m (12 ft) gas & oil-resistant cable

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

13.12.3 Installing the 30-3225

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

This sensor requires TWO Controller Interface Module positions.

- Review Figure 13-23 on page 74.
- Use Table 13-11 below to connect the sensor to the Controller I.S. Interface Module Terminals.
- Use the supplied cable gland and silicone wire nuts.
- Install seal-offs at both ends of the conduit run.

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 a normally wet well, orient the float so that it is in the closed state WITH liquid present (float in upper position).

13.12.4 Combo Sensor Connections

Table 13-11 Combo Dual-Level/Hydrocarbon Liquid Sump Sensor

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

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 terminals.

13.12.5 Typical Dual-Level Hydrocarbon Liquid Sump Sensor Installation

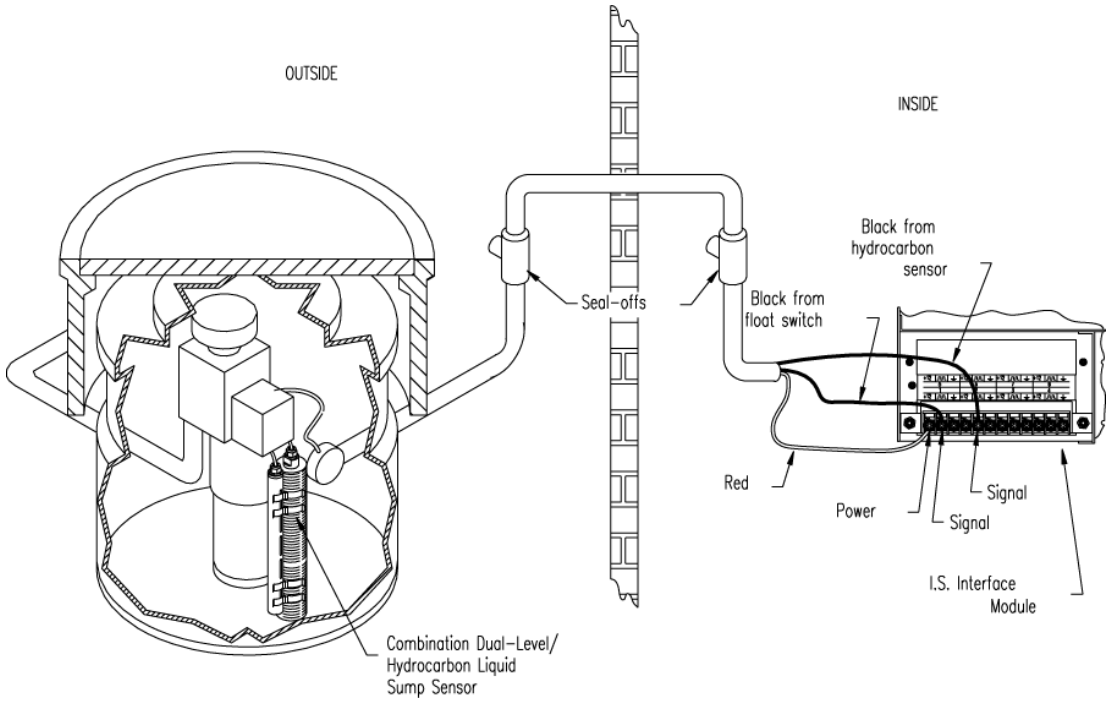


Figure 13-23 Combo Dual-Level & Hydrocarbon Liquid Sensor Installation

13.12.6 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 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.

13.12.7 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 73.

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.

13.12.8 Testing and Decontaminating the Hydrocarbon Portion of the Combo Sensor

> **When working in the hazardous area use caution to avoid a hazardous situation.**

When testing or decontaminating the sensor, work in a well-ventilated area with no hot surfaces or open flames.

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.

13.12.9 Testing the Water Sensor Portion of the Combo Sensor

Immerse only 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.

14 External Device Connection

Figure 14-1 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.

Certain areas of the drawing are expanded in Figure 14-2 below, Figure 15-1 on page 77 and Figure 16-1 on page 78. The modem settings are detailed on page 80.

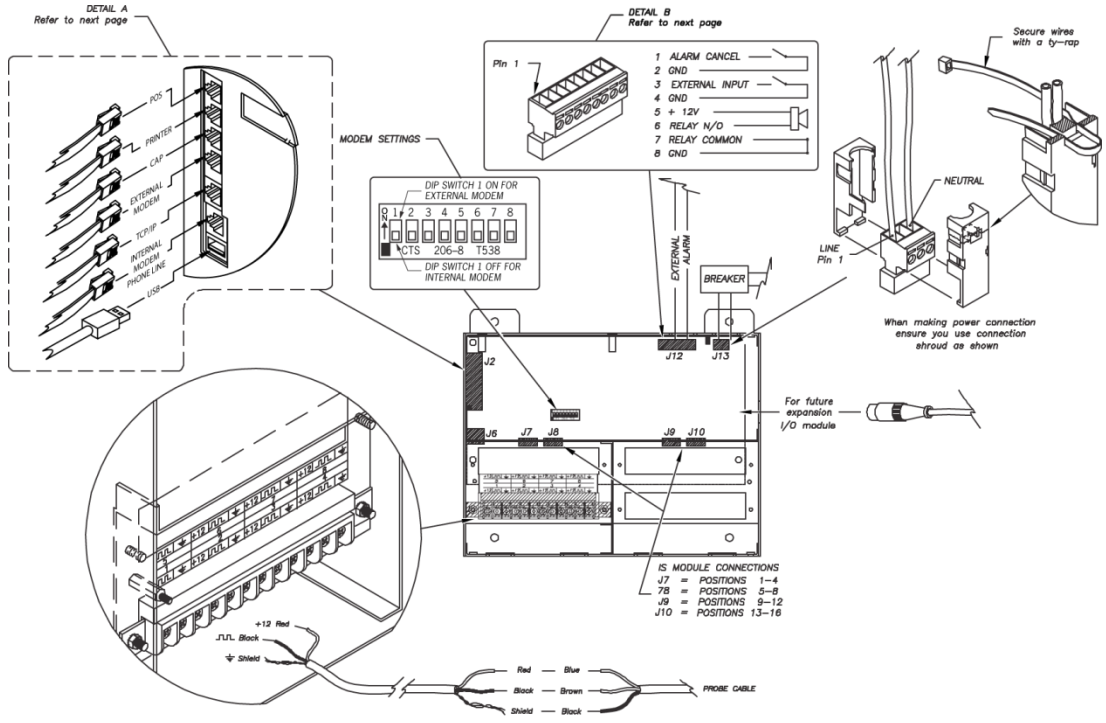


Figure 14-1 Connecting External Devices to the Controller

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.

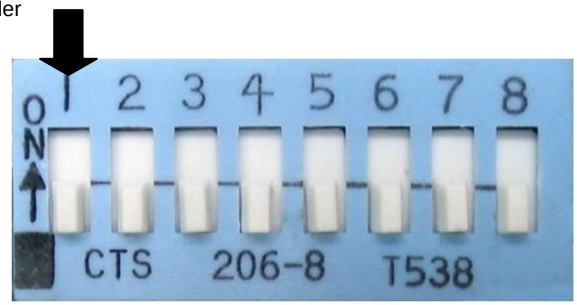


Figure 14-2 Dip Switch for Modem Settings

15 RJ-45 Communication Ports

The SiteSentinel® iTouch™ Controller has five (5) RJ-45 ports as shown in Figure 15-1 below. From top to bottom, they are for:

- POS (Point-of-Sale) Device (see Appendix C – POS Interface on page 85)
- Printer
- CAP port: configuration port for SiteConnect™
- TCP/IP (Internet – setting up a TCP/IP Interface on page 81)
- External Modem (optional)
- Internal Modem (standard)

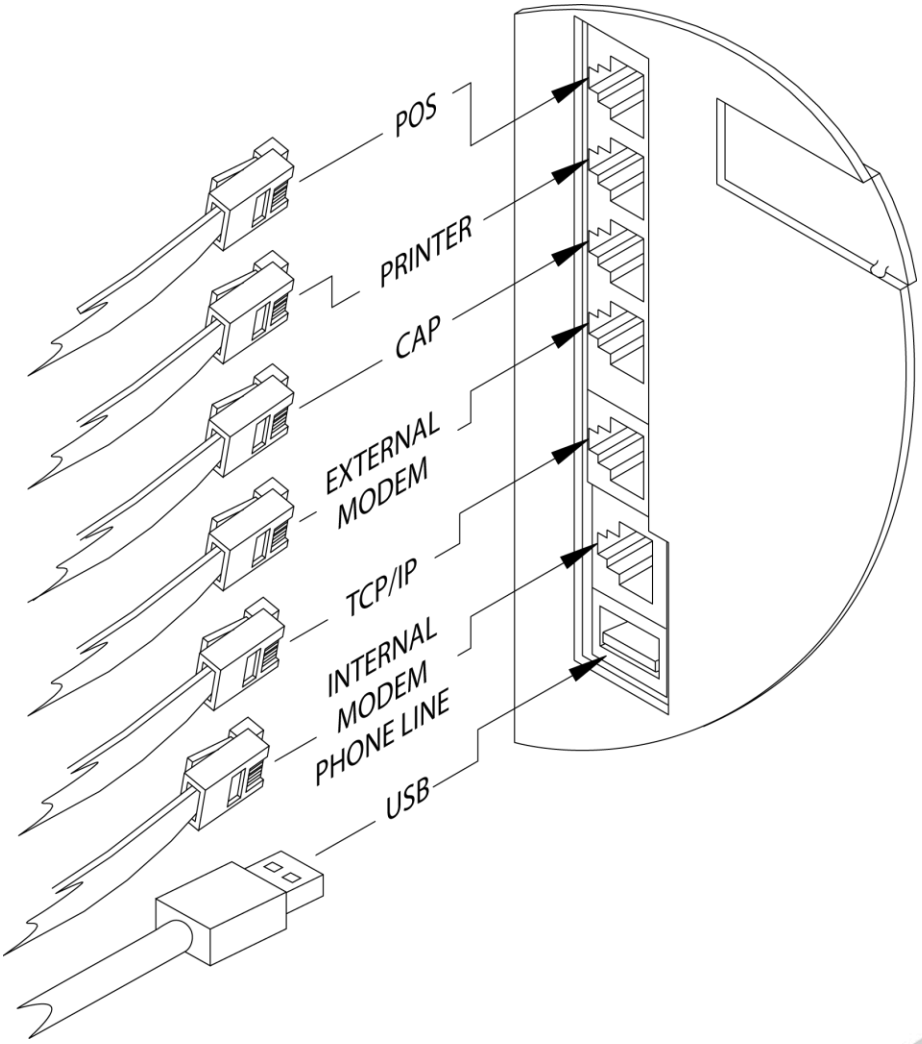


Figure 15-1 SiteSentinel® iTouch™ RJ-45 Communication Ports

16 Terminal Block Detail

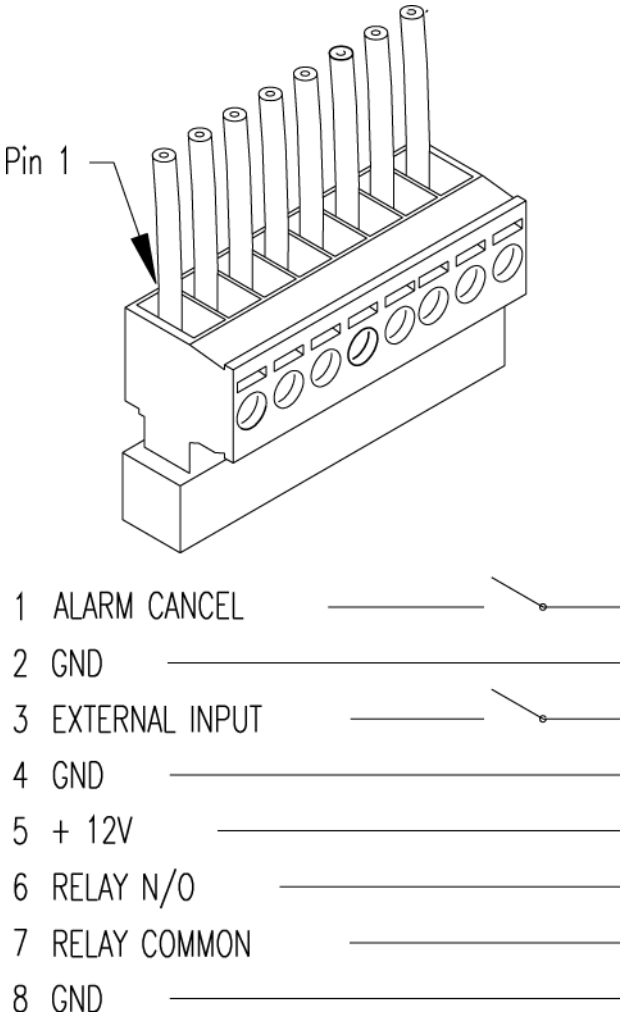


Figure 16-1 SiteSentinel iTouch Terminal Block Connections

If using the external alarm option (see page 83), connect an ALARM CANCEL button across terminals 1 and 2.

17 Printer Option

1. Mount the printer bracket – see Figure 4-2 on page 18.
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 Figure 14-1 on page 76.
4. Plug in the printer's power cable that exits from the 9-pin Dsub.
5. Set DIP switches in printer. See tables in the suction. Refer to the printers operating instructions for paper loading and testing.

The printer is factory-configured with the default settings in Table 17-1, Table 17-2 (below) and Table 17-3 (page 80). 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.

Table 17-1 Printer DIP Switch 1 Settings

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	

Table 17-2 Printer DIP Switch 2 Settings

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	

Table 17-3 Printer DIP Switch 3 Settings

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	

17.1 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 Figure 15-1 on page 77 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 Figure 15-1 on page 77 for the External Modem port location.

18 CAP Connection for SiteConnect™ Software

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 Figure 15-1 on page 77 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 – Upgrading SiteSentinel® iTouch™ Software Via SiteConnect™ on page 86).

If a software upgrade fails, change the connection speed to 19,200 and try to connect to the SiteSentinel® iTouch™ Controller again.

18.1 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 – POS Interface page 85.

18.2 Built-in TCP/IP Connections

SiteSentinel® 1 is equipped with built-in TCP/IP port and supports DHCP function. For port location, please refer to Figure 15-1 on page 77. The controller will automatically accept the TCP/IP address assigned by local LAN.

19 Appendix A – LCD Screen Icons

19.1 Sensor, Probe and Controller Status Icons


Product Level HIGH


Product Level HIGH-HIGH (overflow)


Product Level LOW (re-order)


Product Level LOW-LOW (shut-down)


Water Level HIGH


Water Level HIGH-HIGH


Sensor Alarm


Sensor Alarm (multi-sensor controller position)


Product Temperature HIGH or LOW


Probe Failure


Delete this Alarm


Failed Timed Leak Test (also see below)


Tank #


Pump #


Safe Working Capacity


Controller INPUT Contacts CLOSED


Monitoring Well


Flash Memory Update in Progress


Printer Error


Power Failure


Contoller Status is OK

Manifolded Tanks


Manifolded Tank Group


No Leak Test Warning


Product Density

Leak Test Result Icons


Printer Error


Failed


Aborted


Low Product Volume


Temperature Compensated Volume


Corrupted Start Data


Activity During Test


Delivery


Probe Failure


Power Failure

20 Appendix B – Alarm Kit Option

20.1 Alarm Kit Part Numbers

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

The Alarm Box requires mains/line voltage (see Figure 20-1 on page 83). 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 supplied with the Alarm Kit – obtain a relay with the specifications given in Table 20-1 below.

Table 20-1 External Alarm Relay Specifications (NOT Supplied)

Coil Rating	12 VDC @ less than 100 mA
Contact Rating	115 or 230 VAC @ greater than 500 mA

20.2 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.

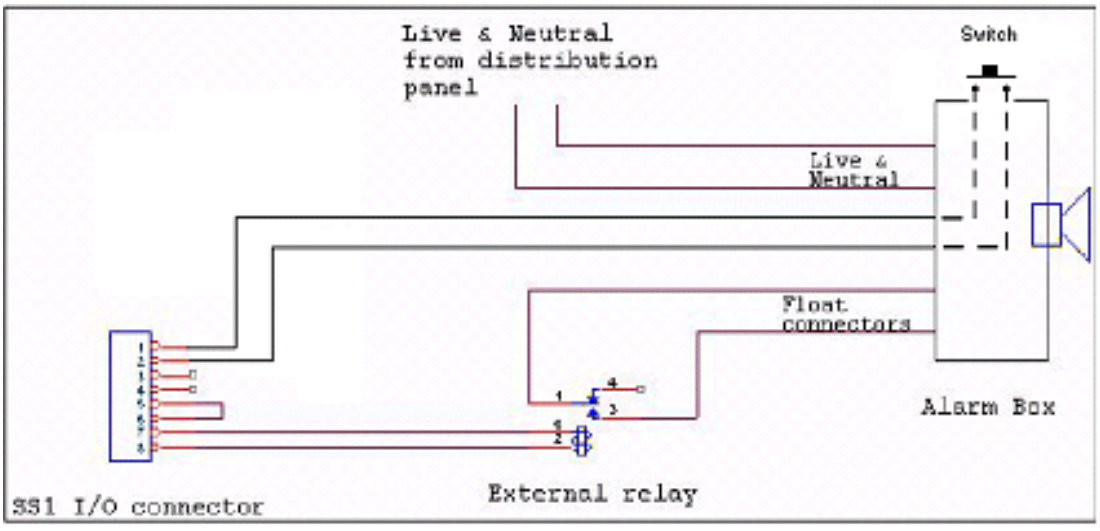


Figure 20-1 External Alarm Wiring

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 the SiteSentinel® iTouch™ Controller are closed or the switch is pressed.

Attach a switch across position 1 and 2 (see Figure 20-1 above) to energize or de-energize an external relay.

20.3 Alarm Kit Connections

See Figure 20-1 above. Connections are also listed in the table in Table 20-2 below.

Table 20-2 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

21 Appendix C – POS Interface

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

21.1 SiteSentinel® iTouch™ POS Port

If you order the SiteSentinel® iSite™ Automatic Tank Gauging System with the POS option, you'll get a cable, part number 20-1586.

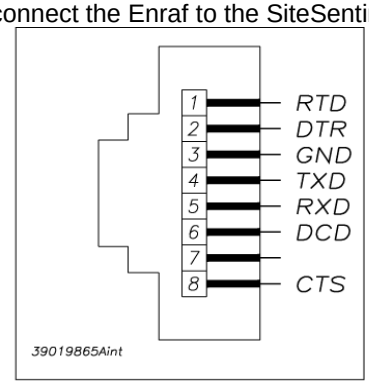
Use SiteConnect™ (from main menu: **Configuration > SiteSentinel iTouch Port Parameters**) to program the following:

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

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

21.2 Prepare and Attach the Cable

See Figure 21-1 below to prepare a cable to connect the Enraf to the SiteSentinel® iTouch™ POS port.



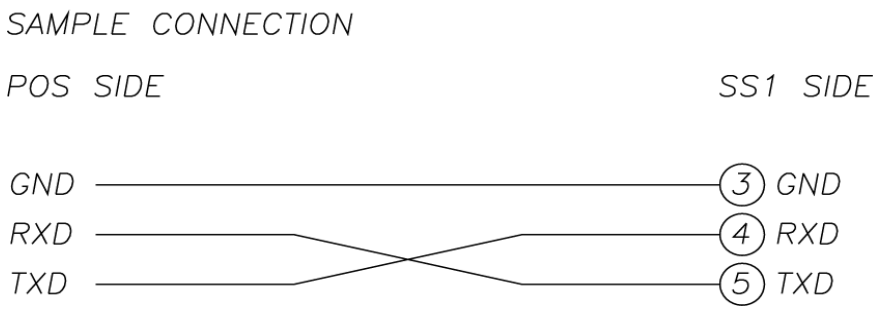


Figure 21-1 Pinout for POS-to-SiteSentinel® iTouch™ Cable

22 Appendix D – Upgrading SiteSentinel® iTouch™ Software Via SiteConnect™

The following steps describe the procedure used to upgrade the SiteSentinel® iTouch™ 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.

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

3. Click the **(New Profile)** icon to create 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 of 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 of 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 of 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 of 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 of the dialog boxes that follow.
30. Select **Tools > Remote Cold Start.**

31. Acknowledge all of the dialog boxes that follow.
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 of the dialog boxes that follow.
36. Select **Controller > Restore**.
37. Disconnect from SiteConnect™.

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

23 Appendix E – OM4 Output Module Option

The optional OM4 Output Module expands your SiteSentinel® iTouch™ capabilities by letting you connect as many as eight (8) output devices to the SiteSentinel® iTouch™ Controller. The OM4 Output Module communicates with the controller via a single-wire communication port. Up to two (2) OM4 Output Modules can be connected for a total of eight (8) output devices.

A common Output Module application is to turn off a submersible pump when low product is detected in the tank. Or, use it to activate an audible alarm when high product is detected in a tank.
See SiteConnect™'s Online Help to program the alarms or events and to associate them with the Output Module.

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

High voltages exist inside the OM4 Output Module. Only qualified technicians should open the unit. Before working on the OM4 Output Module, disconnect all power, including power to and from the relays.

Output relays in the OM4 Output Module are not intrinsically safe! Do not PLACE PROBE AND/OR SENSOR WIRING IN CONDUIT THAT CONTAINS WIRING FOR DEVICES CONNECTED TO THE OM4 Output Module.

23.1 Codes

- Relay wiring is classified 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). The installer is responsible to investigate and follow any applicable local codes.

23.2 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.

23.3 OM4 Output Module Specifications

Table 23-1 Wiring Connections for Alarm Kit

Field Wiring Rating	221ºF (105°C), 600V Type RH. TW, RFH-2 or equal
Power Requirements	12VDC, 0.5A Max. provided by SS1 controller
Dimensions	6" W x 6" H x 4" D (15 cm x 15 cm x 10 cm)
Ambient Temperature	32°F - 104°F (0°C - 40°C)
Relay OUTPUT Rating	5A @ 240 VAC / 5A @ 24 VDC

23.4 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).

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 (4) mounting holes.

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

Run steel conduit for the relays to a knockout 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 Figure 23-1. Remove the metal plug from the right side of the SiteSentinel® iTouch™ Controller to expose the DIN connector inside.
5. See Figure 23-2. 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 bushing to the box.

The field wiring terminal locks are removable to ease installation.

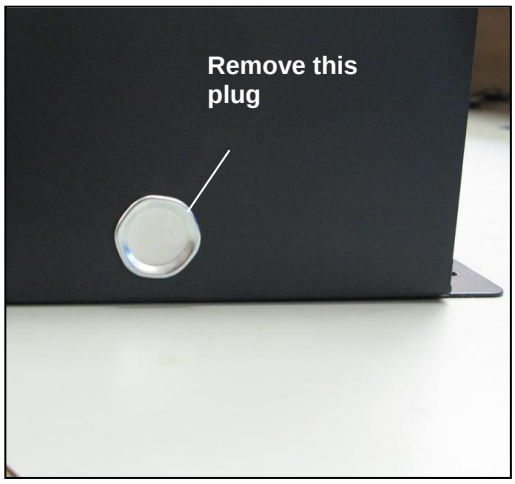


Figure 23-1 SS1-to-OM4 Connection

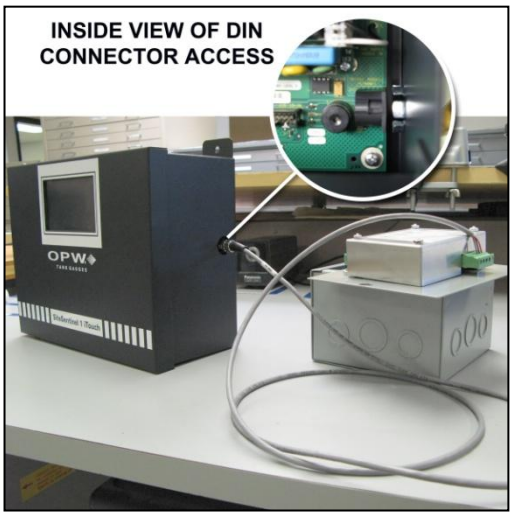


Figure 23-2 DIN Connector Access

See Figure 23-3 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.

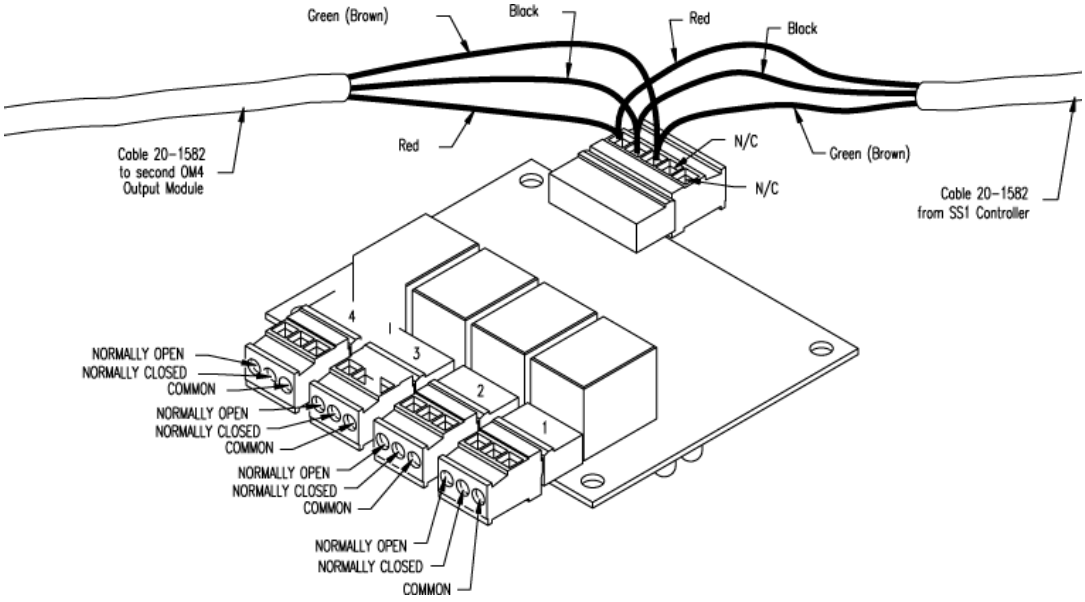


Figure 23-3 OM4 Output Module Wiring

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. See Figure 23-4 right. When installing two OM4 Output Module boxes, place the address jumper on the second OM4 on the second row of pins as shown. To do this, take off the four (4) 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.

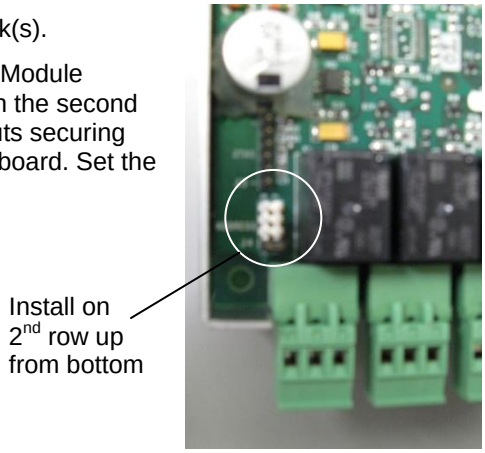


Figure 23-4 Address Jumper for #2 OM

24 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.

24.1 About the LPG Probe

24.1.1 30.1510 Probe Kit (Figure 41) Contents

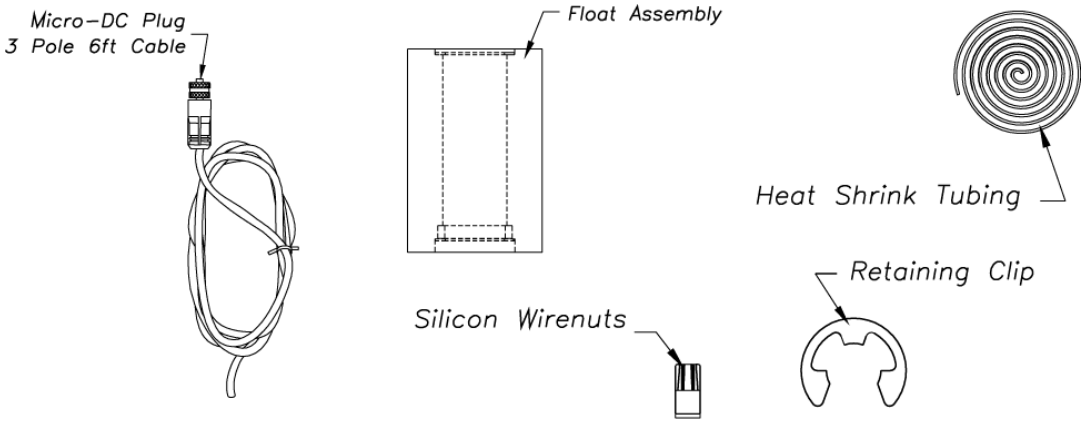


Figure 24-1 What's Supplied in the 30-1510 Kit

1 – Micro-DC plug pole 6 ft Cable

1 – Heat-shrink tubing

1 – Retaining clip

3 – Silicone wire nuts

1 – Float

24.2 30-1511 Probe Kit (Figure 24-2) Contents

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

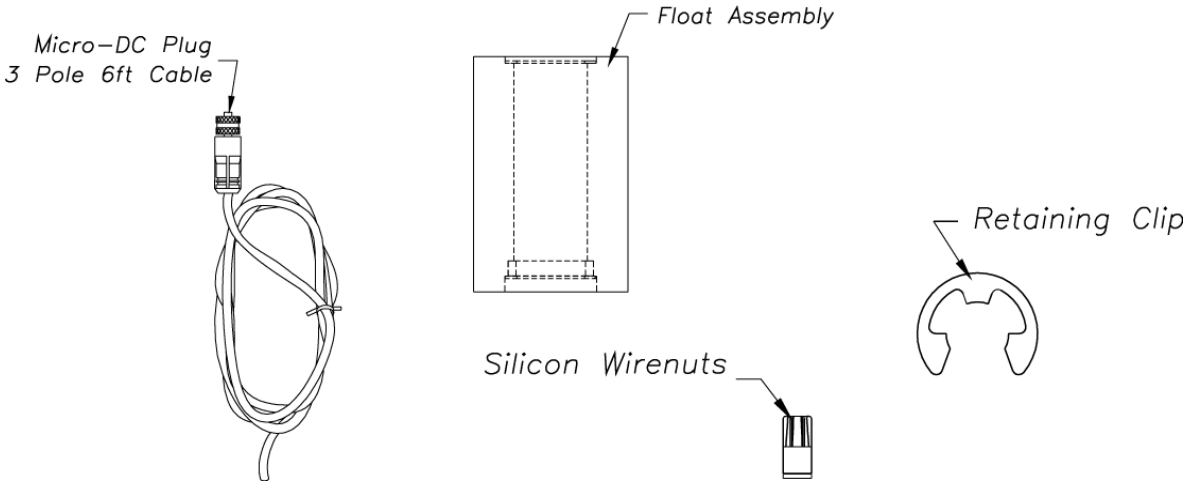


Figure 24-2 What's Supplied in the 20-1511 Kit

1 – Micro-DC Plug Pole 6 ft Cable

1 – Retaining Clip

3 – Silicone Wire nuts

1 – Float

24.2.1 Head Cover Kit (Figure 24-3) Contents

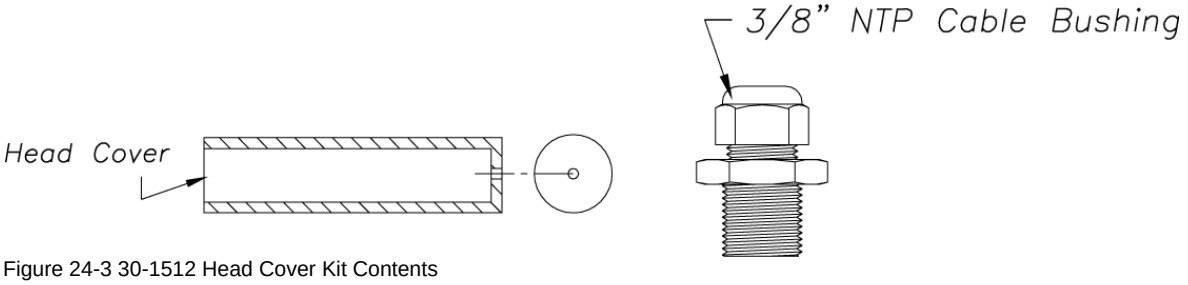


Figure 24-3 30-1512 Head Cover Kit Contents

1 – 3/8 NTP Cable Bushing

1 – Head Cover

24.3 Installing the LPG Probe

Refer to Figure 24-4 below while working on the probes. Unless noted, instructions apply to both probe types.

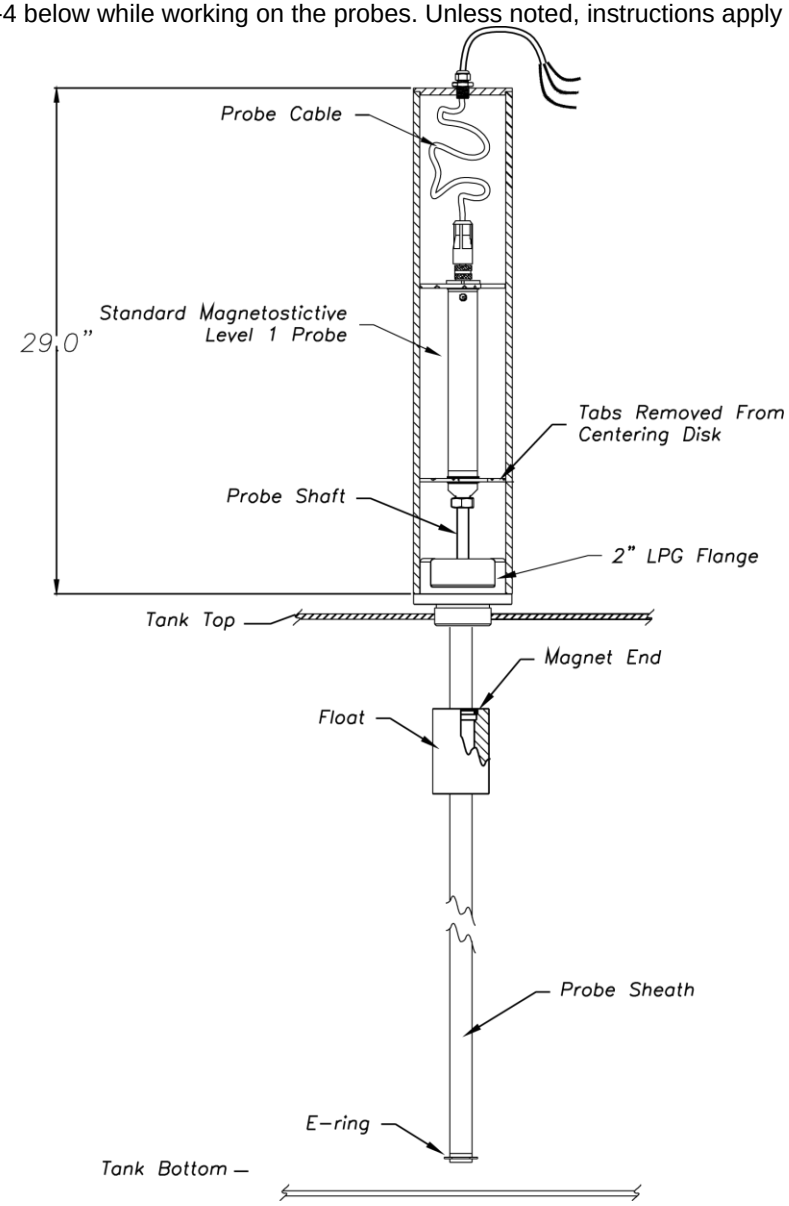


Figure 24-4 Probe Assembly and Installation Overview

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.

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.

> **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

> **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 (Figure 24-3 on page 92). You can cut the cover for clearance, but make sure you leave room for connections and cable (Figure 24-4 on page 93).

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.

25 Appendix G – Probe Comparison

25.1 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 (0.38 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-steel probe head and probe shaft)
- Conformal-coated circuit board with 100% Surface Mount Components
- Smaller overall head diameter - .2 in (3 cm) diameter – and shorter probe head – 8 in (20 cm) long

25.2 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 Table 21 below:

Table 25-1 924 Probe Conversion Chart

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 (335 cm) Diameter/Height Tank
30-EA149	30-B149	Probe for 12 ft (366 cm) Diameter/Height Tank

25.3 Probe Installation

- Riser: as the new 924B probe head is 1 in (2.54 cm) shorter than the 924 Probe, there will be slightly more installation clearance within any given riser (see Figure 25-1 below)
- Wiring: The 924B probe must be installed using Belden 88760 cable terminating on the same cable connector at the head
- Configuration: The configuration process remains the same as current 924 probes. For details, please refer to a SiteSentinel® iTouch™ 2 or 3 installation manual and/or SiteConnect™ software help file.

Figure 25-1 924 vs. 924B Probe Head

All 924B probes will be shipped out from the factory with two plastic stabilizers installed. Should there be any reason to reinstall the plastic stabilizers and the E-Clip retainers, please do the following:

1. Twist white plastic stabilizer to open it and slide it onto the top of the probe head, butting it up against the end of the probe head as shown (See Figure 25-2).
2. Starting at the bottom of the probe, slide on an E-clip all the way up the probe shaft until it locates in the grove directly below the top stabilizer as shown in Figure 25-3 (You will need to push the clip past the lower two grooves on the probe head that are used to locate the second stabilizer).
3. Slide the second E-Clip up the probe shaft and locate it in the second of the two grooves found on the probe head, twist a second stabilizer onto the probe head and butt it up against the E-Clip. Finally, slide a third E-Clip up the probe shaft and locate it into the groove as shown in Figure 25-4, clamping it between the two E-Clips.
4. Put on the clip at the bottom of the probe head.

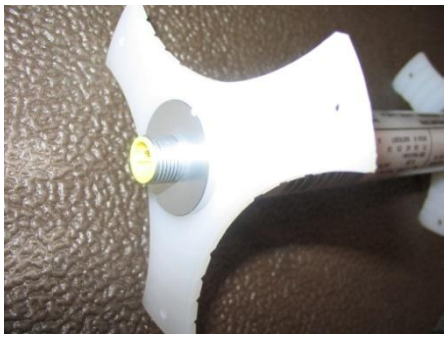


Figure 25-2 Top Stabilizer

Figure 25-3 Top Clip

Figure 25-4 Lower Stabilizer and Clip

26 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.

26.1 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 new SiteSentinel® iTouch™ board (0322) is shown in Figure 26-1 below:

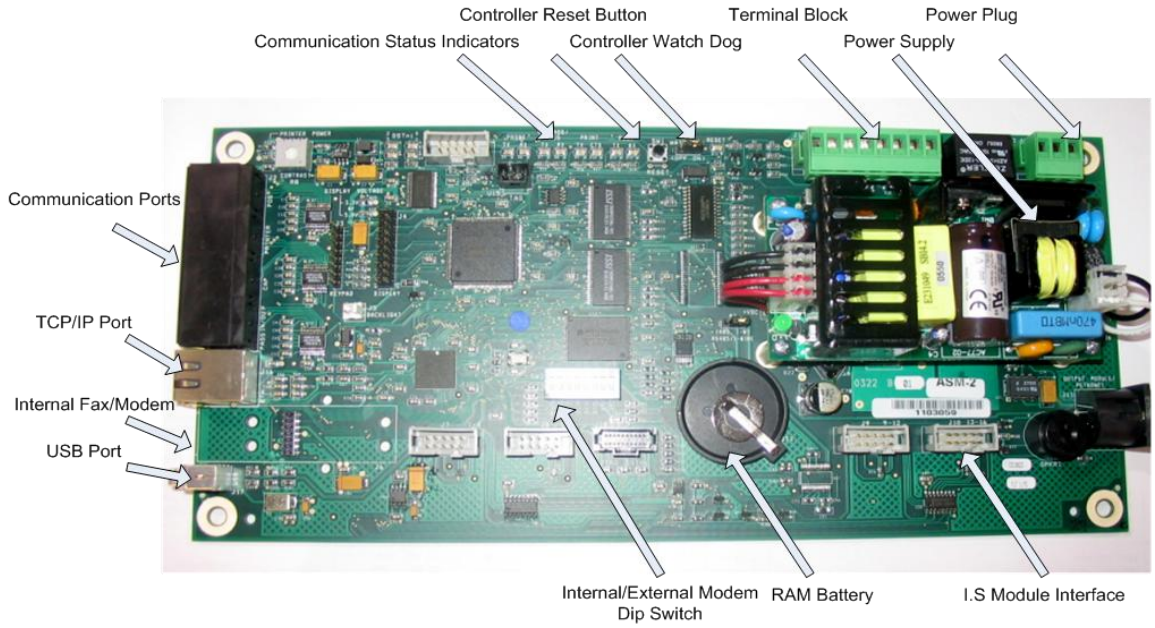


Figure 26-1 SSI Board (0322)

Below is a comparison chart of the current (0320) and new (0322) SiteSentinel® iTouch™ Main Board:

Table 26-1 Comparison chart of the current (0320) and new (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

26.2 Hardware Detail

26.2.1 Communication Ports

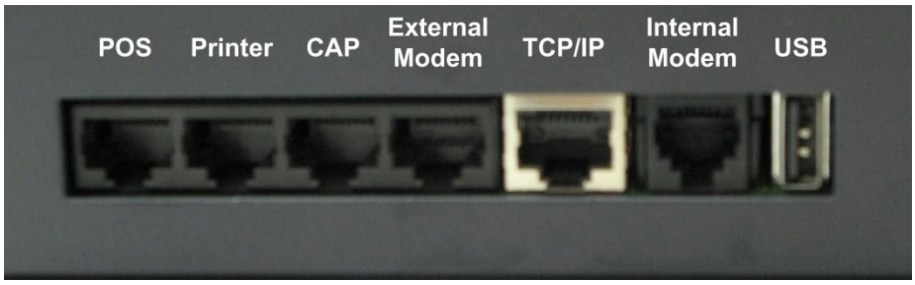


Figure 26-2 Communication Ports

Power Supply: Separate power supply board.

Figure 26-3 Power Supply

26.3 Status Indicators

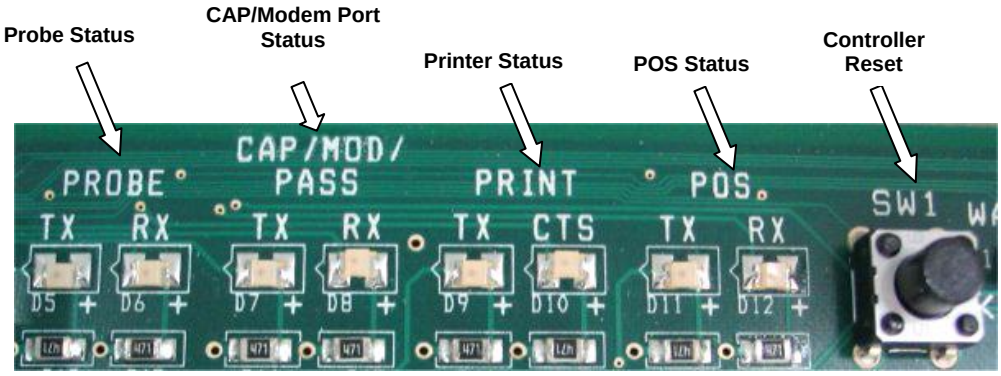


Figure 26-4 Status Indicators

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

RX: Receiving data

TX: Sending data

CTS: Clear to send

26.4 Dip Switch

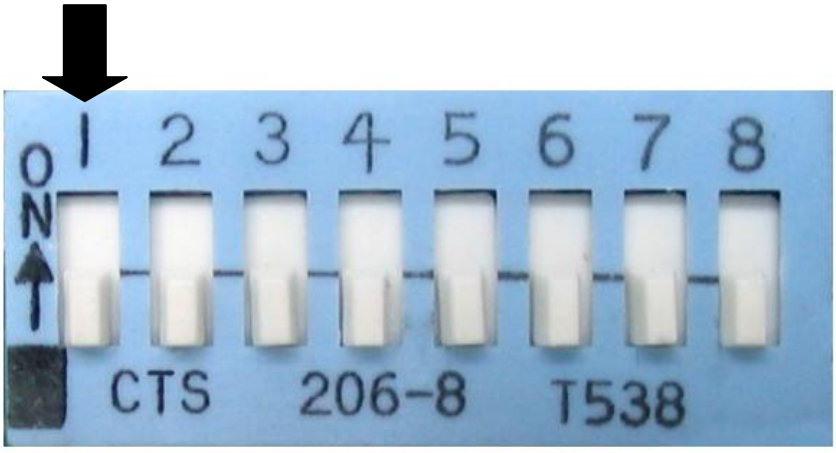


Figure 26-5 DIP Switch

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.

27 Appendix I – 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)

H. Kendall Wilcox
(signature)

November 6, 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
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

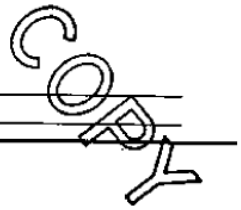
The evaluation testing was conducted in a 13,700 gallon ( ) steel (X) fiberglass tank that was 120 inches in diameter and 323 inches in length.

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



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)

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.

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, 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 0.7 %.

The corresponding probability of detection [P_D] of a 0.20 gallon per hour leak is 99.3 %.

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, 2-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 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 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.

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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

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

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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)

Volumetric TTT Method - Results Form

Page 2 of 2

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

DECLARATION OF CONFORMITY

In accordance with ATEX Directive 94/9/EC, Annexes IV and VII Equipment intended for use in potentially explosive atmospheres.

Standard (s) to which conformity is declared:	EN 50014: 1997 +Amds 1 & 2 EN 50020: 2002 EN 50284: 1999
Manufacturers Name:	OPW Fuel Management Systems, Inc.
Manufacturers Address:	6900 Santa Fe Drive Hodgkins, IL. 60525 USA
Type of Equipment:	Integrated Tank Monitoring System
Model:	SiteSentinel 1 (Controller/924 Probe)
Notified Body:	Baseefa (2001) Ltd. Notified Body Number 1180 Buxton, Derbyshire UK
EC Type Certificates:	Baseefa03ATEX0348X Dated: 30 June 2003 Baseefa03ATEX0349X Dated: 30 June 2003

The following additional European standards have been applied.
EN 60950 + A1: 1993 + A2: 1993 + A3: 1995 + A4: 1996

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

Place: Hodgkins, IL.

Date: 22 December 2004

John G. Petrovich
Compliance Coordinator

European Compliance

DEVICE	AGENCY	STANDARDS	MARKING	CERTIFICATE NUMBER
Model 924 Probe	BASEEFA	EN 50014 (1997) + Amds 1 & 2 EN 50020 (2002) EN 50284: 1999	Ex 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)	Ex 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.

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