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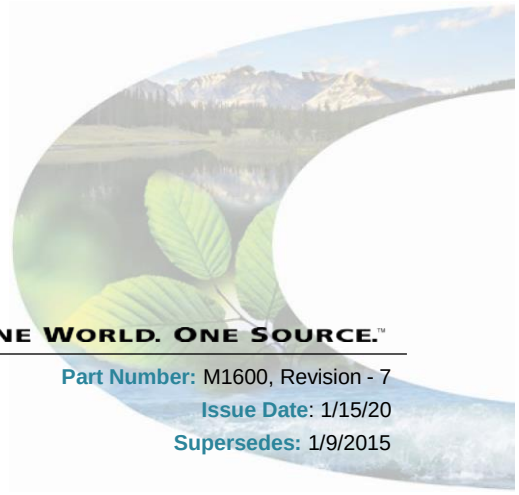
SiteSentinel® iSite™

INTEGRATED MONITORING SYSTEM

Installation Manual



www.opwglobal.com

Central Technical Support Number: 1-877-OPW-TECH (877-679-8324)

Calls outside US and Canada: 1-708-485-4200 **Fax:** 1 (800) 421-3297

Hours: Monday through Friday, 7:00 am to 6:00 pm, US CST

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OPW Fuel Management Systems' System and Replacement Parts Warranty Statement

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

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Applicable Warnings

The inside of the SiteSentinel→ iSite Console contains no useable parts and operates on high-voltage circuitry; therefore, ONLY certified technicians should be allowed to access the console. However, the internal printer (if installed) may be accessed by the user for regular maintenance including paper replacement. The printer is accessed through the door on the right side of the console.

The SiteSentinel® iSite™ Console is powered by a lithium battery which may require periodic replacement.

> CAUTION: Replacing this battery with an incompatible type may lead to complications including EXPLOSION or FIRE.

Once removed, used batteries must be properly disposed of at a battery-recycling center.

The SiteSentinel® iSite™ Console uses RJ-11 telephone connectors for operation – all wires used with these connectors must be 26 AWG or larger.

A readily accessible external disconnect device must be installed for any permanently connected equipment.

A readily accessible electrical outlet should be installed near any equipment requiring access via a plug connection.

Figure 1-1 SiteSentinel® iSite™ Console

1 Before You Begin

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

1.1 Installer Safety

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

Installation must be in accordance with the U.S. National Electrical Code (NFPA No. 70) and the Automotive and Marine Service Station Code (NFPA No. 30A).

For Installations outside of the United States, ensure that the installation adheres to all applicable local codes.

A fuel tank is a **hazardous area** as defined in the NEC. Only non-intrinsically safe devices can be installed in or above the Class 1 Division 1 Hazardous area.

1.2 Precision Leak Test

A precision leak test should be performed on each tank— **especially older ones**—*before* installing the SiteSentinel® iSite™ Integrated Tank Monitoring System. This test ensures that leak data generated by the system is accurate and reliable. A *pressurized* precision leak test can be performed on a tank after the probe has been installed, but pressure is NOT to exceed 5 psi.

> Most regulatory agencies will accept the ATG tank test as the acceptance test on new tank installations.

1.3 Initial Inspection

The console Data Sheet, which can be downloaded from the OPW Global website at www.opwglobal.com, provides specific details about your system. Store this sheet in a secure location.

> All packaging materials should be inspected thoroughly for damage that may have occurred during shipping.

1.4 Manifolded Tanks

Tanks can be physically connected or manifolded so that product flows freely between them. To monitor manifolded tanks with the SiteSentinel® iSite™ system, each tank in the group must have its own probe installed and all probes must be connected to the same VSmart Module.

> 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 all instructions carefully before proceeding.

2 System Overview

2.1 SiteSentinel® iSite™ Console

The SiteSentinel® iSite™ console (Figure 1-1 SiteSentinel® iSite™ Console) monitors up to 256 probes, 64 AST (Flex) probes, 1,024 sensors or combination of each. The console is equipped for up to 16 external output devices to be utilized at once. Since only AC power connections and Petro-Net communication connections are required, the console can be installed in many locations within a fueling facility.

The SiteSentinel® iSite™ console can be operated via the integrated 15″ (38.1 cm) touch screen display, a local PC connection, or a remote PC connection. To operate the SiteSentinel® iSite™ console via PC, an Internet browser capable of rendering Flash 7.0 or higher is required. No additional hardware or proprietary software is required for remote connections.

Operation of the console via a local PC connection requires use of the supplied crossover Ethernet connection cable. To connect remotely via a local or corporate LAN/WAN, the system's IP address may be entered into your Internet browser's address bar. For remote connections via other methods, including VNC Viewer software, consult an IT professional for assistance.

The SiteSentinel® iSite™ supports up to 10 simultaneous browser sessions in addition to one session via the integrated LCD touch screen.

2.1.1 Blank Door Unit

For sites choosing to operate the console via remote connections only, a Blank Door option exists. When enabled, the console's touch screen display will not be activated; instead, an illuminated push button will be available on the front panel for alarm notification and acknowledgement.

SiteSentinel® iSite™ Console Specifications	
Dimensions:	Width: 15" (38.1 cm) Height: 12" (30.5 cm) Depth: 7" (17.8 cm)
Power:	120/240 VAC +/- 10%, 50/60 Hz, 200 W
Operating Temperature:	32°F to 104°F (0°C to 40°C)
Module Capacity:	Eight (8) VSmart Modules Four (4) Output Modules (OM4) Four (4) Line Interface Modules (LIM)
Display:	15" (38.1 cm) color LCD touch screen display GUI interface
Printer:	External USB, Network Office Printer or (optional) Internal Printer
Modem:	Three (3) Internal Modems
Standard Alarms: Optional Alarms: Alarm Notification:	Buzzer, Light and Acknowledge External Tank alert (internal relay) External OM4 module Email, Fax, SMS
Communication Ports:	Four (4) RS-232 Communication ports Two (2) RS-485 Communication ports Two (2) Ethernet ports Two (2) USB ports Optional wireless communication between console and VSmart
Network Connectivity:	DHCP/static addressable RJ-45 Ethernet ports, supports corporate and local LANs

2.2 Network Connections

2.2.1 DHCP and Static IP Connections

When a PC logs onto a network, it obtains an Internet Protocol (IP) address in one of two ways by Dynamic Host Configuration Protocol (DHCP) (Figure 2-1 Dynamic Host Configuration Protocol (DHCP)) or by Static IP (Figure 2-2).

DHCP simplifies network administration by automatically assigning IP addresses rather than requiring configuration by a network administrator. However, this method of connection may not be the best choice for all users of the console.

When connecting a device via DHCP, a different IP address may be assigned each time the device connects to the network. Depending on network settings, the IP address may also change while the device is connected as a result of IP lease expiration. Due to its unpredictable nature, DHCP is recommended for use only on managed networks in which IP address assignment is carried out against a MAC address; under these conditions, the SiteSentinel® iSite™ will always be assigned the same IP address as defined on the server table.

To set up a network connection for the system, navigate to the **Networking** section of the **System Settings** menu and select the preferred network connection method.

If DHCP is selected, the SiteSentinel® iSite™ will automatically be assigned an IP address by the network. No additional user input is required to connect.

If Static IP is selected, users are required to input IP address, gateway address, and DNS server information for the SiteSentinel® iSite™ system. Once this information is saved, remote connections can be established by network users.

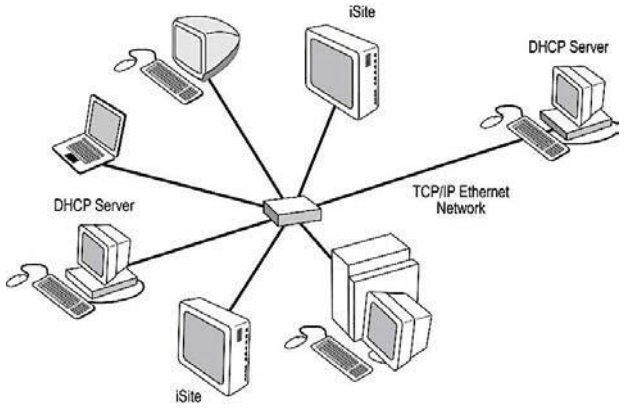


Figure 2-1 Dynamic Host Configuration Protocol (DHCP)

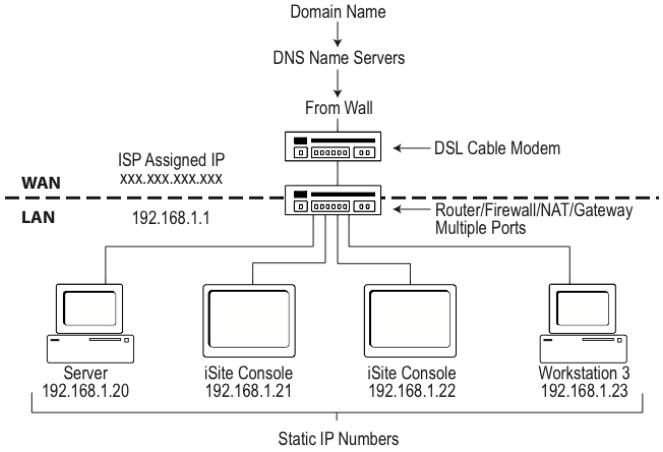


Figure 2-2 Static IP

2.2.2 Direct Connections

To establish a direct, wired connection between the SiteSentinel® iSite™ Console and a PC, a CAT5 crossover cable is required. Follow these steps to connect:

1. Connect one end of the CAT5 crossover cable to the console's Ethernet port, and the other end to an available Ethernet port on the PC.
2. Wait for an "Automatic Private Address" to be assigned to each Ethernet connection by its respective system (this occurs automatically when a DHCP server is unavailable).
3. Navigate to the **Networking** section of the **System Settings** menu on the console and check the DHCP configuration. Then select "Renew IP" to renew the console's IP Address (Figure 2-3).

> "Automatic Private Addresses" will always take the form 169.254.xxx.yyy, where "xxx" and "yyy" may be any numeric value between 1 and 254; specific values will not affect the availability of a connection.

4. Once established, enter the SiteSentinel® iSite™ console's network IP address as displayed on the \System\Network view into the address bar of the PC's Web browser. The console's screen view will be displayed.

> PC network settings may need to be adjusted to establish a direct connection. A machine that is set up for static IP connections will either need to be changed to DHCP or have its IP address set one number higher or lower than the console's IP address in order to connect.

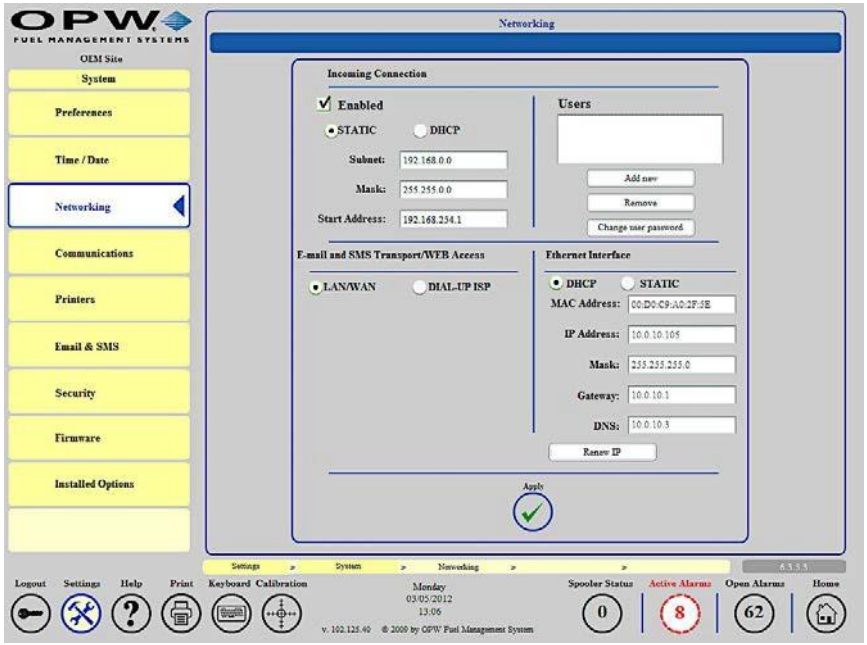


Figure 2-3 Direct Connection Screen

2.3 Peripheral Connections

2.3.1 Petro-Net™ Connections

Wired RS-485 Petro-Net™ connections can be used for communications among the VSmart Module, the I/O Module, and the SiteSentinel® iSite™ console. For this type of connection, a single line of twisted-pair wiring is required. Polarity must always be observed for Petro-Net™ connections.

> Twisted-pair wiring is available from OPW as Part No. 12-1029. This type of wiring can easily be made by twisting together two 18 AWG gas- and oil-resistant wires (THHN, TFFN or THWN). Use a minimum of 10 twists per foot.

When connecting via Petro-Net™, the twisted-pair wiring is connected to positions 1 and 2 of the RS-485-terminal block at each module. Petro-Net™ connections can be daisy-chained, meaning that modules may be connected to each other in various combinations as long as one module in the chain is connected to the console.

> Petro-Net™ connections *must* be made with twisted-pair wiring. The use of conduit is recommended for protecting Petro-Net™ wires, but is not required. If conduit is *not* used, bushings must be installed in the cabinet knockouts to protect wiring and seal the enclosures. Polarity must be observed for all Petro-Net™ wiring!

2.3.2 Wireless Connections

Wireless connections can also be used for communications between the VSmart Module and the SiteSentinel® iSite™ console. For this type of connection, a wireless modem is connected to the VSmart Module, and a second modem is wired to the console's RS-485 port. For best results, the modems should be within a clear line-of-sight.

> Wireless connections are not viable options at all installation sites due to the presence of interference or line-of-site obstacles. Test kits are available, but **A SITE SURVEY IS STRONGLY RECOMMENDED BEFORE COMMITTING TO WIRELESS INSTALLATIONS.**

2.3.3 Ethernet Connections

Ethernet connections are the final option for establishing communications between the console and peripheral devices. For this type of connection, an Ethernet cable is run between devices at a maximum length of 300 feet (100 m), noting this distance can be extended through the use of hubs and routers.

> If more than 6 feet (1.85 m) of cable is required, the use of conduit to protect the cable is recommended.

An Ethernet connection can also be established between the console and a VSmart Module using an existing network. To make this connection, simply connect the console to one node on the network and the VSmart Module to another node.

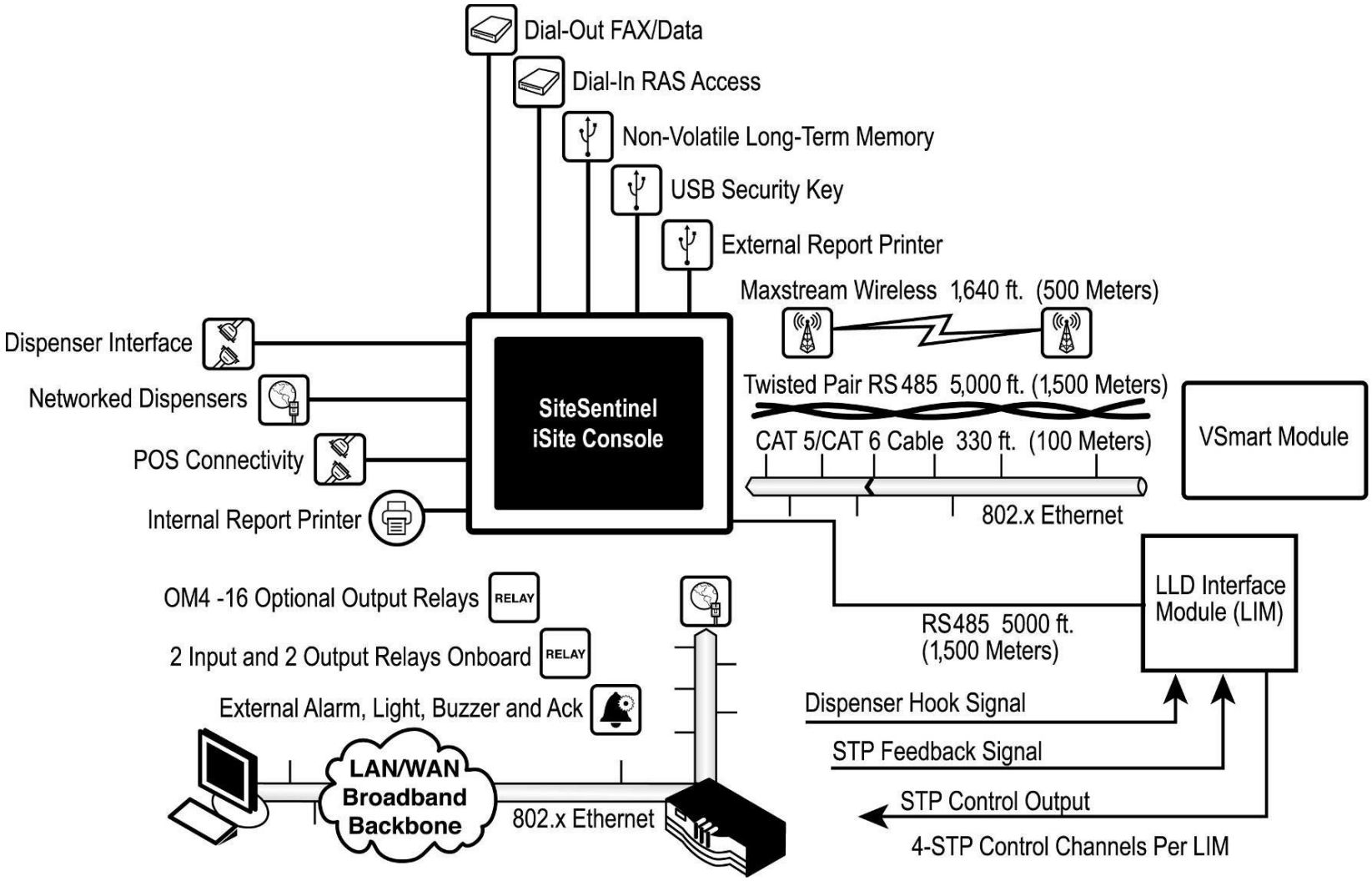


Figure 2-4 Console Connectivity

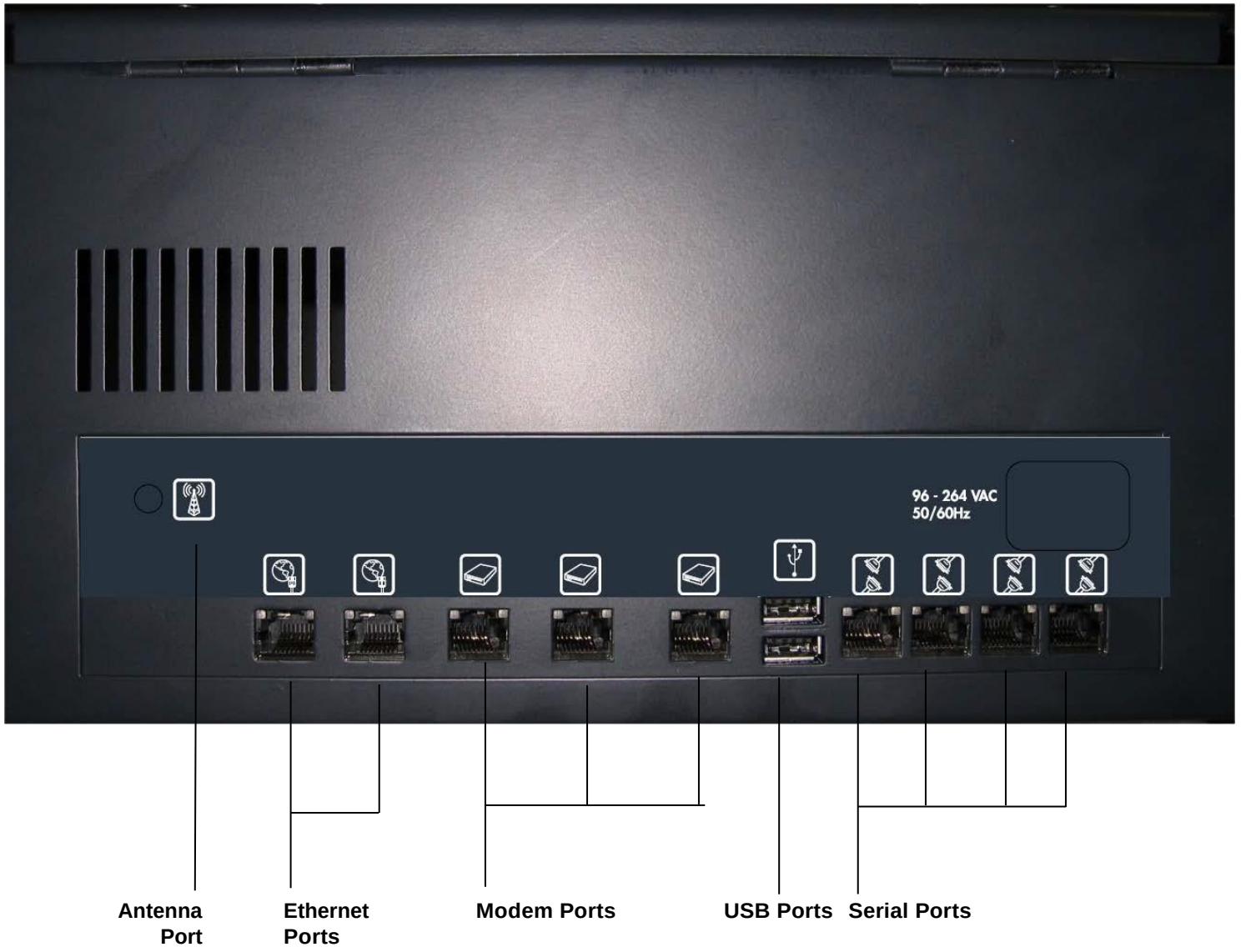


Figure 2-5 Port Connections

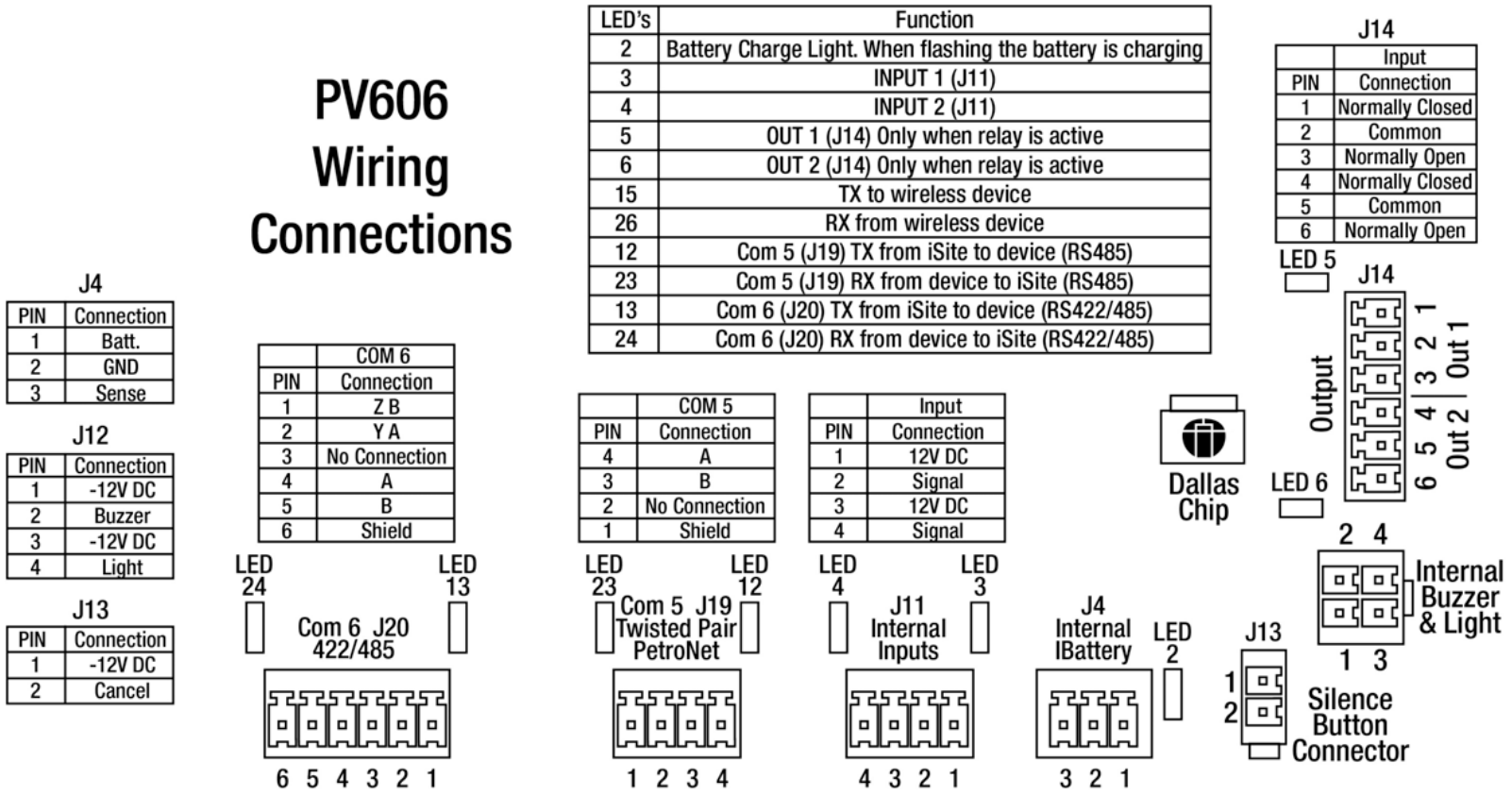


Figure 2-6 Wiring Connections

2.4 The VSmart Module

The VSmart Module is where all monitored devices (probes, sensors, and line-leak detectors) are physically connected to the system through Intrinsically Safe (IS) barriers. Each VSmart Module houses up to two IS Barriers, each of which supports up to 64 peripheral devices, for a maximum of 128 devices per module. The number of devices that can be connected to each channel of the VSmart Module depends on the type of device.

Consult the following table for capabilities of the VSmart Module in connection with various peripheral devices.

VSmart Module Capacity			
	Maximum Per Channel	Maximum Per IS Barrier	Maximum Per Module
Sensors:	16	64	128
924B Probes:	4	16	32
AST (Flex) / UST (924) / EECO:	1	2	4
LLD Sensors:	3	12	16

Connecting multiple peripheral devices to each channel of the VSmart Module is accomplished by making multi-drop (daisy-chain) connections. Each type of sensor or probe that is connected to a Module is detected via IntelliSense™ Technology.

Up to eight (8) VSmart Modules can be connected to the SiteSentinel® iSite™ console via Petro-Net™ (twisted pair), Ethernet, or wireless connections for a total of 1,024 devices per system.

Figure 2-7 VSmart Module

> Conduit is recommended for Petro-Net™ connections between VSmart Modules and consoles, but it is not required.

Part numbers for the barriers:

20-4344 – 12 V Barrier for VSmart 924/924B probes and standard and multi-drop sensors (Green Label)

20-4345 – 24 V Barrier for VSmart Flex probes and EECO probes (Orange Label)

VSmart Module Specifications	
Dimensions:	Width: 11.3” (28.7 cm) Height: 5.6” (14.2 cm) Depth: 5.8” (14.7 cm)
Standard Voltage Supply:	105 to 265 VAC, 50-60 Hz
Power Consumption:	60 watts maximum
Temperature Range:	-40°F to 158°F (-40°C to 70°C)
Device Capacity:	(See page 18)
Probe Cable Requirement:	Belden #88760 or Alpha #55371 (Shielded 2-wire twisted pair)
Intelligent Sensor Wiring Requirements:	Belden #88760 or Alpha #55371 (Shielded 2-wire twisted pair)
Non-Intelligent Sensor Wiring Requirement:	14- to 18-AWG oil-and-gas resistant (TFFN, THHN or THWN)
Petro-Net™ Communication Wiring Requirement:	18-AWG, twisted pair, oil-and-gas resistant (TFFN, THHN, THWN)
Maximum Petro-Net™ Extension using RS485:	5,000’ (1.5 km)

Figure 2-8 VSmart Module (Internal)

For site upgrades from an earlier version of a ᶜonsole in which the existing Smart Module will continue to be used for wiring instructions, please see wiring instructions. The SiteSentinel® iSite™ Smart Module supports only one device per channel; therefore, the multi-drop installation method is not a valid installation for that unit.

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

2.4.1 VSmart Module Connections

You must remove the Intrinsically Safe barrier panel to attach wiring. VSmart power **must be off** while connecting wires! Connect the *probe* wires and cables according to the following chart (see Figure 2-9 VSmart Module Connections).

Probe Wiring		
Probe Wire	Probe Cable (Belden #88760, #8760 or Alpha #55371)	VSmart Module "Device" Terminal
Blue	Red	PWR (power)
Brown	Black	SIG (signal)
Black	Shield	GND (ground)

AST Probe Wiring		
Probe Wire	Probe Cable (Belden #88760, #8760 or Alpha #55371)	VSmart Module "Device" Terminal
Red	Red	PWR (power)
White	Black	GND (ground)
Shield	Shield	GND (ground)

2.4.2 VSmart & I/O Module AC Wiring

1. Pull two AC power wires from the circuit breaker to each module; you may "daisy chain" the wires from module to module, not to exceed the circuit-breaker rating (see Figure 2-9).
2. Connect the live and neutral power wires to the appropriate terminals in each module.
3. Make sure the modules are set for the correct voltages (115 or 230 VAC). For *VSmart Modules*, check the decal near the terminal block. For *I/O Modules*, check the "line voltage selector" switch on the circuit board.
4. Determine the grounding method. There are two versions of the VSmart Module: one has a single-ground terminal; the other has a second-ground terminal for the I.S. barrier. *All ground connections must be done with 12 AWG wire.*
5. Ideally, all AC power should be in the same phase for best operation.

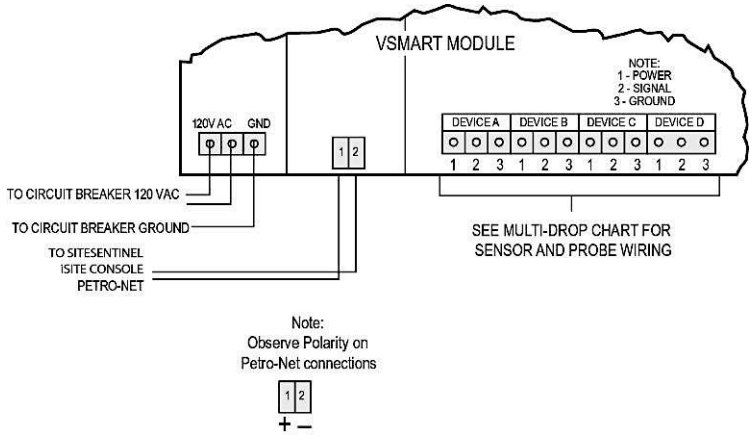


Figure 2-9 VSmart Module Connections

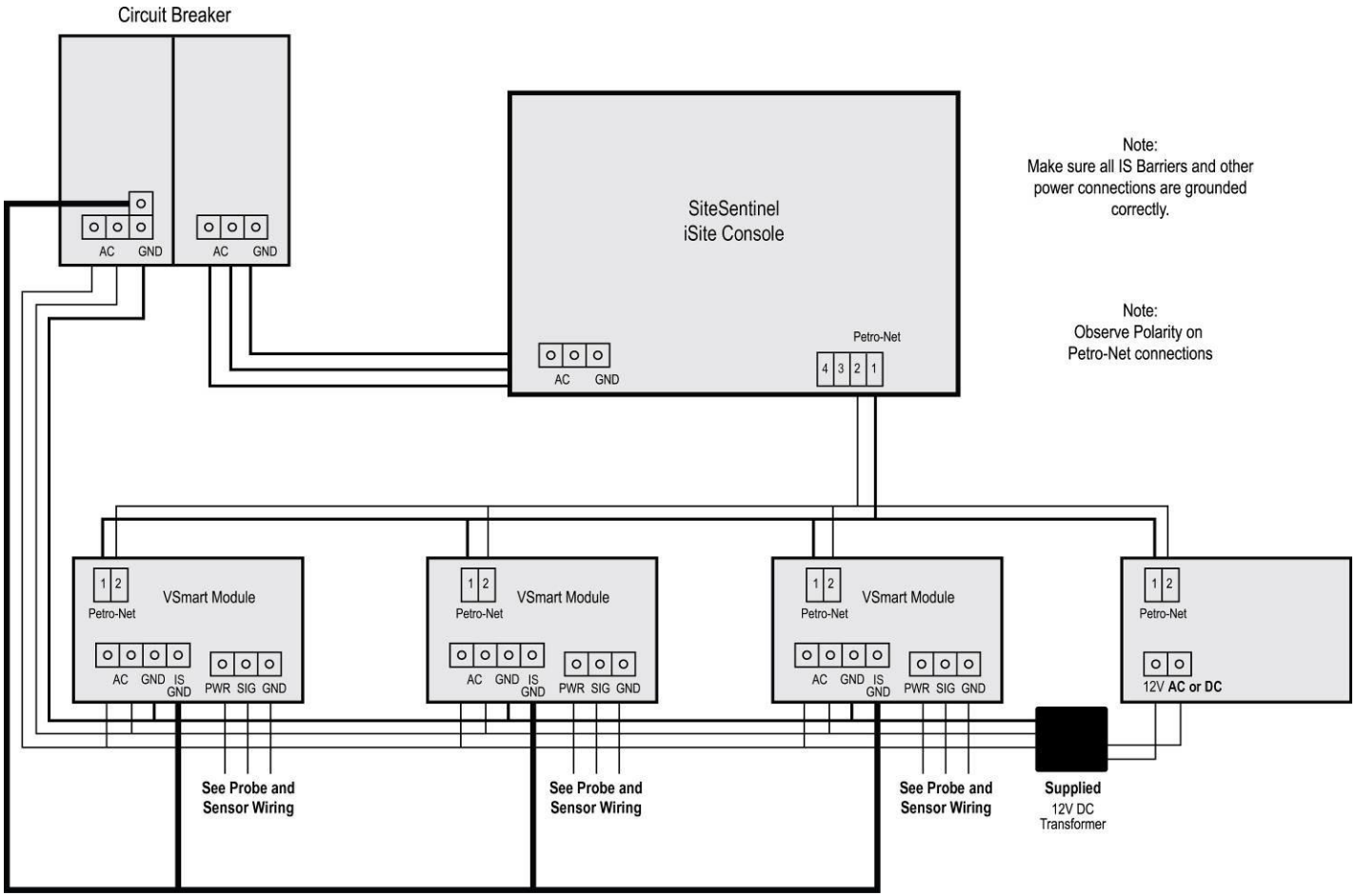


Figure 2-10 Petro-Net and A/C Wiring

To maintain intrinsic safety, a separate and completely independent ground connection MUST be run from the I.S. GND terminal on each VSmart Module directly back to the main panel.

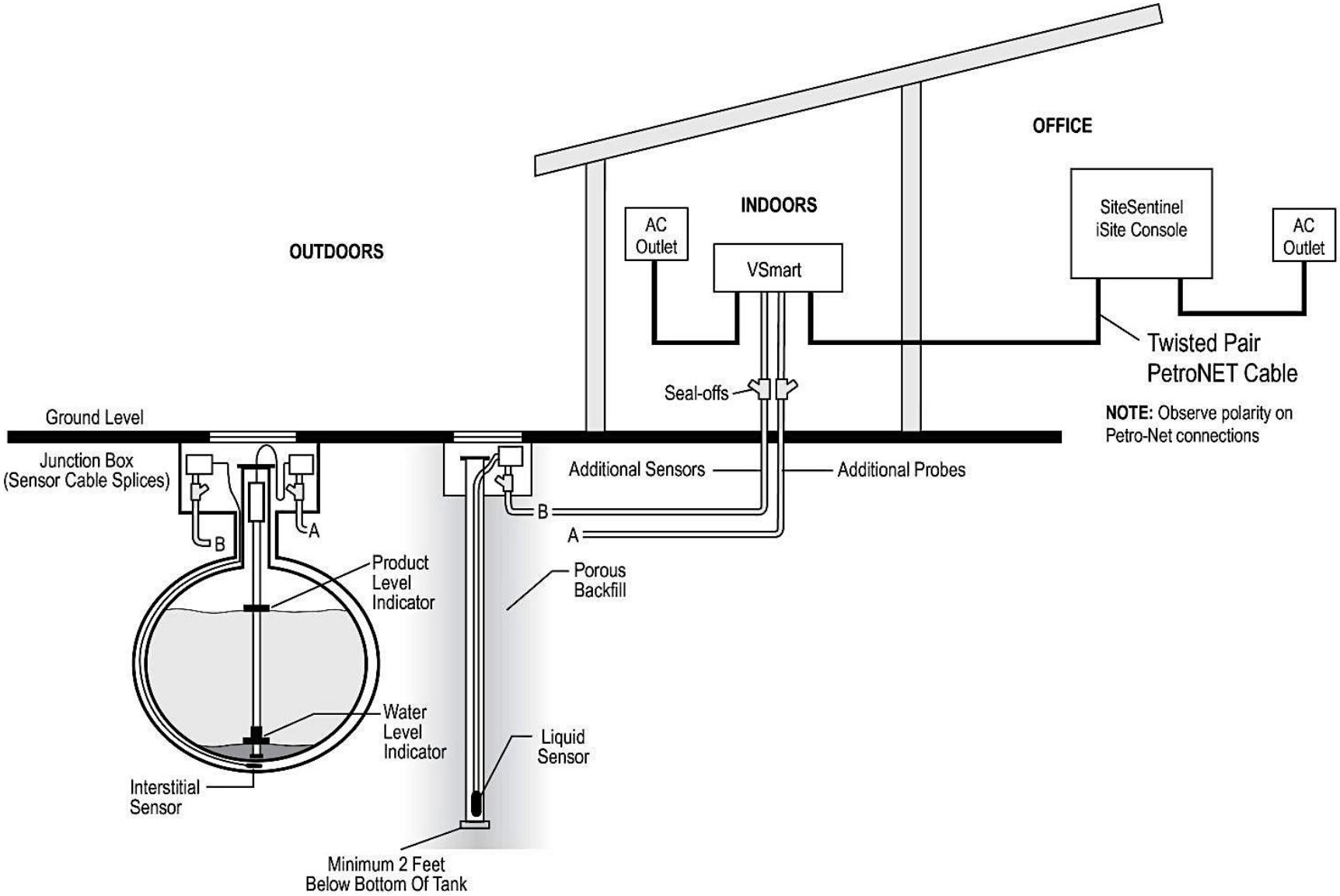
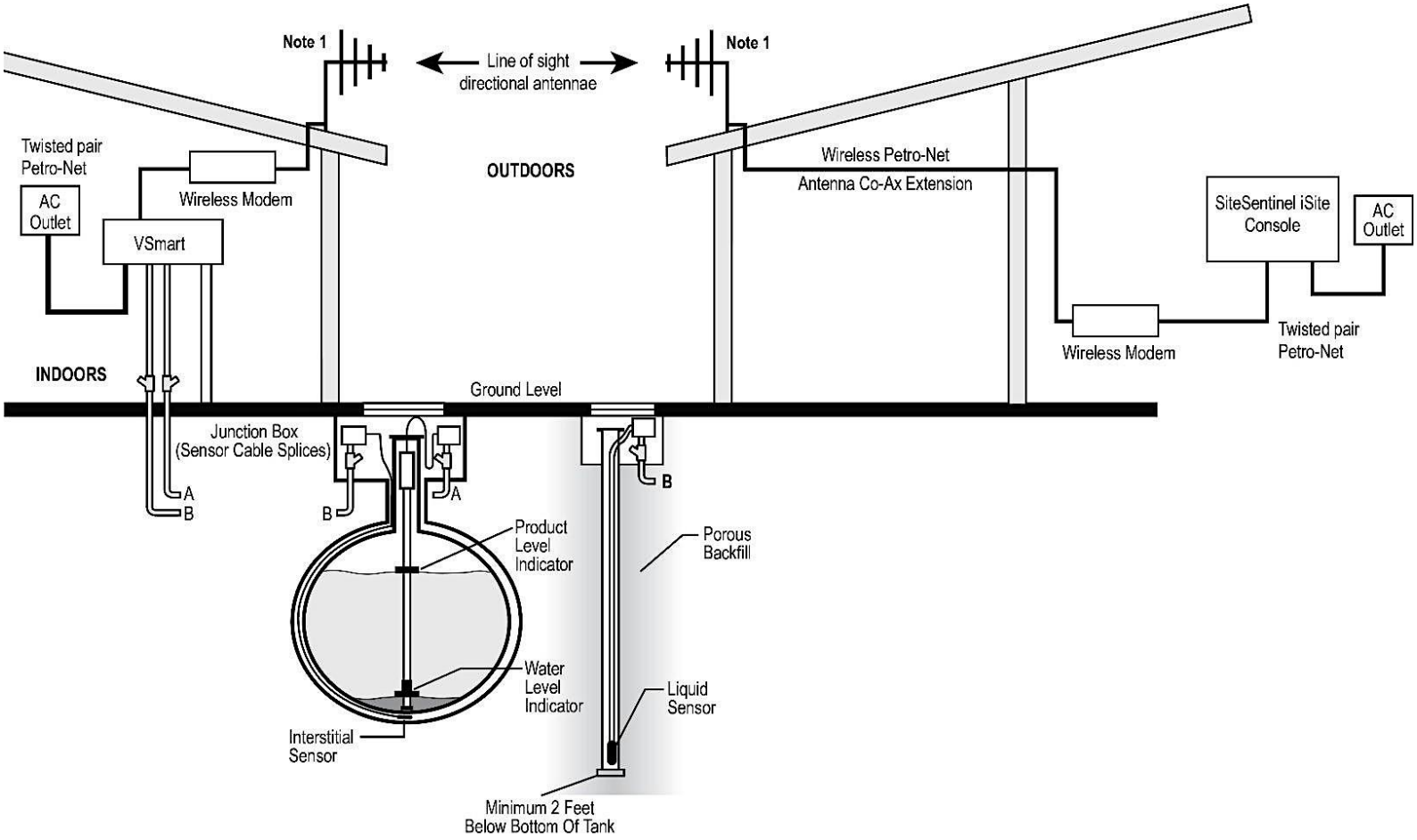


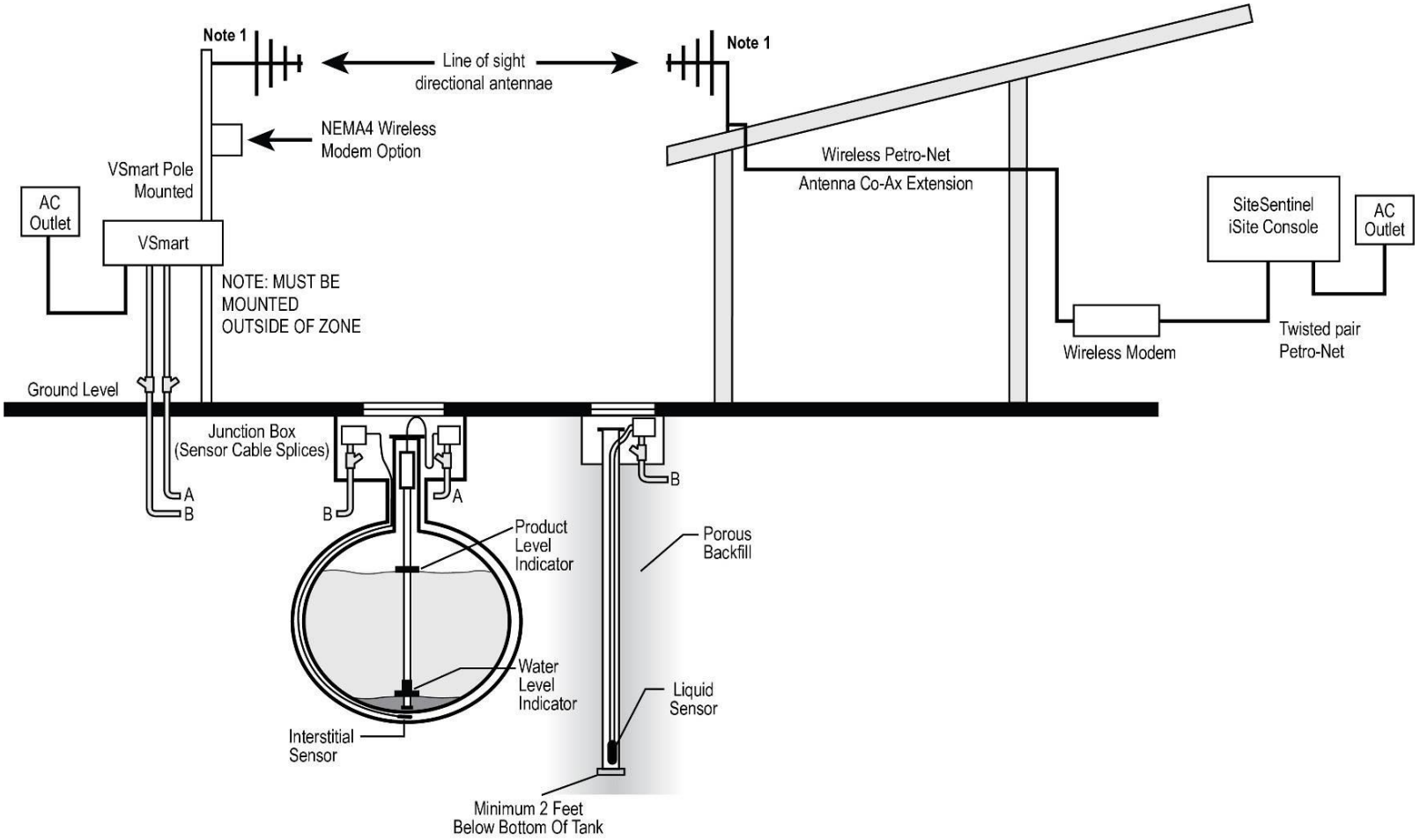
Figure 2-11 Standard Twisted-Pair Petro-Net Installation



Note 1
Directional Antennae may be substituted for Omni-Directional antennae dependent upon site conditions

Note 2
It is highly recommended that all wireless Petro-Net installations are subjected to a site survey prior to installation to identify potential interference problems.

Figure 2-12 Wireless Petro-Net with VSmart in a Building



Note 1
Directional antennae may be substituted for Omni-Directional antennae dependent upon site conditions

Note 2
It is highly recommended that all wireless Petro-Net installations are subjected to a site survey prior to installation to identify potential interference problems.

Figure 2-13 Wireless Petro-Net with VSmart Pole-Mounted Outside

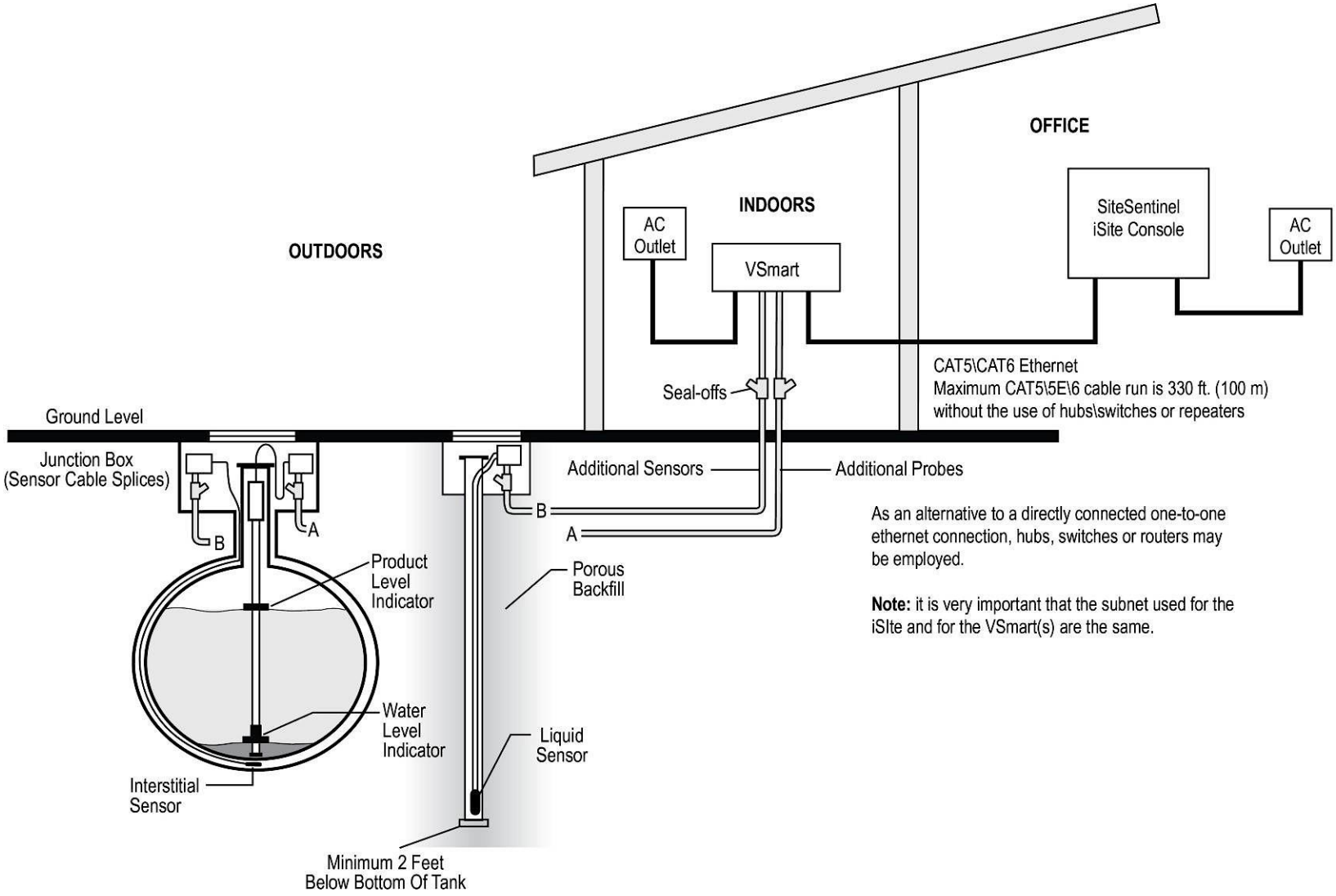


Figure 2-14 Petro-Net□ Over Ethernet Option

2.5 Tank Alert Modules

The SiteSentinel® iSite™ console has the ability to trigger an overfill alarm using the Tank Alert module (Figure 2-16). This module has an audible buzzer and an external light to warn the users in an event of overfill or high-product alarm.

2.5.1 Tank Alert Wiring

The Tank Alert box will be wired into the internal output contacts of the SiteSentinel® iSite™ console or OM4 relay. To connect wires inside the Tank Alert box, follow these instructions (see Figure 2-15):

1. Connect L1 line voltage to Terminal 4 in Tank Alert.
2. Connect Neutral to Terminal 3 in Tank Alert.
3. Connect Float 1 (Either Common or Normally Open) to Terminal 2 in Tank Alert.
4. Connect Float 2 (Either Common or Normally Open) to Terminal 1 in Tank Alert.
5. Connect cable from Float 1 to common on one of the internal output contacts on the SiteSentinel® iSite™ main board.
6. Connect cable from Float 2 to normally open of the internal output contact on the SiteSentinel® iSite™ main board.

Figure 2-16 Tank Alert Module

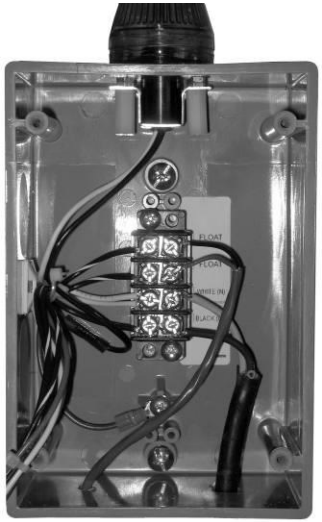


Figure 2-15 Tank Alert Wiring Connections

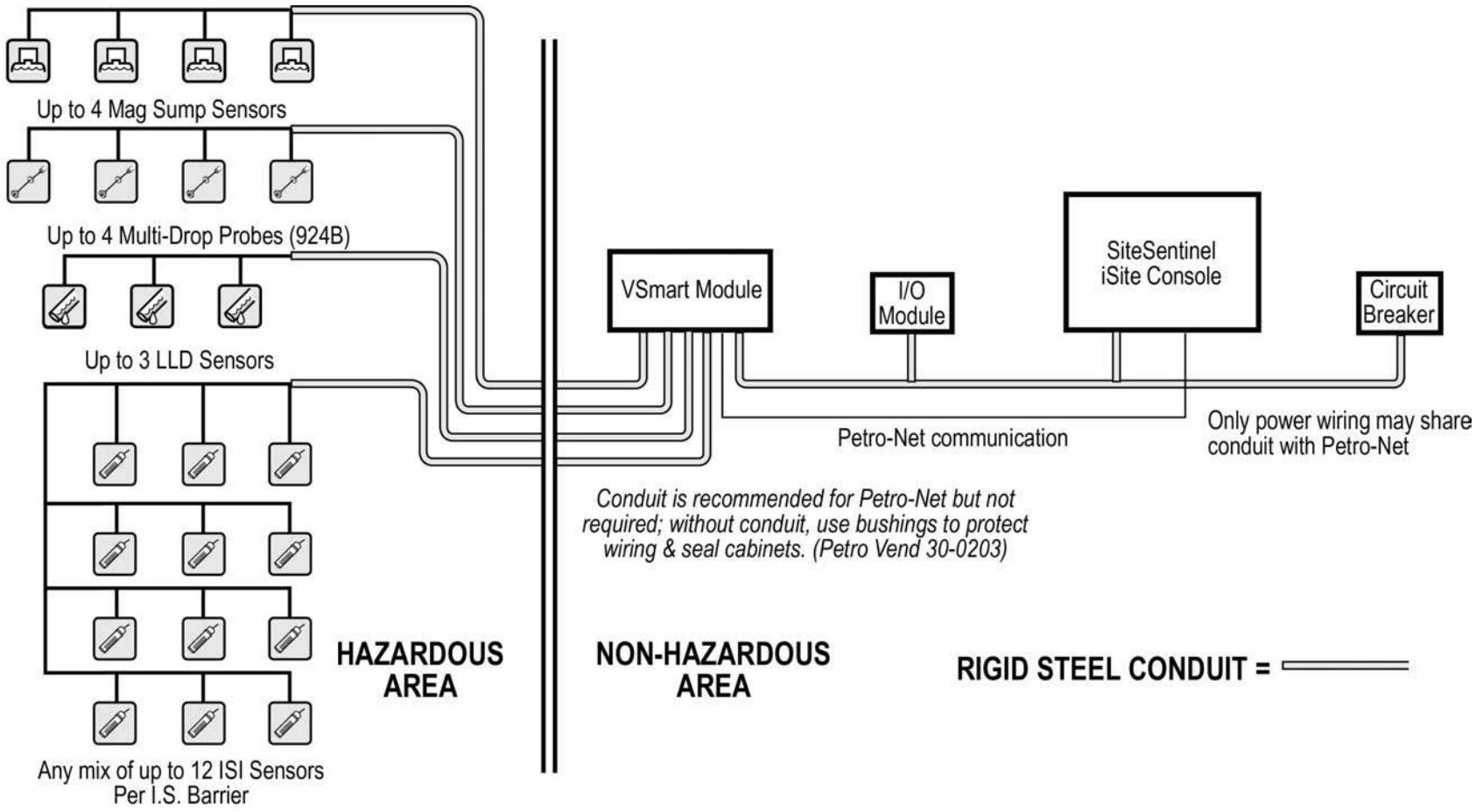


Figure 2-17 Petro-Net□ Conduit Installation

Wireless or Ethernet connections can be substituted during Petro-Net™ installation.

2.6 Internal Printer

An internal thermal printer option is available for the SiteSentinel® iSite™ Console. The printer will install inside the cabinet. The printer will be used for printing the various reports the SiteSentinel® iSite™ has available.

2.6.1 Installation Procedure

1. Mount Printer Power Supply above the existing power supply.
2. Slide printer onto mounting bracket.
3. Mount printer and bracket in SiteSentinel® iSite™ Console fixing to four (4) pre-drilled holes.
4. Connect power cable to 3-connector power plug (CN1) on left-hand side of power supply board.
5. Connect printer power cable to 6-connector plug (CN2) on right-hand side of board.
6. Connect printer ribbon cable to J22 on right-hand side of main communication board.

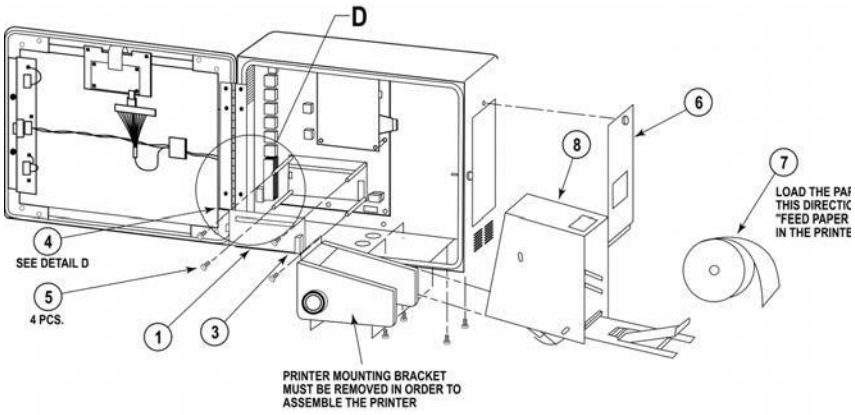


Figure 2-19 Internal Printer

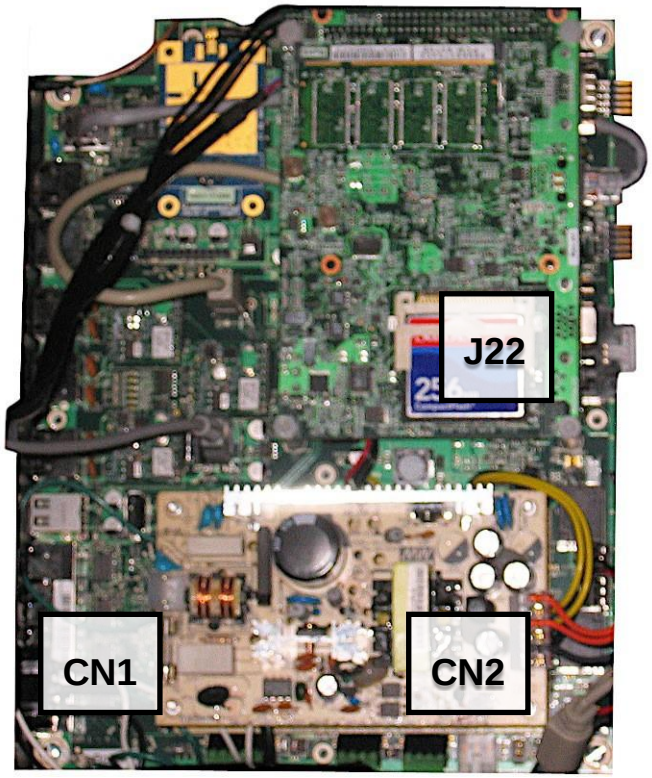


Figure 2-19 Main Board Printer Connections

3 Tank Preparation

3.1 Probe Placement

The ideal location for a probe is in the **center** of the tank (Figure 3-1). The probe should be located at least 3 feet (91.4 cm) from the tank fill pipe. If this distance is less than 3 feet (91.4 cm), the force of the product entering the tank can cause the water float to rise up the shaft of the probe. This may cause the SiteSentinel® iSite™ to generate a false high-water alarm. Adjust the drop tube of the fill pipe so that the product flow is diverted *away* from the probe.

> SiteSentinel® iSite™ probes are safe for Class 1, Div 1, Group D hazardous locations. This includes tanks containing regular, super, diesel and unleaded gasoline; antifreeze; kerosene; mineral spirits; oxinol, methanol and methanol blends; motor, torque and transmission oil; and alcohol. If you have any questions about whether a product is included in this classification, please contact your product distributor or OPW FMS distributor. SiteSentinel® iSite™ probes (Model 924A&B, EECO, or AST 7100 flex) must be installed as described in this section. If the minimum or maximum dimensions specified cannot be met, do not proceed with the installation.

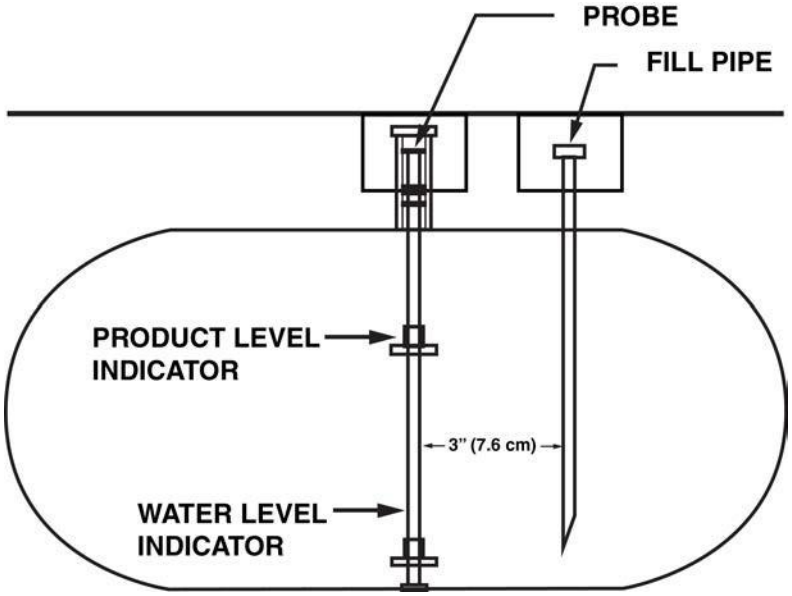


Figure 3-1 Probe Placement

3.2 Probe Installation in Underground Tanks

1. Refer to Figure 3-2. Install a manhole of at least 18 inches (45.7 cm) diameter around an unused fitting in the top of the tank. This manhole must be large enough to accommodate a weatherproof junction box.

> If this fitting is not in the center of the tank, additional measurements are required for probe compensation.

2. When using 4-inch (10.2 cm) floats, install a 4-inch (10.2 cm) diameter riser pipe in the fitting. This pipe must be 19 to 60 inches (48.3 to 152.4 cm) long, enough to allow the cable from the probe to reach a weatherproof junction box. Adjust accordingly for 2-inch (5.1 cm) floats.
3. Install a weatherproof junction box near the riser pipe. The box must be large enough to accommodate ½-inch (12.7 mm) conduit.
4. Install the ½-inch NPT bushing (supplied with each probe) in the weatherproof junction box.

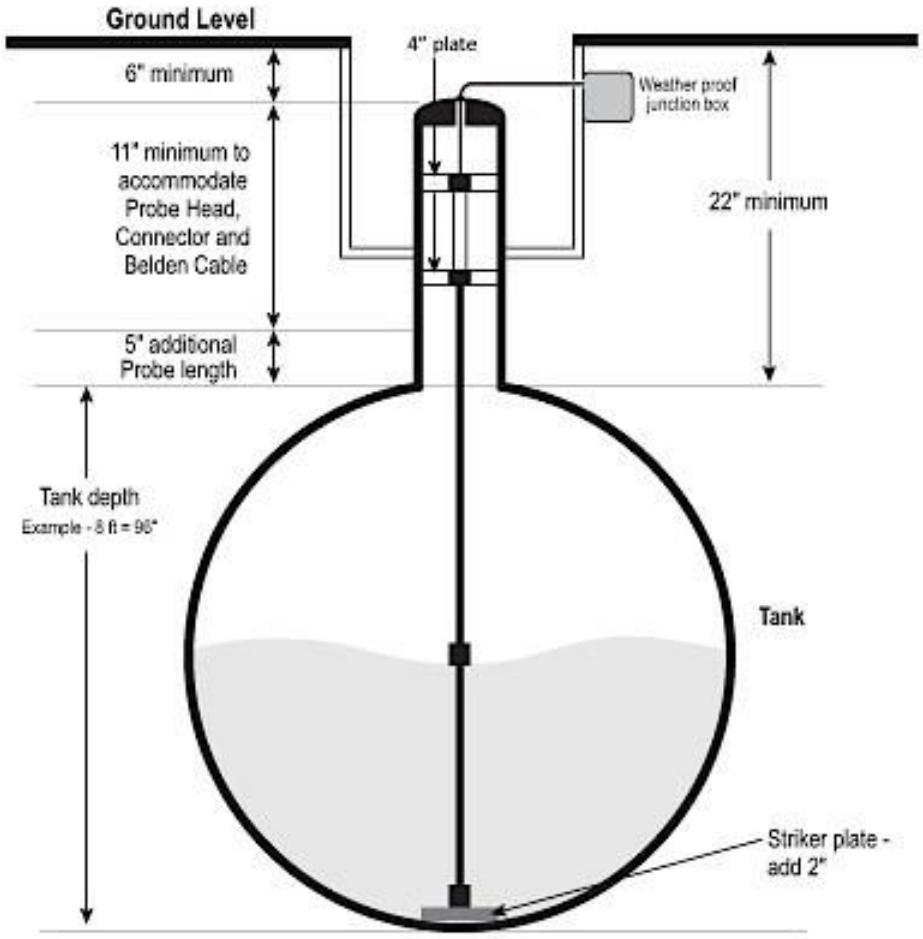


Figure 3-2 Probe Installation in an Underground Tank

3.2.1 Calculating Product Offset

You can calculate 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 to allow water and sediment to collect at the low end, while clear product is drawn from the high end. Tank settling can also cause pitch. 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 3-3).

The product depth at the deep (lower) end of the tank is value “A.” The product depth at the shallow (higher) end is value “B.” The distance between the two measuring points is “C.”

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 above example, 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”.

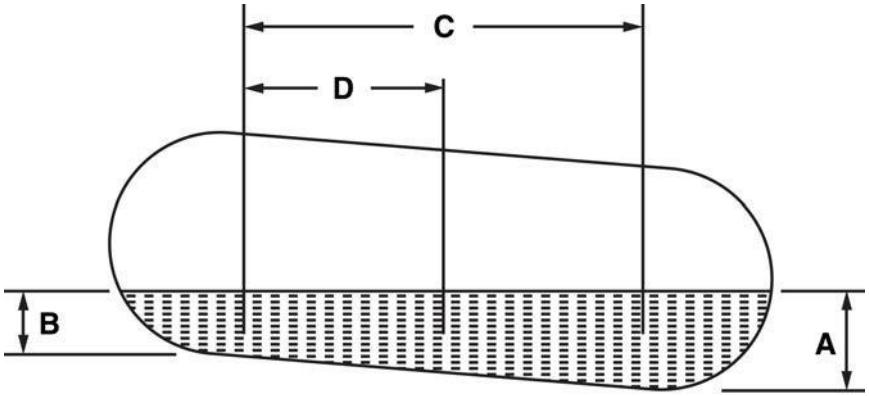


Figure 3-3 Calculating Product Offset in a Tank

4 Probe Installation

4.1 Adaptor Collar & Riser Cap

A modified adaptor collar and riser cap is required for each probe. These collar and riser cap kits are available from OPW Fuel Management System.

1. First, install the modified adaptor collar onto the riser pipe.
2. Next, screw in the bushing supplied with the probe into the 3/8-inch NPT hole in the riser cap.
3. After the probe is lowered into the tank, snap the cap into place.

4.2 Probe Floats

There are three types of floats used with the probes: Product, Water for Diesel, and Water for Gasoline.

Keep in mind that the two types of water floats are NOT interchangeable. Because diesel is denser than gasoline, the water/diesel floats are heavier than the water/gasoline floats. If the wrong water float is installed in a diesel tank, it does not sink through the product to the water below. As a result, the tank will have unusually high water measurements and possibly erratic product measurements as the water float interferes with the product float.

> Water float assembly for AST probes is only available for use in 4-inch (10.2 cm) riser installations.

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

Probe Floats	
Probe Type/Float Style:	Float Kits
924 and 924B 4” (10.2 cm) Floats:	Gas: 30-1508-02 Diesel: 30-1508-01
924 and 924B 2” (5.1 cm) Floats:	Gas: 30-1509-02 Diesel: 30-1509-01
EECO 2” (5.1 cm) Floats:	Gas: 30-1503-02 Diesel: 30-1503-01
EECO 4” (10.2 cm) Floats:	Gas: 439482 Diesel: 439483
AST Flex Probes:	2” (5.1 cm) product only: 30-1503-01 4”(10.2 cm) product only: 439485
AST Flex Probe Water Float for 7” (17.9 cm) weight:	Gas 4” (10.2 cm): 30-0120-GAS Diesel 4” (10.2 cm): 30-120-DSL
AST Flex Probe Water Float for 13” (33 cm) weight:	Gas 4” (10 cm): 30-0121-GAS Diesel 4” (10 cm): 30-121-DSL
AST Flex Probe Water Float for 16” (40.6 cm) weight:	Gas: 30-0124-GAS Diesel: 30-0124-DSL
AST Flex Probe Water Float for 19” (48.3 cm) weight:	Gas: 30-0127-GAS Diesel: 30-0127-DSL

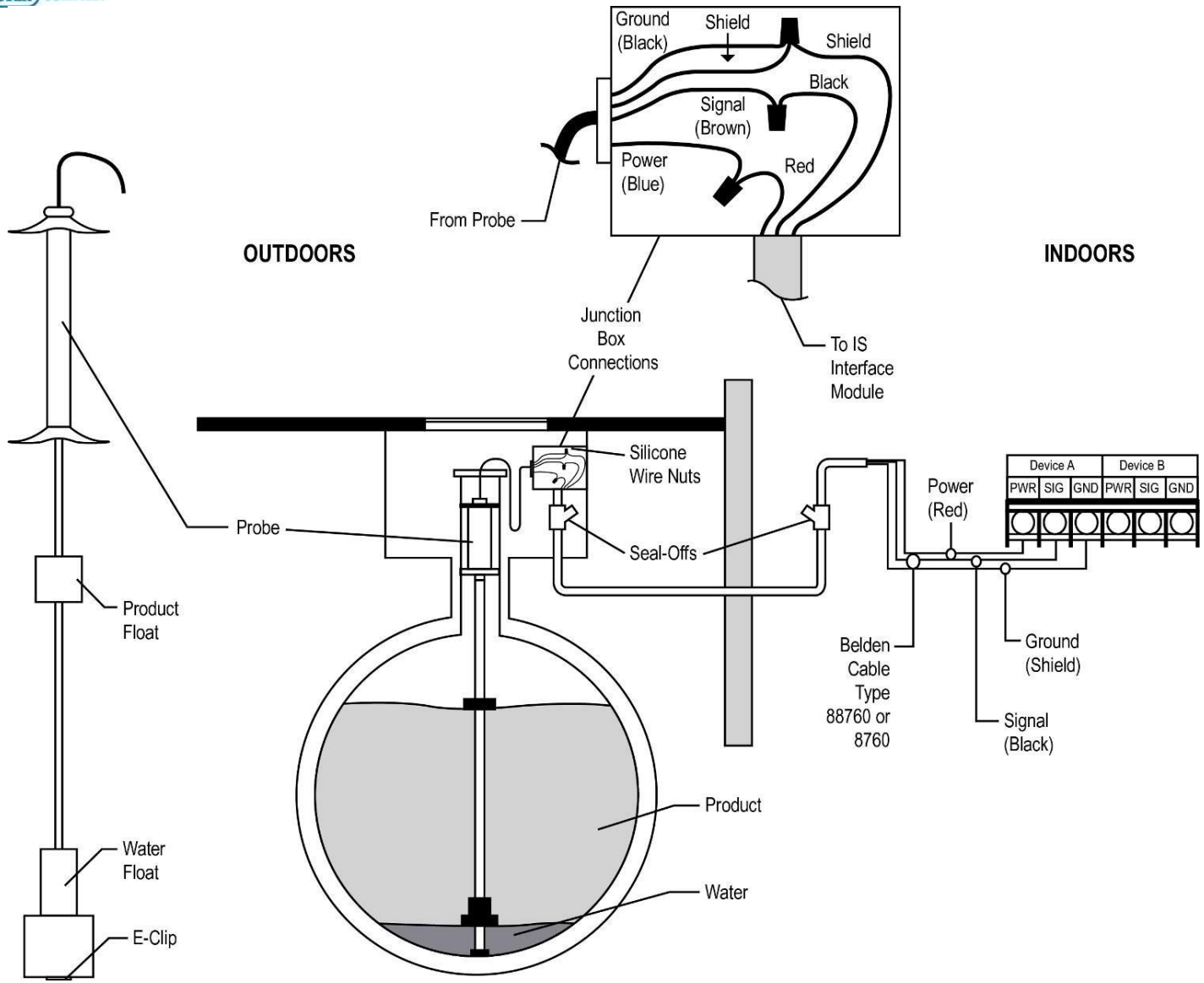


Figure 4-1 924B Probe Installation

4.3 Model 924B Probes

The 924B Probe (Figure 4-2) is OPW's latest probe model. This probe comes standard in stainless steel and can be used in a variety of liquids, including gasoline, diesel and water.

The probe has five-point temperature-sensing elements that provide accurate temperature compensation for product-volume expansion and contraction for accurate inventory management and in-tank leak detection. The probe automatically transmits its profile to the SiteSentinel® iSite™. The 924B Probe wiring can be multi-dropped or "daisy-chained." Up to four probes can be connected to the same I.S. barrier channel, eliminating the need to program probe parameters into the console setup**.**

ONLY 924B Probes built after September 1, 2007, (version 7.xx firmware) can be installed in multi-drop applications.

Special Conditions for Safe Use:

On devices supplied with 4-inch (10.2 cm) 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.

Figure 4-2 Model 924 Probe

Model 924B Probe Specifications	
Power Requirements:	Nominal 12+ VDC from VSmart I.S. Module
Operating Temperature:	-40°F to 158°F (-40°C to +70°C)
Required Cable:	1,000' (304.8 m) Belden 88760 or Alpha 55371 500' (152.4 m) Belden 88761
Level Measurement Product: Water: Temp. Resolution/Accuracy:	 +/-0.00005" (+/- 0.0127 cm) +/-0.04" (+/- 1 mm) +/- 0.1°C, +/-0.5°C
Classifications:	Class I, Division 1, Group D
Certifications:	IECEx UL 11.0012X DEMKO 11 ATEX 1012670X
I.S. Barrier Used:	12 V Part Number 20-4344 (Green Label)
Multi-drop Restriction:	924B is the only probe that can be multi-dropped at a maximum of four (4) probes per channel

4.4 Model 7100V Flex Probe

Model 7100V Flex Probe	
Input Voltage:	23 - 28 VDC
Sensor Length:	Flexible Kynar®: R1 & T1: (44”- 600”/111.8-1,524 cm); R5: (51”- 600”/129.5-1,524 cm)
Enclosure Material:	Kynar®
Rating:	IP68
Resolution:	0.010” (0.25 mm) Inventory Mode
Linearity:	+/- 0.01% of Full Scale +/- 0.010” (0.25 mm), whichever is greater
Repeatability:	+/- 0.001% of Full Scale +/- 0.00025” (0.64 mm), whichever is greater
Temp. Accuracy:	Absolute +/- 2°F (+/- 1°C)
Temp. Measurement:	Up to five (5) along the sensor span; Resolution: +/- 0.01°F (+/- 0.01°C)
Temp. Sensing Range:	-40°F to +158°F (-40°C to +70°C)
Operating Temp. Range:	-40°F to +158°F (-40°C to +70°C)
Environment:	NEMA 4
Floats (not included):	Specs based on 4” (10.2 cm) standard floats
Listings:	UL; Intrinsically Safe
I.S. Barrier	24V Part Number 20-4345
Multi-Drop Capability	Requires one I.S. Barrier channel per probe

The 7100V Flex Probe (Figure 4-3) utilizes the same magnetostrictive technology for above ground tanks up to 50 feet (15.2 m) in height. It is important to follow the handling instructions to avoid damaging the probe and voiding the warranty. During the unpacking and installation of the Model 7100V Flex Probe, always keep the diameter of the coils between 40 and 48 inches (about 1 m).

Flex Probe Installation Requirement:

Flex probe head/wiring must be installed in weatherproof junction box with seal packs for wiring connections. Failure to comply with these requirements may invalidate probe warranty.

Figure 4-3 Model 7100V Flex Probe

4.5 Flex Probe Installation

Proper operation of the SiteSentinel® iSite™ system using the flex probe depends on the correct sizing of the probe. If the probe is too long, it will touch the bottom of the tank and bow, causing either inaccurate or loss of readings. If it is too short, product measurement range will be compromised.

> Each Flex Probe is custom made to fit a particular tank. They are not returnable if an error is made in determining the correct length.

4.5.1 Probe Length Determination

1. The flex probe mounts to the tank with a ¾-inch NPT male thread. Obtain the proper fittings to adapt the tank opening to a ¾-inch NPT female thread. Do not use the tank's vent opening to install the flex probe.
2. Temporarily install this hardware in the tank opening.
3. Using a plumb bob or measuring tape measure the distance (in inches) from the top of the ¾-inch NPT flange to the bottom of the tank. Save this measurement, which will be Total Height (TH).
4. Flex probes are ordered by overall length (OAL). Overall length is the distance from the top of the ¾-inch (19.1 mm) NPT wiring bushing to the tip of the probe. OAL (inches) = 1.5 + (TH x .993)

    - If cable runs to 750 feet (229 m) use Belden #88761
    - If cable runs to 1,000 feet (305 m) use Belden #8760, #88760 or #8761

> Some electrical codes require intrinsically safe wiring to have a blue jacket.

4.5.2 Installation Preparations

5. Measure the product level in the tank. Keep tank out of service to prevent product level from changing.
6. Make note of the probe information found on the probe serial number tag.
7. Locate standard plumbing fittings that will adapt your tank opening to the ¾-inch NPT required for the probe.
8. Mount all of the pieces of this adaptor that floats will fit through to the tank opening using a minimal amount of thread sealant. Wipe any excess sealant from the inside of the fittings to prevent any from getting on the probe shaft during installation.

4.5.3 Installation Procedure

9. Run one data cable for each probe. No splices are allowed between probe junction box and console. Multiple TLM flex-probe cables are allowed in one conduit. Use masking tape or labels to mark TANK # on each cable at the console.
10. Leave 16-inches (40.6 cm) in length of cable inside the probe junction box for connection.
11. Install fiber dam and sealing compound in all TLM vapor seal-off fittings.

Figure 4-4 Probe Installation

4.5.4 Installing Adaptor, Float, Weight on the Probe

12. Carry the probe to the top of the tank in its rolled-up state.
13. Carry the floats and remaining installation components to the top of the tank.
14. Cut the single tie wrap (Labeled #1) that is securing the tip of the probe to the rest of the coil. This should provide enough length to install the float and related hardware.
15. Assemble the remaining adaptor hardware that the float will fit through and slide this adaptor assembly onto probe. Do not apply thread sealant at this time.
16. Install the product float on the probe shaft with the magnet towards the bottom of the probe.
17. Install the weight on the probe shaft with the recess toward the bottom of the probe.
18. Install the weight-retaining pin through the hole in the tip of the probe.

Figure 4-5 Adaptor, Float and Weight Installation

4.5.5 Installing the Flex Probe

19. Position the coiled probe over your shoulder so that the coil is vertical with the float in front of you.
20. Feed the weight and floats into the tank opening. Be careful not to scratch the probe shaft during the installation.
21. Cut the next tie wrap (Labeled #2) and continue feeding the probe into the tank.
22. Continue cutting the tie wraps in order until the probe is all the way in the tank.
23. Hand-tighten the probe into the still loose adaptor fittings. Thread sealant is not required on the nylon probe bushing.
24. Install the rest of the adaptor to the tank using a minimal amount of thread sealant. The assembly was done in this manner to prevent the soft nylon probe bushing from being cross-threaded.

Figure 4-6 Flex Probe Installation

4.5.6 Finishing the Flex Probe Installation

25. Connect the probe wiring bushing ½-inch NPT to the junction box using a short length [18 inches (45.7 cm) max] of flex conduit.
26. Connect the probe to the cable in the junction box and console as below.
27. Verify that the probe is operating correctly at the console.
28. Waterproof the probe connections at the junction box with the epoxy seal-pack and close the junction box.

Figure 4-7 Finishing the Flex Probe Installation

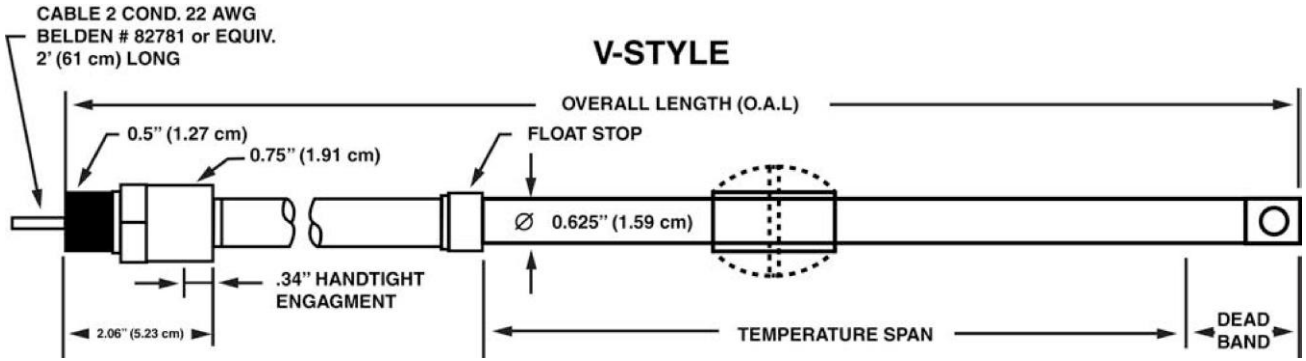


Figure 4-8 Flex Probe Component Diagram

4.5.7 Flex Probe Specifications

Dead Zone		
Overall Length	**Dead Band**	**Clearance**
51”-144” (130-366 cm)	6” (15.2 cm)	1” (2.5 cm)
145”-288” (368-732 cm)	8” (20.3 cm)	2” (5.1 cm)
289”-432” (734-1097 cm)	12” (30.5 cm)	3” (7.6 cm)
433”-600” (1100-1524 cm)	14” (35.6 cm)	4” (10.2 cm)

Multiple RTD Thermistor Location		
Probe Type	**Overall Probe Length**	**Thermistor Location**
7100V (R5)	Shorter than 144” (366 cm)	(Temp Span +7” (17.9 cm))/6
7100V (R5)	145”- 288” (368-732 cm)	(Temp Span +10" (25.4 cm))/6
7100V (R5)	289”- 432” (734-1,100 cm)	(Temp Span +15” (38.1 cm))/6
7100V (R5)	433”-600” (1,099.8 -1,524 cm)	(Temp Span +18” (45.7 cm))/6

Flex Probe Catalog Number (Example: 7100V030R1XF1L049)	
7100	**Model Number**
V	Flexible PVDF Tube w/Male NPT PVDF Connector & 2’ (61 cm) Teflon® Cable
030	Temperature Span (in)
R1	Number of Thermistors
X	Standard
F1	Number of Floats
L048	Overall Length

Single RTD Thermistor Location		
Probe Type	**Overall Probe Length**	**Thermistor Location Length (from bottom of probe)**
7100V (R1 & T1)	Shorter than 144” (365.8 cm)	27” (68.6 cm)
7100V (R1 & T1)	145”- 288” (368-732 cm)	30” (76.2 cm)
7100V (R1 & T1)	289”- 432” (734-1,097 cm)	35” (88.9 cm)
7100V (R1 & T1)	433”- 600” (1,100 -1,524 cm)	38” (96.5 cm)

5 Sensors

The new smart sensors have the ability to monitor all contained areas of the fuel-storage system: tank interstice, piping sumps, STP containment sumps, dispenser sumps/pans and monitoring wells. Sensors connected to the VSmart Module are automatically detected and identified by the console.

5.1 IntelliSense™ Technology

This technology allows the SiteSentinel® iSite™ and VSmart Module to automatically detect sensor connection, sensor type and sensor status. IntelliSense will minimize user entry error and identify hardware issues with minimal troubleshooting.

5.2 Multi-drop Installation

With the new VSmart Module you have the ability to multi-drop ("daisy-chain") the sensors and probes. When using this installation method; follow the below directions to ensure approved wiring. **(**Figure 5-1 and Figure 5-2**).**

> Sensors and probes cannot be multi-dropped from the same I.S. Channel. Therefore you must run sensors and probes to different channels on the barrier.
>
> Seal packs are required with all wiring applications in the field. Weatherproof junction boxes are recommended with multi-drop installations but are not required. They are, however, required with sump installation wiring.
>
> Probes and Sensors cannot run within the same chain. Independent chains must be run for Probes and a separate chain for Sensors.

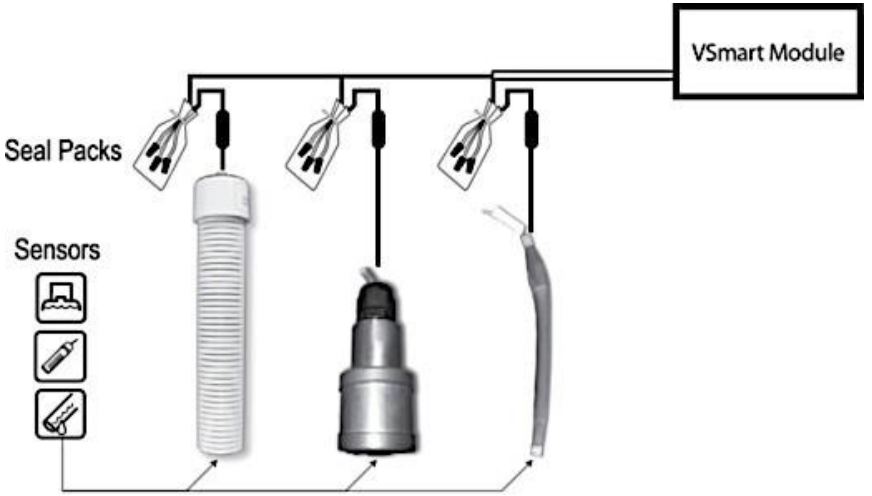


Figure 5-1 Sensor Chain

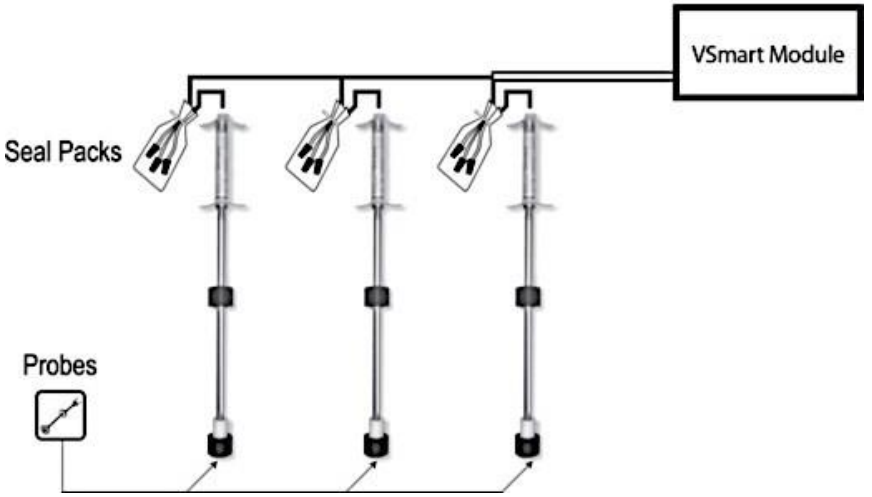


Figure 5-2 Probe Chain

5.3 Interstitial Level Sensor Float Switch

Part No. 30-0231-S

Interstitial Level Sensors (Figure 5-3) are used primarily in the interstitial area of a steel double-walled tank. The sensor contains a float switch that activates in the presence of a liquid. The sensor is constructed from chemical-resistant non-metallic material. 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 the event of a break in the cable, the system will activate the alarm.

Interstitial Level Sensor Float Switch Specifications	
Primary Use(s):	Interstitial Area
Alternate Use(s):	Sumps and Dispenser Pans
Detects:	Liquid
Operating Temperature:	–40°F to +168°F (–40°C to +70°C)
Dimensions:	Length: 3.9” (9.9 cm), Diameter: 1.3” (3.3 cm)
Cable Requirements:	Belden #88760 or Alpha #55371
Maximum Wiring Length*:	1,000’ (305 m) field wiring
Multi-Drop Restriction:	16 per I.S. barrier channel (64 per barrier)
Connections:	Red = Power, Black = Signal, Shield = Ground

This technology allows the SiteSentinel® iSite™ and VSmart Module to automatically detect sensor connection, sensor type and sensor status, will minimize user entry error and identify hardware issues with minimal troubleshooting.

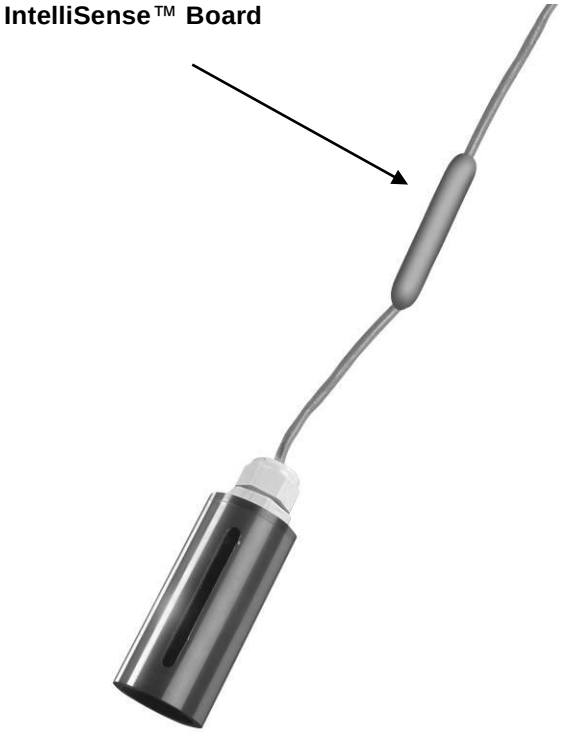


Figure 5-3 Interstitial Level Sensor Float Switch

5.4 Single-Level Sump Sensor

Part No. 30-0231-L

The Single-Level Sump Sensor **(**Figure 5-4**)** 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.

The sensor contains a normally closed float switch that activates in the presence of liquid. In the event of a break in the cable, the system will activate the alarm.

Single level Sump Sensor Specifications	
Detects:	Liquid
Cable Requirements:	Belden #88760 or Alpha #55371
Operating Temperature:	-40°F to 158°F (-40°C to +70°C)
Dimensions:	Length: 3.75” (9.5 cm), Diameter: 2.9” (7.4 cm)
Maximum Wiring Length*:	1,000’ (305 m) field wiring
Multi-Drop Restriction:	16 per I.S. barrier channel (64 per barrier)
Connections:	Red = Power, Black = Signal, Shield = Ground

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

5.4.1 Installation

1. Check that the sump is dry.
2. Position the sensor on the bottom of the sump/pan and secure the sensor wire to an existing pipe or bracket with a tie wrap.
3. Connect the sensor wires to the field wires in the junction box using the supplied wire nuts.
4. Seal the electrical connections with the epoxy seal packs.

Figure 5-4 Single-Level Sump Sensor

5.5 Universal Sump Sensor

The Universal Sump Sensor (Figure 5-5) is used in an attached manway riser, double-wall piping, or an attached collar riser. A sump sensor detects the presence of any liquid in a piping sump. When enough liquid enters the sump riser, it activates the sump sensor.

5.5.1 Installation

1. Place the Universal Sump Sensor into the sump.
2. Route the lead wiring into the junction box.
3. Adjust the length of the wiring until the sensor rests on the sump floor (this dimension can be changed at your discretion).
   Secure the wiring into the box.
4. Connect the sensor to the VSmart Module by splicing the sensor wires to the field wires. These wires, in turn, pass through vapor seal-offs and enter the VSmart Module.
5. Keep track of sensor-wiring identity to ensure proper wiring at the VSmart Module. Follow all applicable codes.
6. Run separate wiring from each sensor to the chain leading to the VSmart Module, if using the multi-drop connection method; otherwise, run separate wire for each sensor.

Probe cables and sensor wiring can share the same conduit. Keep track of sensor-wiring identity to ensure proper wiring at the VSmart Module.

Maximum wiring length is the maximum length of cable to be used to connect all sensors on an individual channel. This length includes the run of the cable from the VSmart to each sensor board in the string.

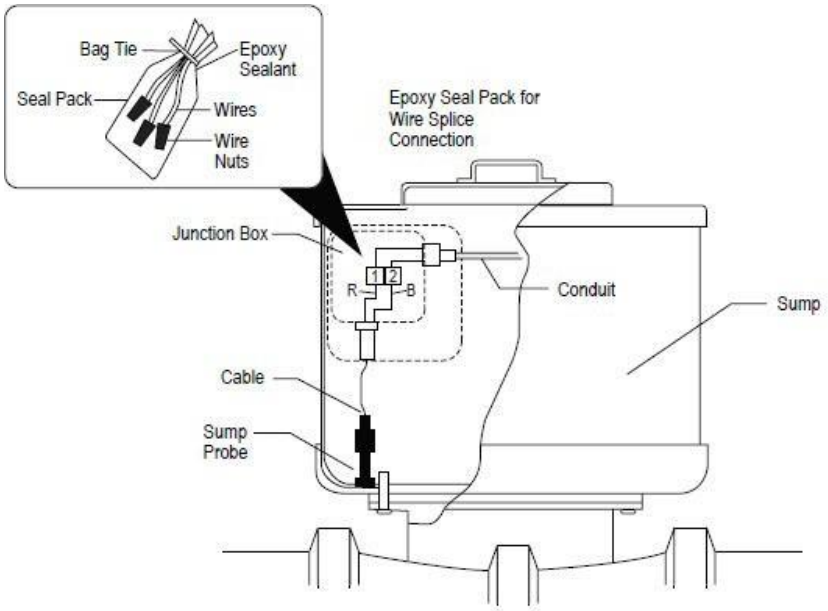


Figure 5-5 Universal Sump Sensor Installation

5.6 Liquid-Only Float Sensor

Part No. 30-0230-S

Designed to detect the presence of fluid in the interstitial space of a steel double-walled tank or a containment sump. The sensor (Figure 5-6), which utilizes float technology, activates on the presence of water or fuel and provides an alarm condition. An alarm condition will also occur if the cable is broken.

Liquid-Only Float Sensor Specifications	
Primary Use(s):	STP Sumps and Dispenser Pans
Alternate Use(s):	Use Steel Tank Interstitial
Detects:	Liquid
Operating Temperature:	-40°F to 158°F (-40°C to +70°C)
Dimensions:	Length: 3.5” (8.9 cm), Width: 1.43” (3.6 cm)
Cable Requirements:	Belden #88760 or Alpha #55371
Maximum Wiring Length*:	1,000’ (305 m) field wiring
Multi-Drop Restriction:	16 per I.S. barrier channel (64 per barrier)
Connections:	Red = Power, Black = Signal, Shield = Ground

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

5.6.1 Installation

1. Check that the sump is dry.
2. Position the sensor approximately 1/2” (1.3 cm) above the bottom of the sump/pan and secure sensor wire to an existing pipe or bracket with a tie wrap.
3. Connect the sensor wires to the field wires in the junction box using the supplied wire nuts.
4. Seal the electrical connections with the epoxy seal packs.

Figure 5-6 Liquid-Only Float Sensor

5.7 Discriminating Dispenser Pan Sensor

Part No. 30-0232-DH-10

The Discriminating Dispenser Pan Sensor (Figure 5-7) detects abnormally high or low liquid levels and distinguishes liquid type (water or hydrocarbons) using a polymer strip and float technology. The polymer strip will change resistance showing hydrocarbon detection; if the polymer doesn't change resistance it indicates detection of water. Detection of either will result in an alarm condition, as will a break in the cable or sensor malfunction.

Discriminating Dispenser Pan Sensor Specifications	
Primary Use(s):	Dispenser Pan/Sump
Alternate Use(s):	STP Sumps
Detects:	Low Liquid, High Liquid, Fuel
Operating Temperature:	-40°F to 158°F (-40°C to +70°C)
Dimensions:	Length: 11.1” (28.2 cm), Diameter: 2.3” (5.8 cm)
Float Requirements:	Low: 1.5” (3.8 cm), High: 8” (20.3 cm)
Cable Requirements:	Belden #88760 or Alpha #55371
Maximum Wiring Length*:	1,000’ (305 m) field wiring
Multi-Drop Restriction:	16 per I.S. barrier channel (64 per barrier)
Connections:	Red = Power, Black = Signal, Shield = Ground

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

5.7.1 Installation

1. Check that the dispenser pan is dry.
2. Install the bracket with pipe clamp and sensor bracket.
3. Position the sensor to touch the bottom of the pan.
4. Connect the sensor cable to the sensor and field wiring.
5. Seal the electrical connections with the epoxy seal pack.
6. Remove the sensor from sump while servicing the pump to prevent activating the sensor with fuel.

With Belcor® inside sensor

Figure 5-7 Discriminating Dispenser Pan Sensor

5.8 Discriminating STP Sump Sensor

Part No. 30-0232-DH-20

The Discriminating STP Sump Sensor (Figure 5-8) detects abnormally high or low liquid levels and distinguishes liquid type (water or hydrocarbons) using a polymer strip and float technology. The polymer strip will change resistance showing hydrocarbon detection; if the polymer doesn't change resistance it indicates detection of water. Detection of either will result in an alarm condition, as will a break in the cable or sensor malfunction.

Discriminating STP Sump Sensor Specifications	
Primary Use(s):	STP Sumps
Alternate Use(s):	Dispenser Pans/Sumps
Detects:	Low Liquid, High Liquid, Fuel
Operating Temperature:	-40°F to 158°F (-40°C to +70°C)
Sensor Dimensions:	Length: 21.1” (53.6 cm), Diameter: 2.3” (5.8 cm)
Float Requirements:	Low: 1.5” (3.8 cm), High: 11” (27.9 cm)
Cable Requirements:	Belden #88760 or Alpha #55371
Maximum Wiring Length*:	1,000’ (305 m) field wiring
Multi-Drop Restriction:	16 per I.S. barrier channel (64 per barrier)
Connections:	Red = Power, Black = Signal, Shield = Ground

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

5.8.1 Installation

1. Check that the dispenser pan is dry.
2. Install the bracket with pipe clamp and sensor bracket.
3. Position the sensor to touch bottom of pan.
4. Connect the sensor cable to the sensor and field wiring.
5. Seal the electrical connections with the epoxy seal pack.
6. Remove the sensor from the sump while servicing the pump to prevent activating the sensor with fuel.

With Belcor® inside sensor

Figure 5-8 Discriminating STP Sump Sensor

5.9 Hydrocarbon Vapor Sensor

Part No. 30-0235-V

The Hydrocarbon Vapor Sensor (Figure 5-9) detects hydrocarbon vapors in dry monitoring wells. 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. Detection of vapors will result in an alarm condition, as will a break in the cable or sensor malfunction.

Hydrocarbon Vapor Sensor Specifications	
Detects:	Hydrocarbon Vapors
Operating Temperature:	-40°F to 158°F (-40°C to +70°C)
Dimensions:	Length: 3.5”(8.9 cm), Diameter: 0.9” (2.3 cm)
Nominal Resistance:	Uncontaminated: 3,000 - 5,000 ohms Contaminated: 10,000 - 200,000 ohms
Cable Requirements:	Belden #88760 or Alpha #55371
Maximum Wiring Length*:	1,000’ (305 m) of field wiring
Multi-Drop Restriction:	16 per I.S. barrier channel (64 per barrier)
Connections:	Red = Power, Black = Signal, Shield = Ground

Depending on saturation factor, the sensor may require up to 30 minutes to return to normal after vapors have dissipated.

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

5.9.1 Installation

1. Check Dry Monitoring Wells for vapors before installing.
2. Mount Sensor close to the top above the water level, if applicable.
3. If sensor is submerged in water it will not function.

Figure 5-9 Hydrocarbon Vapor Sensor

5.10 Discriminating Interstitial Sensor

Part No. 30-0236-LW

The Discriminating Interstitial Sensor (Figure 5-10) utilizes a solid-state optical technology to detect the presence of fluid in the annular space of a tank, and conductive probes to distinguish fluid type (water or hydrocarbons). Detection of liquid will result in an alarm condition, as will a break in the cable or sensor malfunction.

Discriminating Interstitial Sensor Specifications	
Primary Use(s):	Interstitial Space
Alternate Use(s):	Dispenser Pans and STP Sumps
Detects:	Liquids (Fuel and Water)
Operating Temperature:	-40°F to 158°F (-40°C to +70°C)
Dimensions:	Length: 3.22” (8.2 cm) Width: 1.1” x .62” (2.8 cm x 1.6 cm)
Required Cable:	Belden #88760 or Alpha #55371
Maximum Wiring Length*:	1,000’ (305 m) field wiring
Multi-Drop Restriction:	16 per I.S. barrier channel (64 per barrier)
Connections:	Red = Power, Black = Signal, Shield = Ground

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

5.10.1 Installation

1. Measure the length of the annular space-monitoring pipe from top to bottom and subtract 1/2” (1.3 cm) for a total measurement to be used for sensor placement.
2. Measure from the sensor tip along the sensor cable the length calculated and mark with tape or marker.
3. Position the sensor into the monitoring pipe until the tape mark is even with the top of the pipe.
4. The sensor should not touch the bottom of the monitoring tube to prevent false alarms.
5. Connect the sensor wires to the field wires in the junction box using the supplied wire nuts.
6. Seal the electrical connections with the epoxy seal pack.

Figure 5-10 Discriminating Interstitial Sensor

5.11 Interstitial Hydrocarbon Liquid Sensor with Water Indicator

Part No. 30-0234-HW-01

The Interstitial Hydrocarbon Liquid/Water Sensor (Figure 5-11) is designed for use in the interstitial area of a fiberglass double-walled tank. The hydrocarbon liquid/water sensor contains a carbon/polymer material that changes its resistance when exposed to liquid hydrocarbons. Additionally, it contains a conductive strip to detect the presence of water, 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.

Interstitial Hydrocarbon Liquid/Water Sensor Specifications	
Detects:	Liquid hydrocarbons/water
Operating Temperature:	-40°F to 158°F (-40°C to +70°C)
Dimensions:	Length: 13.8” (35 cm), Width: 1.0” (2.5 cm)
Nominal Resistance:	Uncontaminated: 1000-3000 ohms Contaminated: 10,000-200,000 ohms
Cable Requirements:	Belden #88760 or Alpha #55371
Maximum Wiring Length*:	1,000’ (305 m) field wiring
Multi-Drop Restriction:	16 per I.S. barrier channel 64 per barrier)
Connections	Red = Power, Black = Signal, Shield: = Ground

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

Figure 5-11 Interstitial Hydrocarbon Liquid Sensor with Water Indicator

5.12 Hydrocarbon Liquid Sensor with Water Indicator

Part Nos.: 6 feet: 30-0234-HW-06; 15 feet: 30-0234-HW-15; 20 feet: 30-0234-HW-20

The Hydrocarbon Liquid/Water Sensor (Figure 5-12), which is available in lengths of 6 feet (1.8 m), 15 feet (4.6 m) and 20 feet (6.1 m), is used primarily for monitoring wet wells with fluctuating groundwater tables. The sensor contains a carbon/polymer material that changes its resistance when exposed to liquid hydrocarbons. Additionally, a water sensor that relies on the conductivity of water to detect its presence is utilized, providing the ability to discriminate between hydrocarbon liquid and water. An alarm condition will result from the absence of groundwater in a monitoring well. Detection of fuel entering the containment area (indicating a leak) will also result in an alarm condition, as will a break in the cable or sensor malfunction.

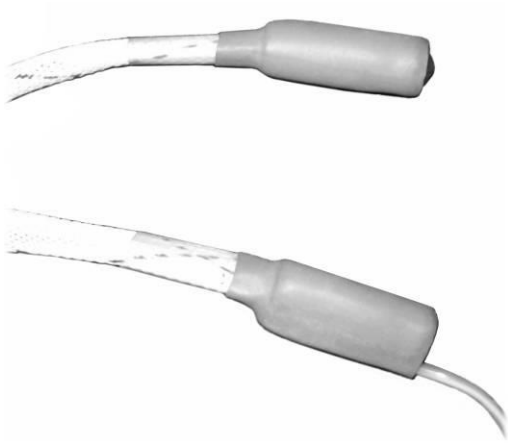


Figure 5-12 Hydrocarbon Liquid Sensor with Water Indicator

Hydrocarbon Liquid/Water Sensor Specifications	
Primary Use(s):	Monitoring wells
Detects:	Liquid hydrocarbons and water
Operating Temperature:	-40°F to 158°F (-40°C to +70°C)
Dimensions:	Length: 6’ (1.9 m), 15’ (4.6 m) or 20’ (6.1 m) Diameter: 0.7” (1.8 cm)
Nominal Resistance:	Uncontaminated: 1,000 – 3,000 ohms/ft Contaminated: 30,000 - 200,000 ohms/ft
Cable Requirements:	Belden #88760 or Alpha #55371
Maximum Wiring Length*:	1,000’ (305 m) field wiring
Multi-Drop Restriction:	16 per I.S. barrier channel (64 per barrier)
Connections:	Red = Power, Black = Signal, Shield = Ground

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

5.13 Interstitial Sensor

Interstitial Sensors can be installed around the inside perimeter of the retaining wall or “snaked” under the length of an above ground storage tank within the retaining wall area (Figure 5-13 and Figure 5-14).

Interstitial Sensors can also be installed in manways (Figure 5-14), in trenches or inside a sump.

5.13.1 Interstitial Sensor Installation

1. Place the Interstitial Sensor in its intended location. When installing the sensor in a sump, place the sensor at the bottom of the sump.
2. Connect the sensor to the VSmart Module by splicing the sensor wires to field wires. These wires, in turn, pass through vapor seal-offs and enter the VSmart Module.
3. Keep track of sensor-wiring identity to ensure proper wiring at the VSmart Module. A below-grade wiring workbox can be used as a junction box for the splice when wiring underground. Follow all applicable codes.
4. Run separate wiring from each sensor to the chain leading to the VSmart Module if using the multi-drop connection method; otherwise, run separate wire for each sensor.

> Probe cables and sensor wiring can share the same conduit. Keep track of sensor-wiring identity to ensure proper wiring at the VSmart Module.

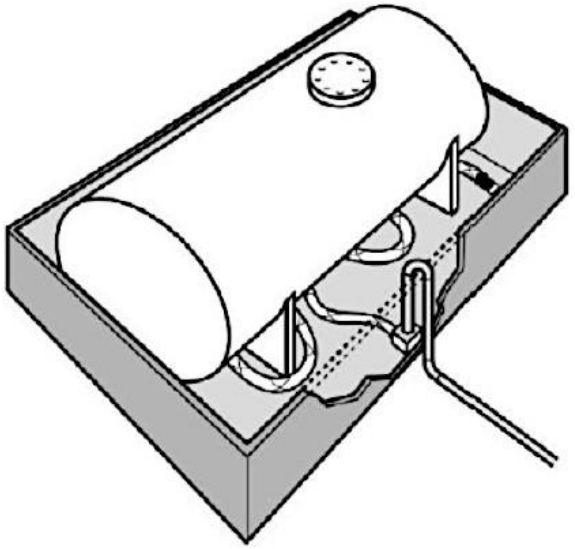


Figure 5-13 Interstitial Sensor in Aboveground Tank

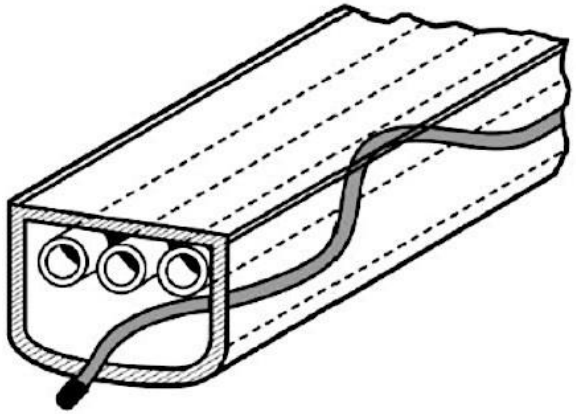


Figure 5-14 Interstitial Sensor Installed in Manway

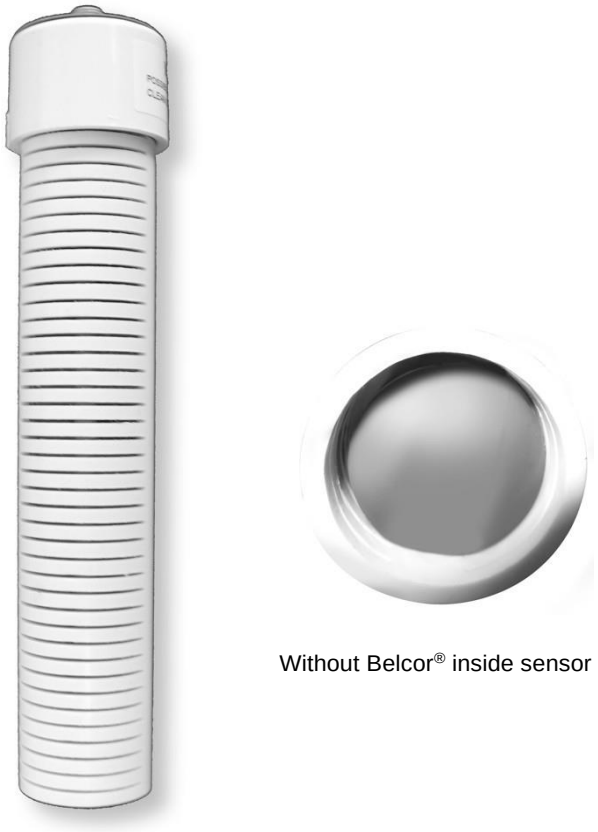
5.14 Dual-Float Dispenser Sump Sensor

Part No. 30-0232-D-10

This Dual-Float Sensor is the same as a Discriminating Dispenser Pan Sensor, Part No. 30-0232-DH-10, but without Belcor® inside the sensor. This makes it non-discriminating.

Dual-Float Dispenser Sump Sensor Specifications	
Primary Use(s):	Dispenser Pan/Sump
Alternate Use(s):	STP Sumps
Detects:	Low Liquid, High Liquid, Fuel
Operating Temperature:	-40°F to 158°F (-40°C to +70°C)
Dimensions:	Length: 11.1” (28.2 cm), Diameter: 2.3” (5.8 cm)
Float Requirements:	Low: 1.5” (3.8 cm), High: 8” (20.3 cm)
Cable Requirements:	Belden #88760 or Alpha #55371
Maximum Wiring Length*:	1,000’ (305 m) field wiring
Multi-Drop Restriction:	16 per I.S. barrier channel (64 per barrier)
Connections:	Red = Power, Black = Signal, Shield = Ground

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



Without Belcor® inside sensor

Figure 5-15 Dual-Float Dispenser Sump Sensor

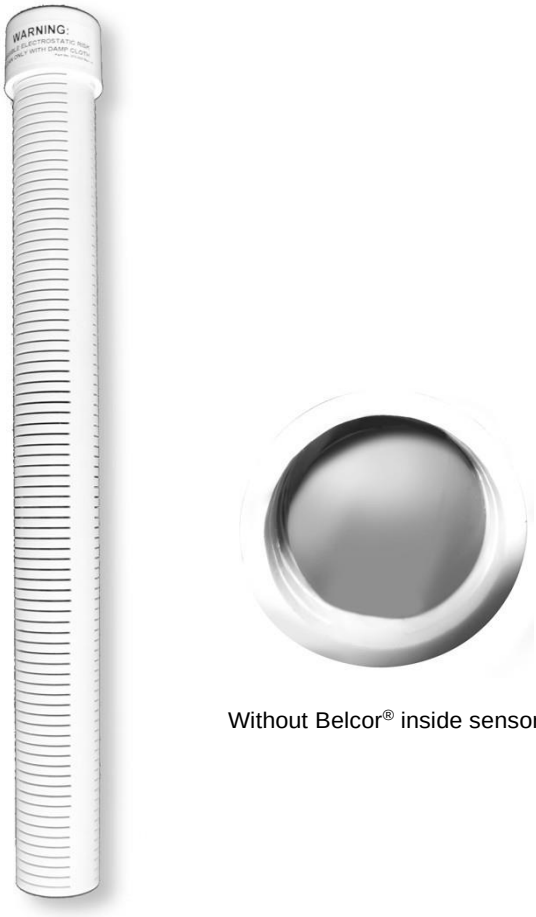
5.15 Dual-Float STP Sump Sensor

Part No. 30-0232-D-20

This Dual-Float Sensor is the same as a Discriminating STP Sump Sensor, Part No. 30-0232-DH-20, but without Belcor® inside sensor. This makes it non-discriminating (see Figure 5-16).

Dual Float STP Sump Sensor Specifications	
Primary Use(s):	Dispenser Pan/Sump
Alternate Use(s):	STP Sumps
Detects:	Low Liquid, High Liquid, Fuel
Operating Temperature:	-40°F to 158°F (-40°C to +70°C)
Dimensions:	Length: 21.1” (28.2 cm), Diameter: 2.3” (5.8 cm)
Float Requirements:	Low: 1.5” (3.8 cm), High: 11” (27.9 cm)
Cable Requirement:	Belden #88760 or Alpha #55371
Maximum Wiring Length*:	1,000’ (305 m) field wiring
Multi-Drop Restriction:	16 per I.S. barrier channel (64 per barrier)
Connections:	Red = Power, Black = Signal, Shield = Ground

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



Without Belcor® inside sensor

Figure 5-16 Dual-Float STP Sump Sensor

5.16 Dual-Float Brine Sensors

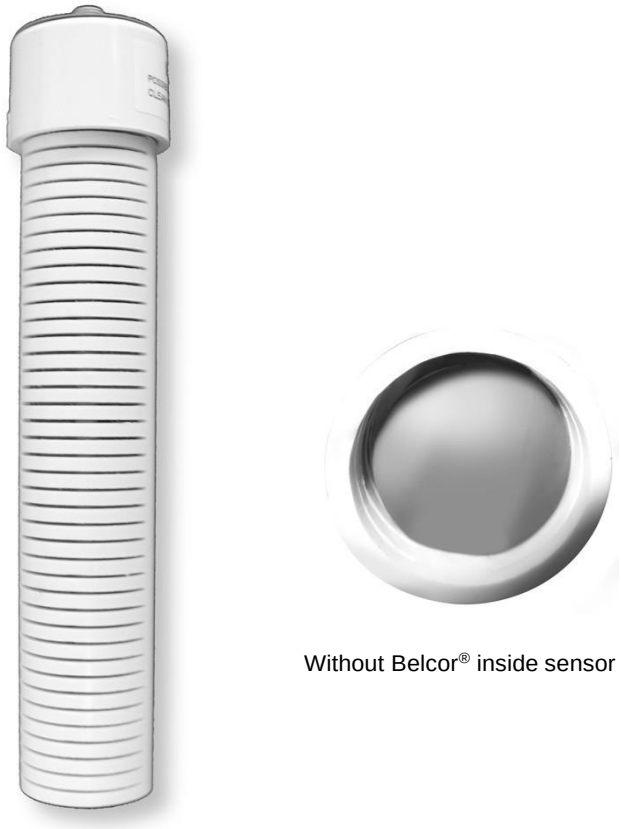
5.16.1 Dual-Float Brine Sensor (D-10)

Part No. 30-0232-D-10B

The Dual Float Brine Sensor (D-10) **(**Figure 5-17**)** is very similar to the 30-0232-D-10, but unlike the other dual float sensors it measures a level of liquid that is already present in the tank. The bottom float of the brine sensor will remain in the up position in a normal condition. When in alarm, the sensor will have either triggered the upper float or the level has dropped below the bottom float.

Dual Float Brine Sensor (D-10) Specifications	
Primary Use(s):	Measure Level of Brine solution
Detects:	Low Liquid, High Liquid
Operating Temperature:	-40°F to 158°F (-40°C to +70°C)
Dimensions:	Length: 21.1” (28.2 cm), Diameter: 2.3” (5.8 cm)
Float Requirements:	Low: 1.5” (3.8 cm), High: 11” (27.9 cm)
Cable Requirements:	Belden 88760 or Alpha 55371
Maximum Wiring Length*:	1,000’ (305 m) field wiring
Multi-Drop Restriction:	16 per I.S. barrier channel (64 per barrier)
Connections:	Red = Power, Black = Signal, Shield = Ground

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



Without Belcor® inside sensor

Figure 5-17 Dual-Float Brine Sensor (A)

5.16.2 Dual-Float Brine Sensor (D-20B)

Part No. 30-0232-D-20B

The Dual Float Brine Sensor (D-20B) (Figure 5-18) is very similar to the 30-0232-D-20, but unlike the other dual float sensors it measures a level of liquid that is already present in the tank. The bottom float of the brine sensor will remain in the up position in a normal condition. When in alarm, the sensor will have either triggered the upper float or the level has dropped below the bottom float.

Dual Float Brine Sensor (D-20B) Specifications	
Primary Use(s):	Measure Level of Brine solution
Detects:	Low Liquid, High Liquid
Operating Temperature:	-40°F to 158°F (-40°C to +70°C)
Dimensions:	Length: 21.1” (28.2 cm), Diameter: 2.3” (5.8 cm)
Float Requirements:	Low: 1.5” (3.8 cm), High: 11” (27.9 cm)
Cable Requirements:	Belden #88760 or Alpha #55371
Maximum Wiring Length*:	1,000’ (305 m) field wiring
Multi-Drop Restriction:	16 per I.S. barrier channel (64 per barrier)
Connections:	Red = Power, Black = Signal, Shield = Ground

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

Without Belcor® inside sensor

Figure 5-18 Dual-Float Brine Sensor (B)

5.17 Reservoir Sensor Installation

Use a Universal Reservoir Sensor with hydrostatically monitored tanks. The Reservoir Sensor monitors the level of the liquid in the reservoir of a double-walled tank (Figure 5-19). The sensor has a single float that detects abnormally high or low liquid levels within the reservoir. If a leak occurs in either wall of a tank, it causes the liquid in the reservoir to rise or fall. When liquid reaches the upper or lower limit on the sensor, the sensor activates.

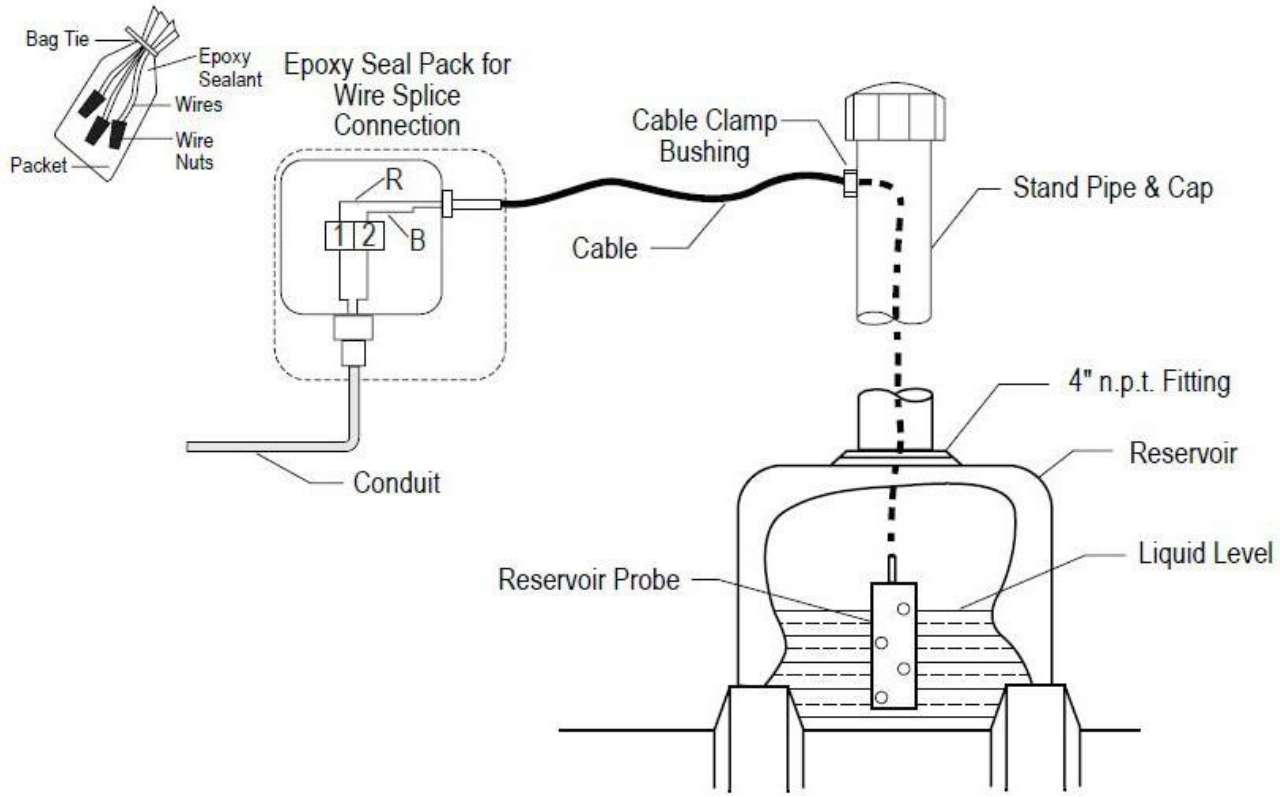


Figure 5-19 Reservoir Sensor Installation

5.18 Density Measurement Sensor (DMS)

Part No. 30-3232

The Density Measurement Sensor (DMS) (Figure 5-20) installs on the pre-existing probe and continuously measures the average density of the fuel in the tank. This provides a measure of even the smallest change in product density within the API density range. Fuel-density reports can be displayed real-time on the console or exported to an external device. The readings can be either nominal or temperature-corrected density.

Density Measurement Sensor	
Materials:	Nitrophyl, Delrin, and Stainless-Steel spring
Resolution:	0.00004 g/cc
Accuracy:	+/- 0.0025 g/cc
Density Range:	0.6 – 1.0 g/cc
Operating Temperature:	-40°F to 158°F (-40°C to +70°C)
Dimensions:	Length: 11” (27.9 cm), Diameter: 2” (5.1 cm)
Sensors per Barrier:	16 maximum
Suggested Location:	6” (15.2 cm) from bottom of probe) **Note:** Use set screw at top and bottom of sensor to hold in position

Figure 5-20 Density Measurement Sensor

5.18.1 DMS Installation

As density sensing is no longer an option in the system, the sensor itself will be picked up by the system once the device is installed and after redoing Auto-Detection of the probe.

1. Take the probe out of the tank and remove the clip and nylon probe foot at the bottom of the probe.
2. Remove the water float, slide the density sensor on and tighten the screws of the sensor onto the probe shaft (the umbrella should be facing down). Leave a space of at least 4 to 6 inches (10.2 cm - 15.2 cm) at the bottom of the probe shaft to allow the water float to detect at least 3 inches (7.6 cm) of water.
3. Replace the water float, nylon probe foot and end clip.
4. Place probe back in the tank.

5.18.2 DMS Configuration

1. Log into SiteSentinel® iSite™ system as an Administrator.
2. Go to “Settings > Probe/Sensors >,” click on the VSmart Module icon and select “Auto-Detect.” Then select the specific probe icon to prompt the system to search for the new density sensor on that probe.
3. Once the auto-detection is finished, click the probe icon to go into the detailed “In-Tank Probe” configuration.
4. The newly discovered density sensor will activate the configuration section of the “Integrated Density Sensor.”
5. Input the values for Factor A and Factor B. These values can be found on the label of the Density Sensor’s plastic bag, which are pre-calibrated by the manufacturer.
6. Click the “Apply” button.

In the SiteSentinel® iSite™ system, there are two possible setups with DMS: with a single sensor on regular 924B Magnetostrictive Probes or a dedicated density probe with three DMS. For the former, SiteSentinel® iSite™ will automatically recognize the DMS on the probe during the auto-detection process; the latter needs the “Density Probe” option to be flagged in the Section of “Integrated Density Sensor,” which is shown below. For density probes, three density sensors are allowed. In both cases, the configuration section of “Integrated Density Sensor” has to be activated, which normally requires to re-do the auto-detection.

7. Density can be displayed as API or kg/m^3 depending on the reference density unit selected in Settings > Probe/Sensors > Probe/Sensors > Probe Settings.
   As shown in example of on page 60, the controller will display density in API unit if the API unit is input in “Density Information > Density/API”, but will display in kg/m^3 if the “Density/API” and “@ Temp” are input.
8. Click “Apply” to finish density sensor configuration and follow the screen prompts to complete probe alarms and threshold settings.
9. Pull out the power plug of console and wait for all internal LEDs to go dark. Then, replace the power cable.
10. Log into system as Administrator and go to “Settings > Probe/Sensors >”.
11. Go to the barrier and channel position of the probe installed with the density sensor (see screenshots on the following pages).

12. To check current density readings from the system, click "Verify Density Device." The system will start calculating the density readings and then display the information in the window for verification, as shown below:

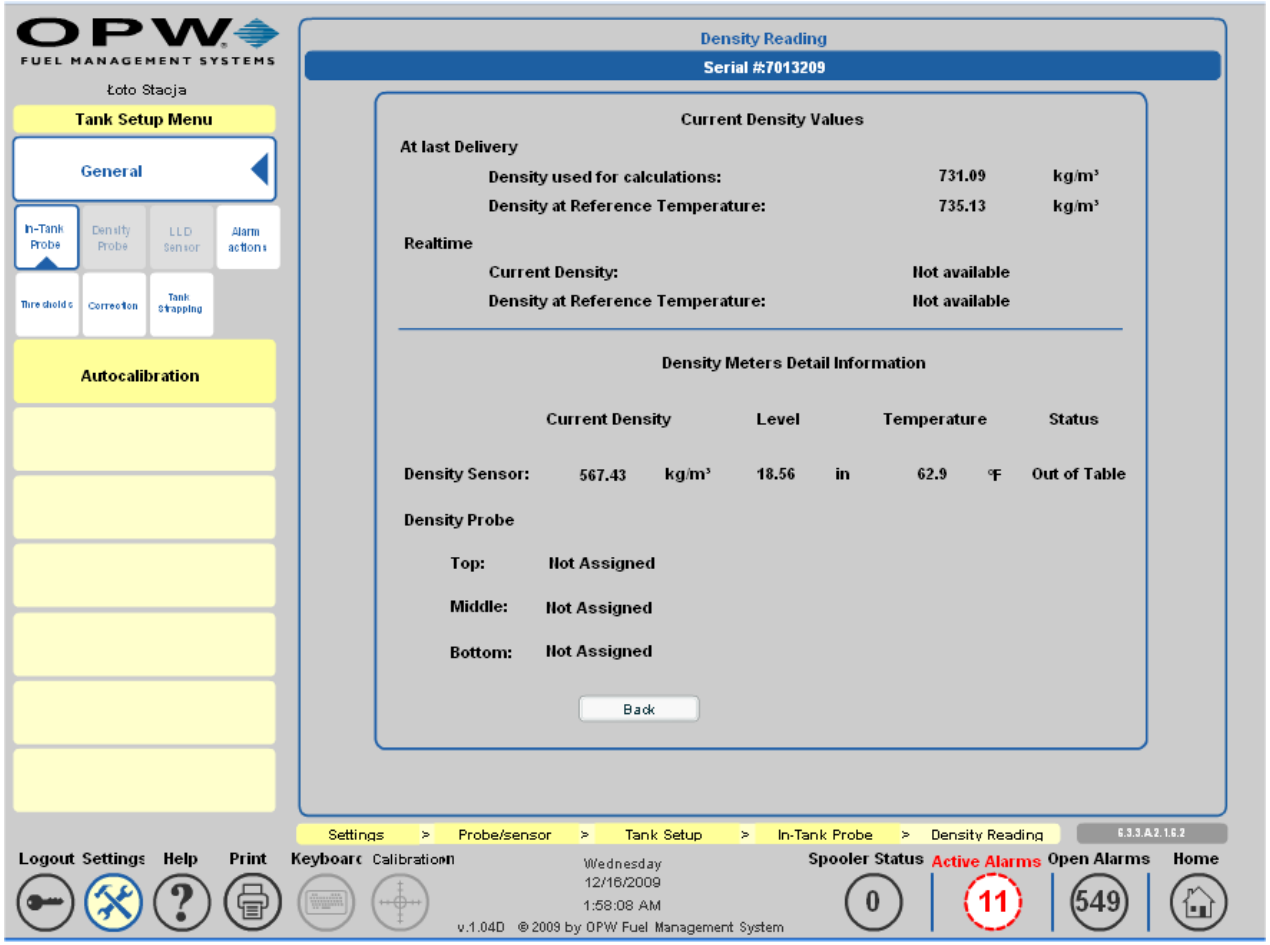


Figure 5-21 Current Density Values

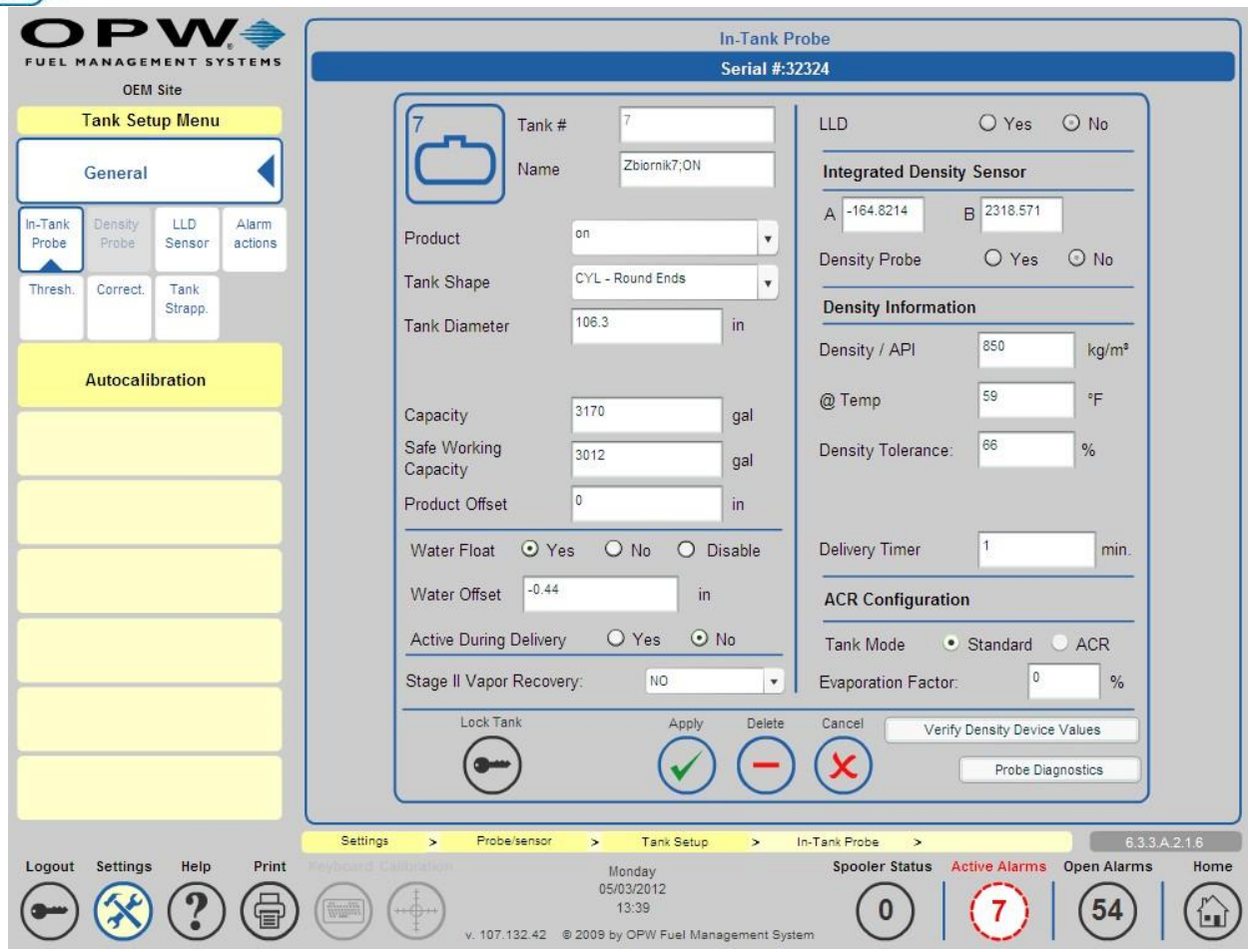


Figure 5-22 In-Tank Probe Setup

5.18.3 Tank Thresholds

1. As the Density Sensor is installed between the water and Product Float, the Product Float will not be able to go further down than the Density Sensor. In order to provide low-product alarms, the Low and Low-Low product threshold level should be set above the Density Sensor. The suggested level is 17 inches (43.2 cm) or higher.
2. Measure the distance between the end of the probe shaft and top end of the Density Sensor. To this distance, add 2 inches (5.1 cm) to account for the dead zone at the end of the probe. The resulting value represents the minimum product Low-Low threshold (see Figure 5-23).

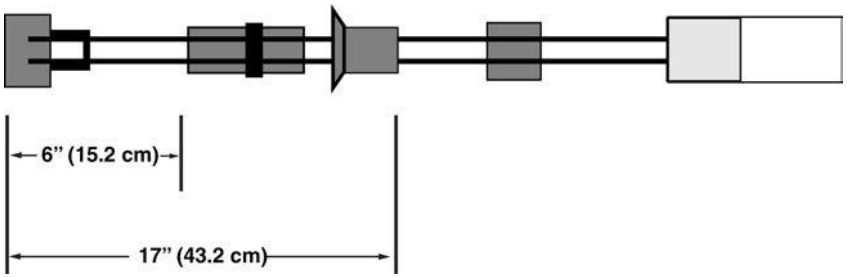


Figure 5-23 Low-Low Threshold

5.18.4 DMS Preliminary Calibration

1. Use a Hydrometer or other density device to measure the fuel density and temperature. Consult the density-temperature table to convert measured density into a value at the reference temperature/temperature corrected density (59ºF or 68ºF; 15°C or 20° C).
2. Consult the density-temperature table and convert the temperature-corrected density to the density at the same temperature as the SiteSentinel® iSite™ controller reads in the density verification page. The reason for this step is that the temperature readings from the Hydrometer and Controller may be different.
3. Click "Verify Density Device Values," take the difference of the density results from steps 19 and 20 (Density from step 19 minus the density from step 20).
4. Go to Tank Setup window (in-tank probe), add the resulting value from step 3 back to the Factor B and then click "Apply." DO NOT JUST ENTER THE RESULT ALONE. The controller will calculate the new density readings.

> The current density readings from the console will be displayed here in real time. In the first-time installation, the initial density reading can be adjusted by changing the B factors ONLY and matching the density readings between the SiteSentinel® iSite™ and reference density device. By changing the B factors, the density readings will be adjusted accordingly. A reference density device with accuracy of +/- 0.005 kg/m^3 is required for initial calibration.
>
> For a dedicated Density Probe, readings will be displayed from all three (3) DMS. The calibration process will be the same as above, just repeated three times.

5.18.5 DMS Final Calibration and Maintenance

Nitrophyl®, the float material, changes change weight and volume over time when immersed in fuel. As such, it is necessary to calibrate the Density Sensors again two to three weeks after initial calibration.

1. Repeat the preliminary calibration process.
2. After re-calibrating the Factor B, the Density Sensor is ready to use.

> For daily operations, it is necessary to wait **at least two (2) hour**s after delivery for valid density readings.

6 Leak Detection

6.1 Volumetric Line Leak Detector (VLLD) Sensor

Part No. 30-3251

Designed to detect a leak in pressurized product piping by monitoring flow when the submersible pump is running and no one is dispensing fuel. The sensor (Figure 6-1) utilizes an internal flow meter to detect and measure flow and provides an alarm condition if a leak is detected. An alarm condition will also occur if the cable is broken. The use of this sensor requires the addition of an external Line Interface Module (LIM) for each four (4) lines.

> LLD sensors may be multi-dropped (maximum three (3) LLD sensors). Cannot be multi-dropped with OPW probes/sensors on same I.S. channel.

Volumetric Line Leak Detector Sensor	
Primary Use:	Pressurized Product Lines
Location:	Submersible Pump Leak Detector Port
Alternate Location:	Sensor Adaptor Fitting
Detects:	Product Flow
Operating Temperature:	-40°F to 158°F (-40°C to +70°C)
Connections:	Blue = Power; Brown = Signal, Black and Shield = Ground
Multi-Drop Restriction:	3 per I.S. barrier channel (16 per barrier)
Maximum Wiring Length*:	1,000’ (305 m) field wiring
Wiring Requirement:	Belden #88760 or Alpha #55371

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

Figure 6-1 VLLD Sensor

6.1.1 Prior to Installation

- Lock-out and tag-out the STP breaker.
- Completely barricade your work area.
- Adhere to OSHA Confined-Space Entry (CSE) protocol.
- Depressurize the product line.
- Keep plenty of fuel-absorbent material in the sump surrounding area.

6.1.2 Installation

1. Remove all pressure from the product piping.
2. Remove the current mechanical leak detector.

CAUTION: Be sure to prevent any debris or scaling from entering system through the leak detector opening.

3. Use the fuel-absorbent cloths to soak up fuel within the work area and around the dry pipe threads.
4. Use an emery cloth to remove any burrs in the packer of the VLLD sensor seat.
5. Plug the line test port.

NOTE: Apply fuel-approved thread sealant (not thread tape) to plug.

6. Install the sensor in the existing submersible pump line leak detector port. Take care not to damage O-ring seal.
   a. Apply proper thread sealant to the sensor threads.
   b. Install into test port and tighten by hand.
   c. Using the proper wrench, tighten the sensor using the flats below the cap or the hex on top of the sensor. Tighten only enough to prevent leakage. Do not over tighten!
7. Connect the sensor wires to the field wires in the junction box using the supplied wire nuts. See figure 6.5.
8. Seal the electrical connections with the epoxy seal packs.
9. Clean the area and power the pump.

Figure 6-2 Soak-up Fuel

Figure 6-3 Apply Thread Sealant

Figure 6-4 Tighten Sensor

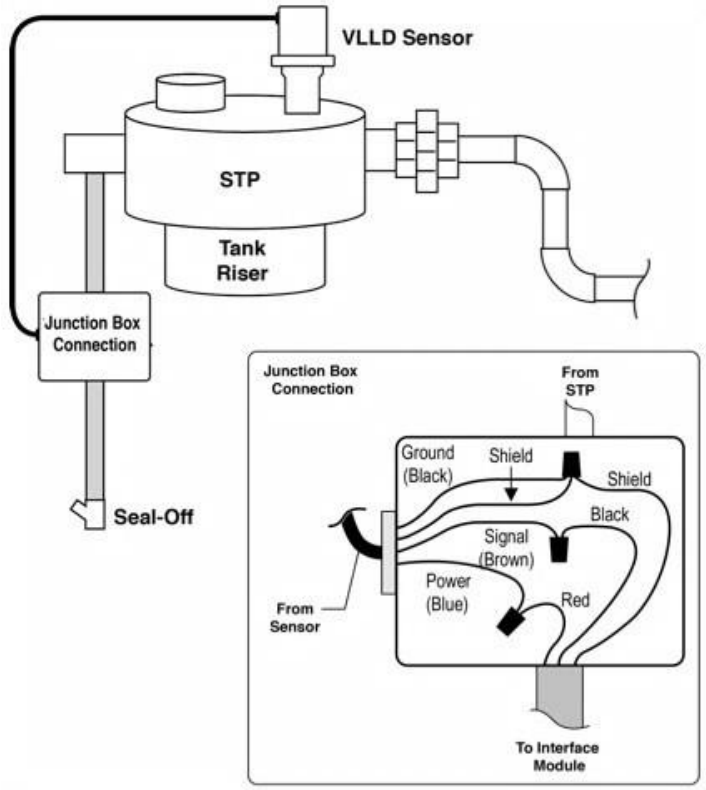


Figure 6-5 VLLD Wiring Connections

7 Line Interface Module (LIM)

The LIM device is a magnetic contactor that supplies line/tank activity by monitoring input/output status of nozzle signals and Submersible Turbine Pump (STP) contactors.

Each Line Interface Module (LIM) interface (maximum of four (4) per system) will monitor up to four (4) pressurized lines (for a total of 16 sensors per system). In the case of manifold submersible pumps, only one (1) LLD sensor is installed, but the manifold will require one LIM position for each submersible pump.

Typically, the dispenser sends a “hook signal” (110 V) to the submersible pump controller, whereas the LIM functions by intercepting this hook signal and communicates via Petro-Net™ with the SiteSentinel® iSite™ requesting the status of the LLD sensor installed in the submersible pump’s leak detection port. The LIM sends signal to the STP controller to turn the submersible pump ON, unless an alarm condition is detected then no signal is sent. A HV feedback signal confirms that the submersible pump is turned ON.

The LIM works in conjunction with the SiteSentinel® iSite™ to test the lines during periods of inactivity to consistency monitor the site for leaks in the line(s).

Line Leak Interface Module	
Monitors:	Nozzle Signal and STP Contactors
Dimensions:	6” W x 8” H x 5.4” D (15 cm x 20.3 cm x 13.5 cm)
Power Requirements:	12 VDC, 0.5A Max.
Temperature Range:	-40°F to 158°F (-40°C to +70°C)

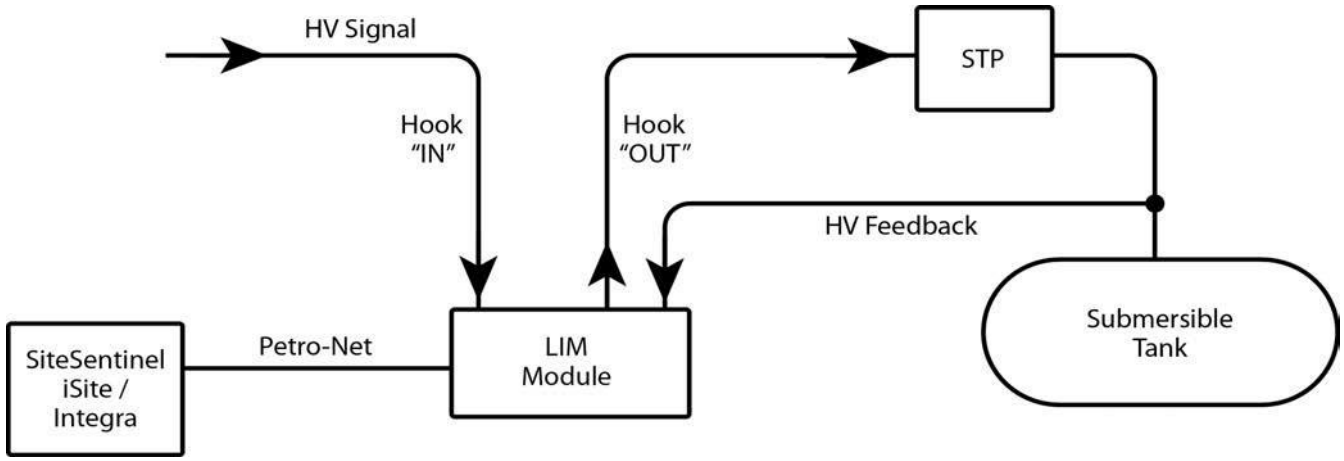


Figure 7-1 LIM Functional Overview

7.1.1 Installation Overview

Installation may vary depending on your submersible pump manufacturer; therefore, installation overview may vary from site to site.

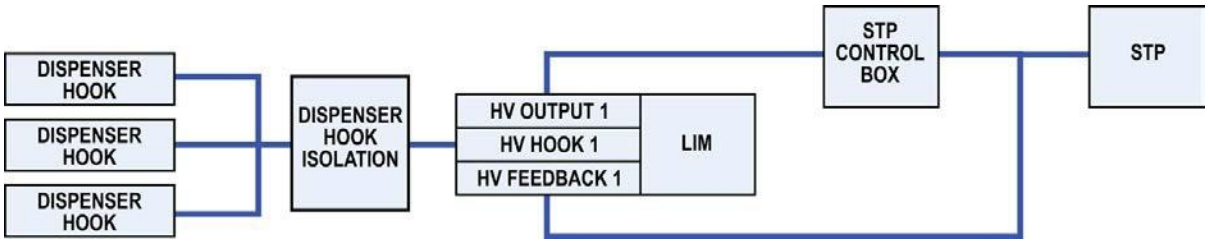


Figure 7-2 LIM System Overview

Typical FE Petro Connection

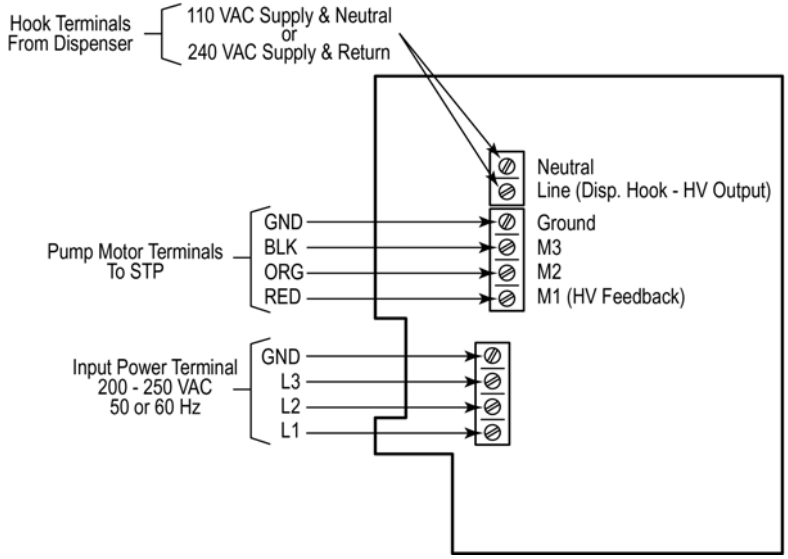


Figure 7-2 Variable Speed Control Wiring for FE Petro

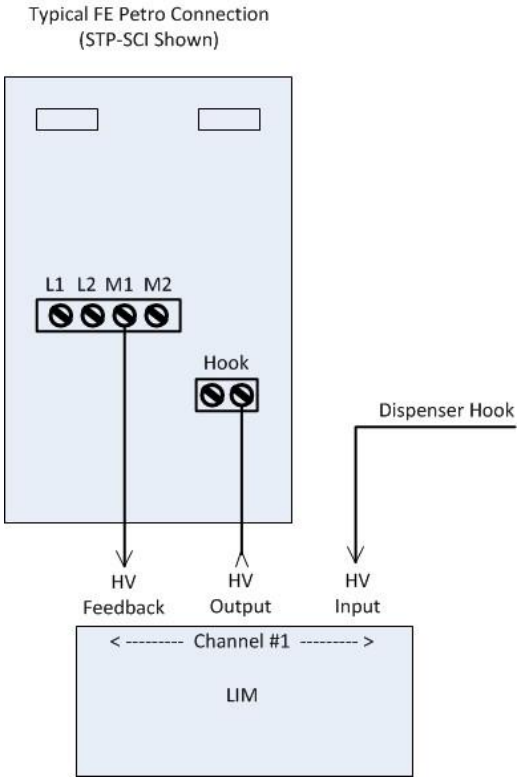


Figure 7-4 Typical FE Petro Wiring Connections

Typical Red Jacket Connection

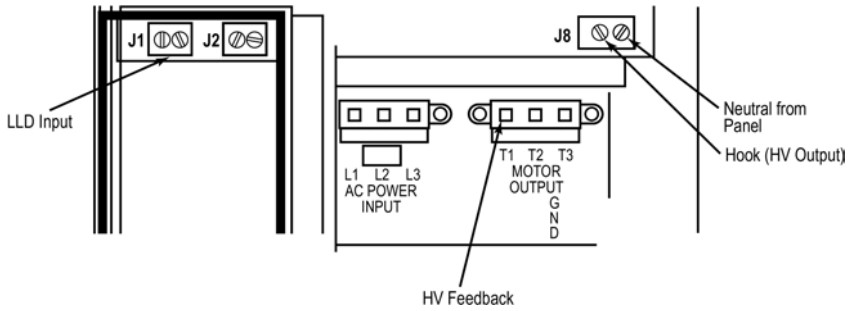


Figure 7-5 Variable Speed Control Wiring for Red Jacket

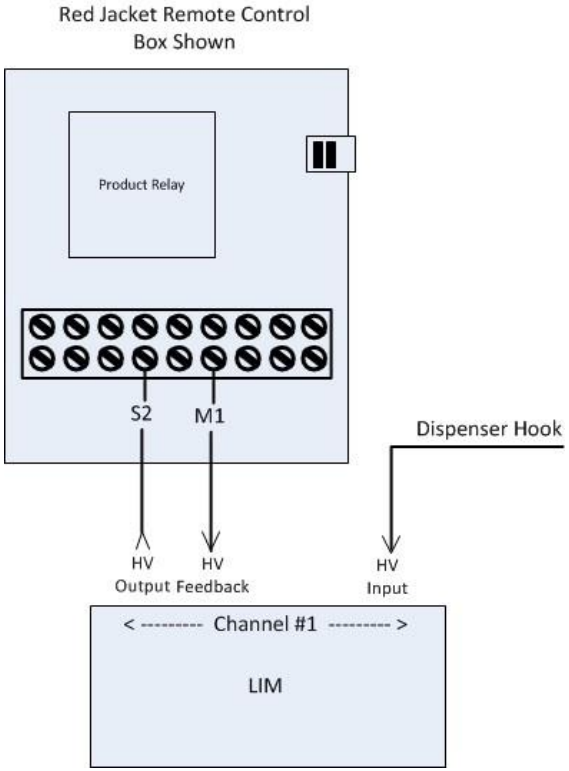


Figure 7-6 Typical Red Jacket Wiring Connections

8 Conduit & Cabinet Installation

8.1 Console Installation

Mount the SiteSentinel® iSite™ console on a wall in a secure indoor location using the mounting holes provided, or use the rubber feet included and place on any flat surface for easy access. If possible, align the console so the display is easily visible and at a comfortable eye level (approximately 5 to 6 feet (1.5 to 1.9 m) above ground if mounted on a wall). Knockout locations are shown below.

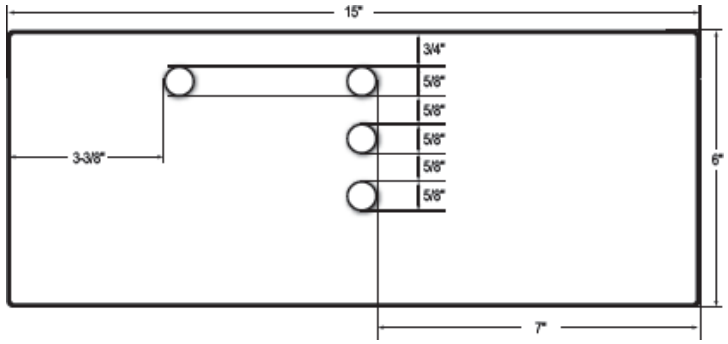


Figure 8-1 Console Knockouts

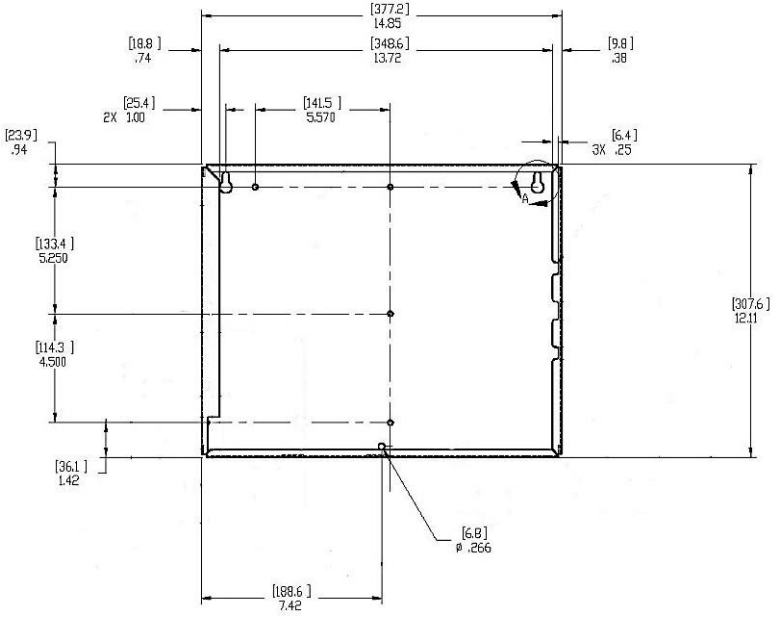


Figure 8-2 Console Mounting Dimensions

8.2 VSmart Module Installation

The VSmart Modules must be mounted on a wall using ONLY the mounting tabs provided. Knockout locations are shown in Error! eference source not found.3. VSmart Modules require AC power and communication connection to the console.

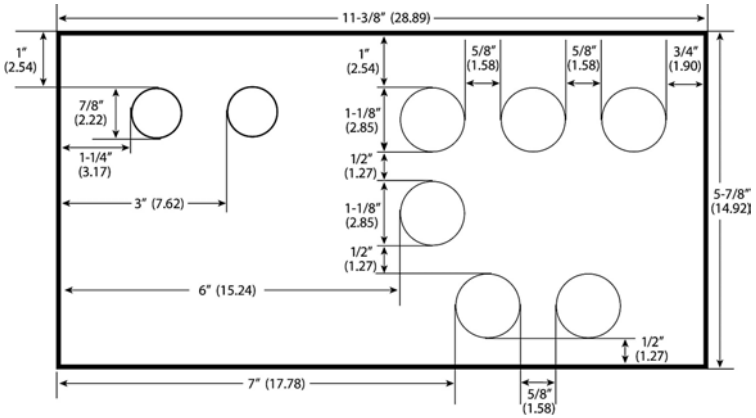


Figure 8-3 VSmart Module Knockouts

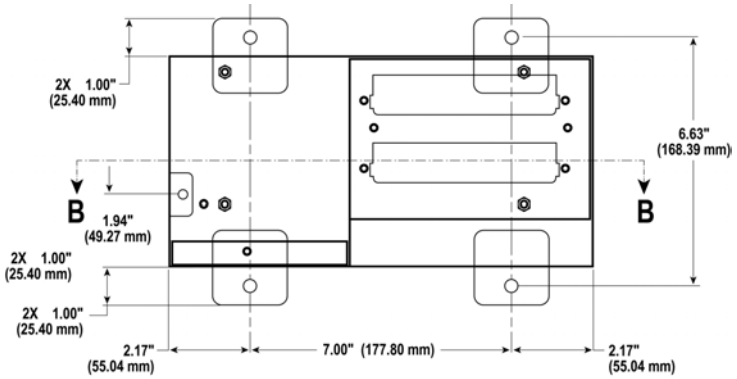


Figure 8-4 VSmart Mounting Dimensions

8.3 Line Interface Module (LIM) Installation

The Line Interface Module must be mounted on a wall using ONLY the mounting tabs provided. Knockout locations are shown below. LIMs require AC power and communication connection to the console.

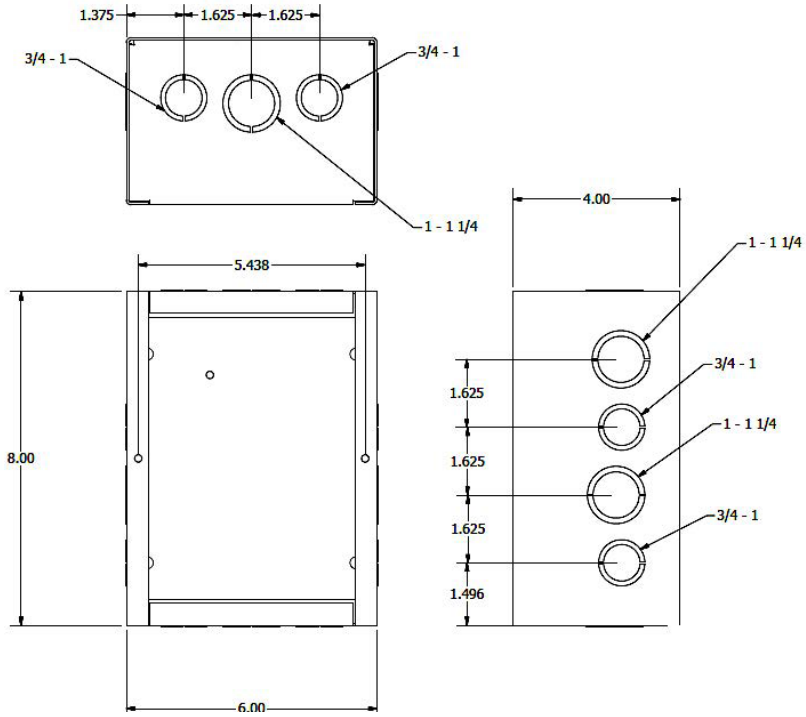


Figure 8-5 LIM Knockouts and Dimensions

8.4 Probe & Sensor Conduits

> All installations must be carried out in accordance with local regulations. Rigid steel conduit, which may or may not be required, should be used whenever possible.

Each VSmart Module is equipped with four (4) ½- to ¾-inch (13 to 19 mm) knockouts to accommodate conduit for probe cables and sensor wiring. Additional knockouts are provided for power and communication wiring conduits.

Refer to the following table to determine the number and size of conduits required between each VSmart Module and its corresponding probes and sensors. Probe and sensor wires must be grouped into single dedicated conduits for each barrier.

8.4.1 Circuit Breaker Conduits

Run ½-inch (13 mm) conduit from the power knockout in the console to the circuit breaker box. Run a corresponding ½-inch (13 mm) conduit from the power knockout in each VSmart Module to the circuit-breaker box. This conduit may also contain Petro-Net™ wiring.

Probes/Sensors	Number/Size of Conduits	
1 to 2	1	1/2” (13 mm)
3 to 4	1	3/4” (19 mm)
5 to 6	2	One 1/2” (13 mm)
		One 3/4” (19 mm)
7 to 8	2	3/4” (19 mm)
9 to 12	3	3/4” (19 mm)
13 to 16	4	3/4” (19 mm)

8.4.2 RS-232 Communications Conduits

If a terminal or PC located more than 6 feet (1.8 m) from the console is to be connected, conduit must be installed to accommodate the RS-232 cable.

> This cable must be no longer than 50 feet (15.2 m). The maximum runs are 5,000 feet (1,524 m) for RS-485 communication cables, and 300 feet (100 m) for Ethernet communication cables.

Run ½-inch (13 mm) conduit from a knockout on the SiteSentinel® console to a knockout on the VSmart Module for communication wiring.

8.5 I/O Device Conduits

Rigid steel conduit should be used for wiring runs to all I/O devices, especially runs over 50 feet (15.2 m). Each I/O module is equipped with a single 1 to 1-1/4 inch (2.5 to 3.3 cm) knockout to accommodate conduit for I/O device wiring. Additional knockouts are provided for power and Petro-Net™ communication wiring conduits.

To prevent interference, all wiring to and from the VSmart Module must be protected by rigid steel conduit. Probe and sensor wires must be alone in their conduits. DO NOT run the wiring from other manufacturers' probes, sensors or alarms.

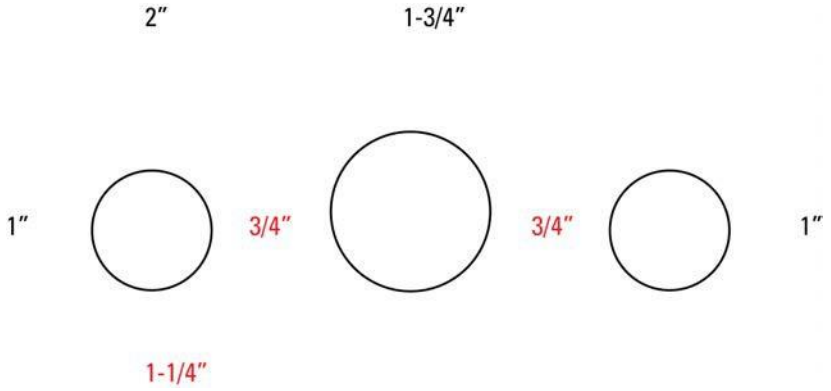


Figure 8-6 I/O Module Knockouts

9 Sensor Installation

9.1 Introduction

SiteSentinel® iSite™ sensors (Figure 9-1) must be installed, positioned, and operated according to all applicable codes. These codes may include but are not limited to the **National Fire Prevention Code** and the **National Electrical Code. Check the requirements of any other applicable codes in the country/region of installation before beginning.**

Due to the variety of surface and soil conditions, a person familiar with local conditions and codes should determine the placement of monitoring wells. For best results, a groundwater survey should also be completed.

All SiteSentinel® iSite™ sensors are intrinsically safe for use in Class 1, Group D, Division 1 and 2 hazardous locations, as defined by the National Electrical Code. Connect to VSmart Modules using 14- to 18-AWG twisted-pair wiring and rigid steel conduit. The maximum distance between a sensor and the VSmart Module is 500 feet (152 m) with 18-AWG wire, or 1,000 feet (305 m) with 14-AWG wire. *Seal off all wiring for vapor protection!*

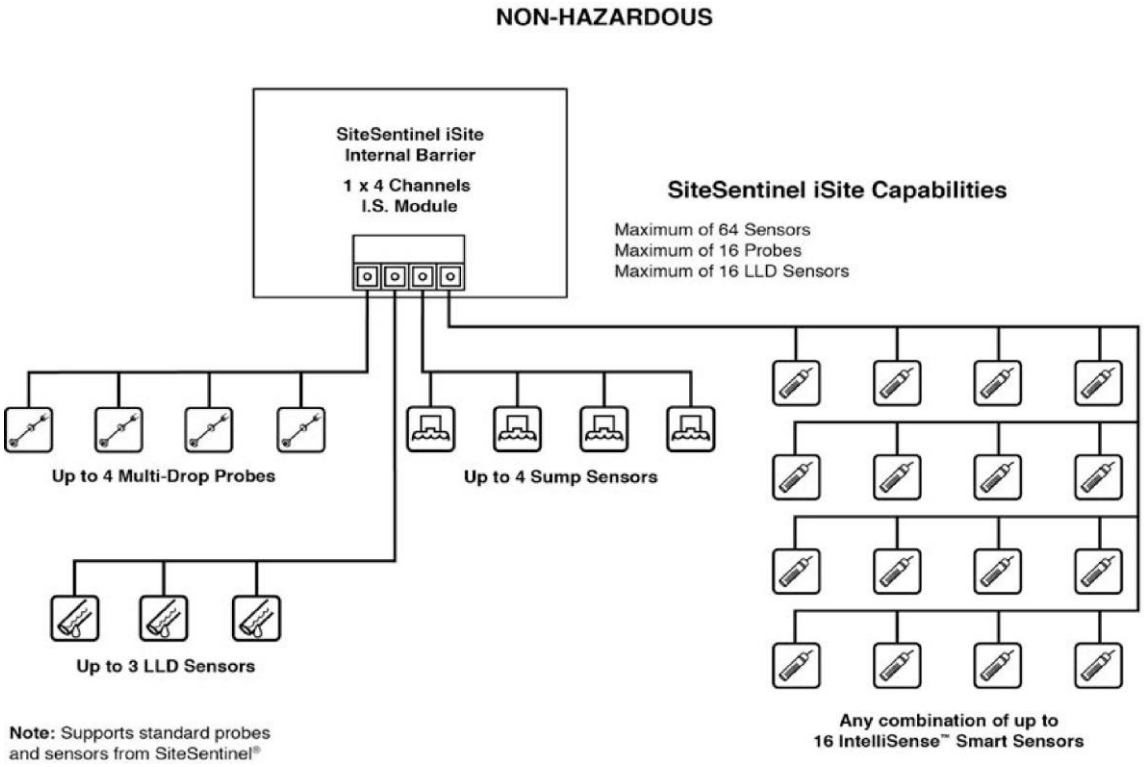


Figure 9-1 Sensor Installation Diagram

9.2 Dry-Well Monitoring, Single-Wall Tank

Error! Reference source not found. represents a typical dry-well monitoring layout for a single-wall tank. Monitoring wells are placed around the perimeter of the tanks, and are dug as close as possible to the tanks or product lines for optimal sensor response.

The manhole should be watertight and the monitoring well should be at least 2 feet (61 cm) deeper than the bottom of the tanks to be monitored. Either 2-inch (5.1 cm) or 4-inch (10.2 cm) well casing should be used.

To obtain an adequate sample area, the *perforated* section should be a large part of the well casing's length. Place a cap on the bottom of the well casing to prevent dirt entry. Backfill dirt around the casing.

The vapor sensor monitors hydrocarbon vapors. A *liquid* sensor should also be installed and placed lower than the vapor sensor to detect any liquid buildup.

Though vapor sensors are *not* damaged by submersion in liquid, they will not function properly until removed from the liquid and given sufficient time to dry. The sealed liquid sensor is protected from particles such as dirt. It requires no particular placement. Any combination of vapor and liquid sensors may be used.

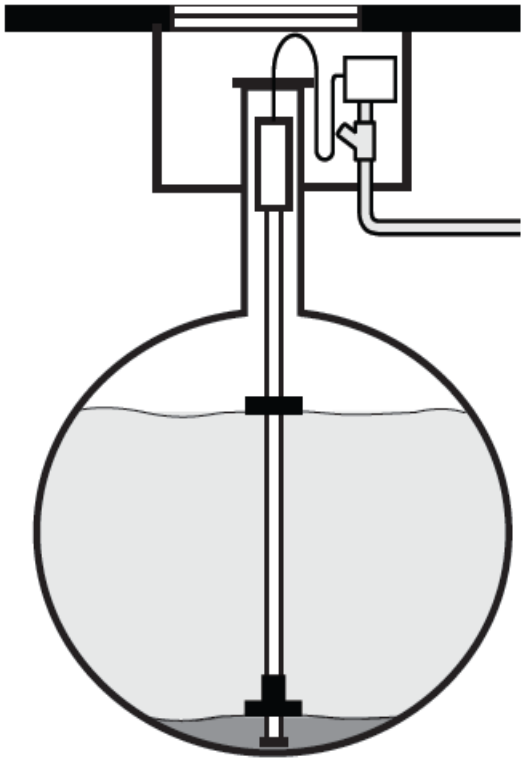


Figure 9-2 Dry Well Monitoring, Single-Wall Tank

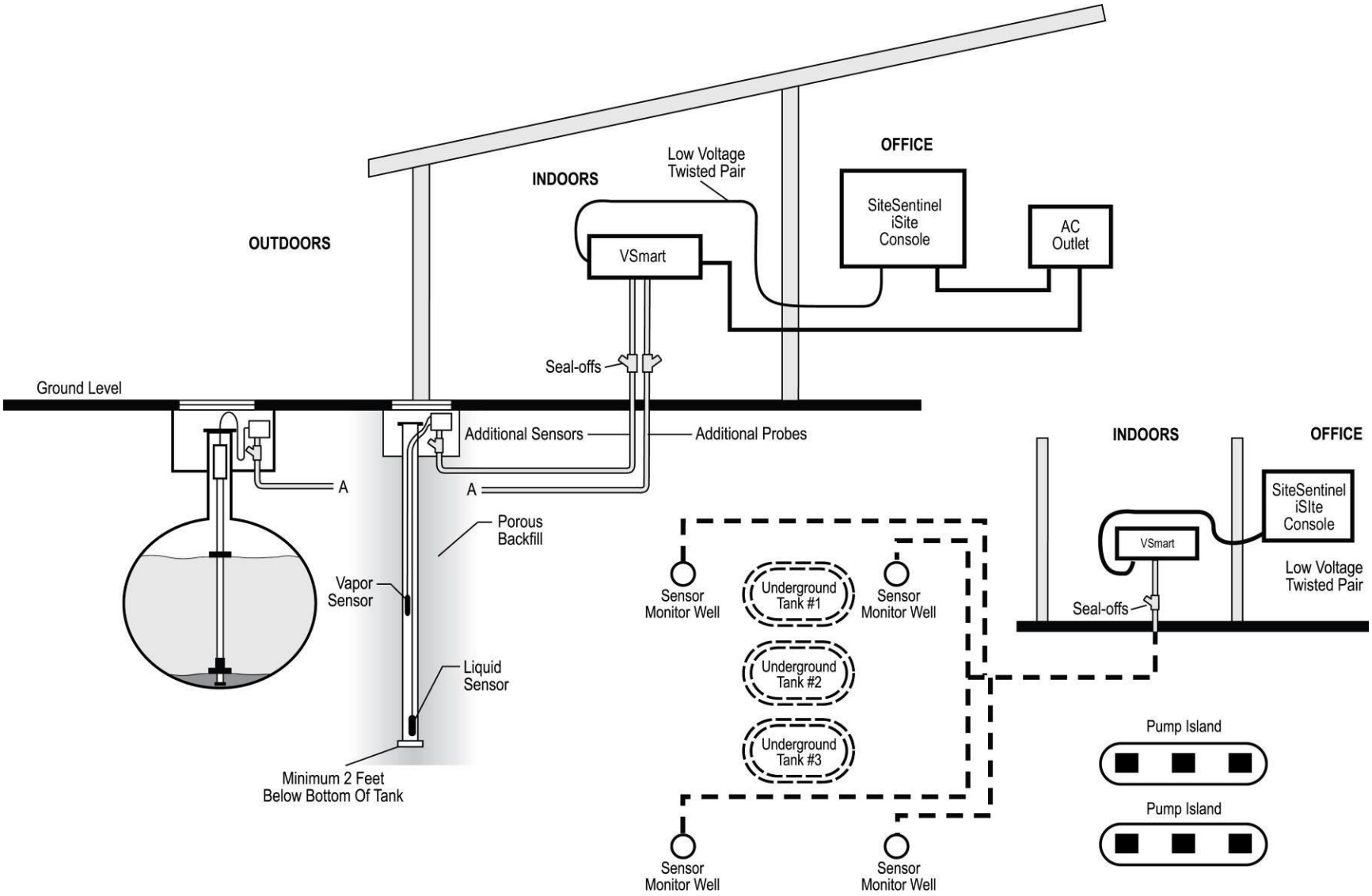


Figure 9-3 Dry-Well Monitoring, Single-Wall Tank

9.3 Wet-Well Monitoring, Single-Wall Tank

Error! Reference source not found. shows a typical wet-monitoring ell layout for a single-wall tank. The sensors are placed around the perimeter of the tanks. The monitoring wells are dug as close as possible to the tanks or product lines for optimal sensor response.

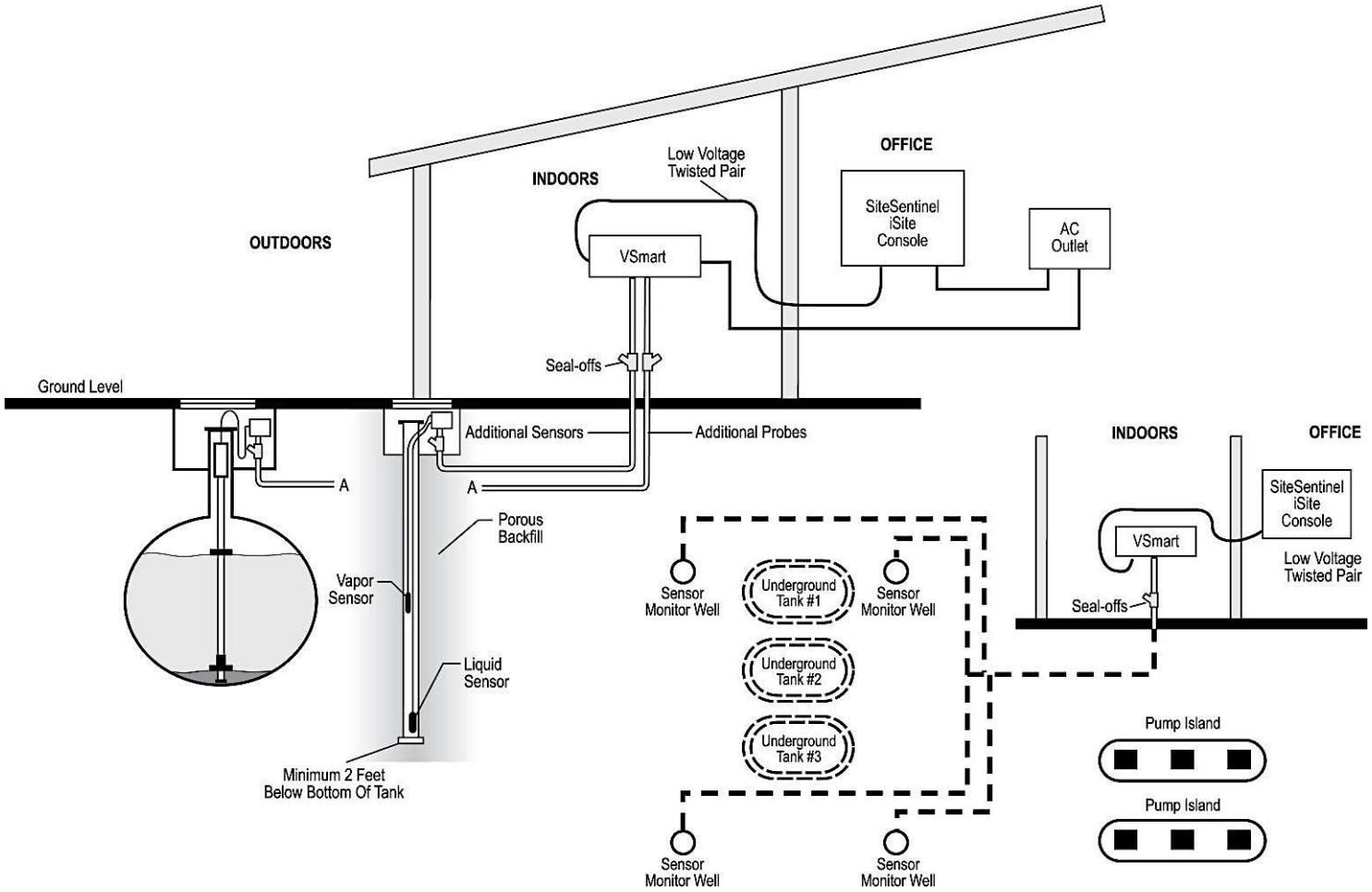


Figure 9-4 Wet-Wall Monitoring, Single-Wall Tank

9.4 No-Well Monitoring, Double-Wall Tank

The space between the walls of a double-wall tank is the *interstitial* space, and it is an ideal location for liquid sensors.

If the *outside* tank wall develops a leak, groundwater enters the interstitial space and the liquid sensor triggers an alarm. If the *inside* wall develops a leak, the tank contents enter the interstitial space and both sensors indicate an alarm condition.

Error! Reference source not found. shows a typical sensor layout for a double-wall tank.

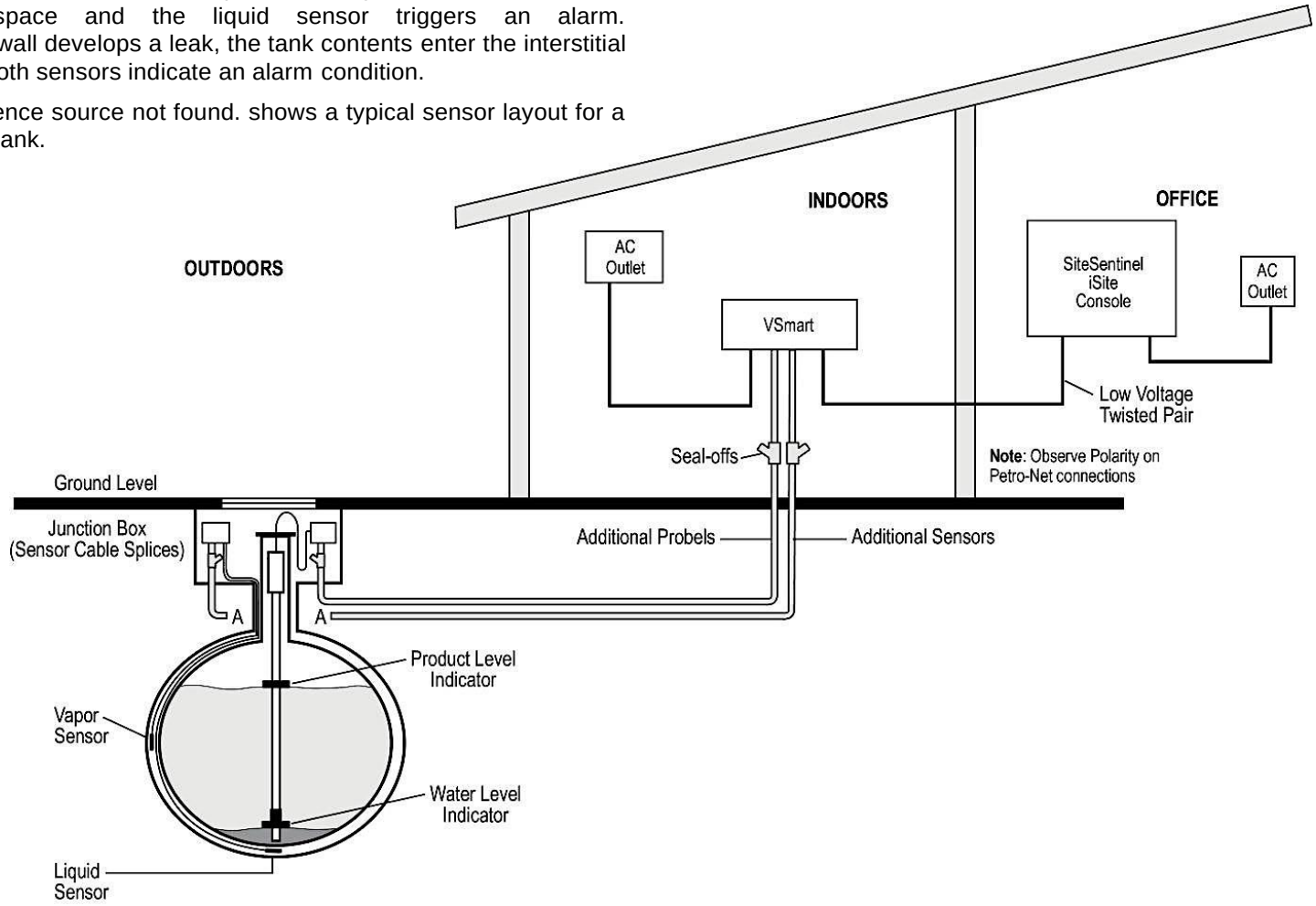


Figure 9-5 No-Well Monitoring, Double-Wall Tank

9.5 Double-Wall Tank with Well Monitoring

A monitoring well is used with a double-wall tank only if the local water table reaches tank level. Because of the danger of water-table contamination, install the well with a Liquid Phase Sensor.

Error! Reference source not found. is a typical wet-monitor well layout for
a double-wall tank. Place the sensors around the tank's perimeter. Locate wells as close as possible to the tanks or product lines for best sensor response. A monitoring well cross-section is also shown. Manholes are watertight.

The monitoring well should be at least 2 feet (61 cm) deeper than the bottom of the monitored tanks. Use 2-inch (5.1 cm) or 4-inch (10.2 cm) well casing; the perforated section should be a large portion of the casing length. The bottom of the casing should have a cap to prevent dirt from entering, and porous material should be backfilled around the casing.

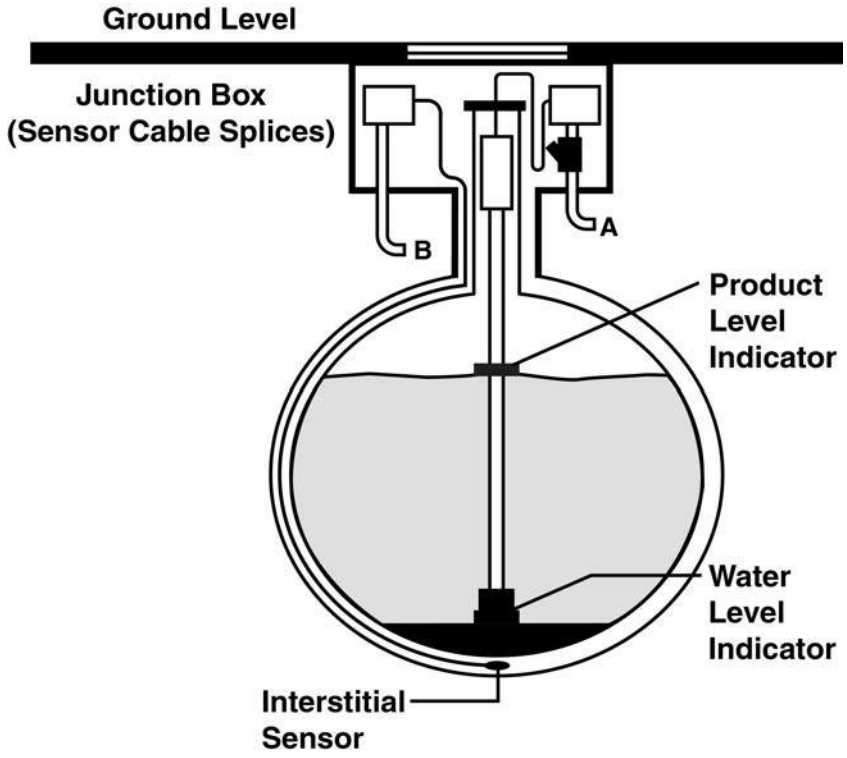


Figure 9-6 Double-Wall Tank with Well Monitoring

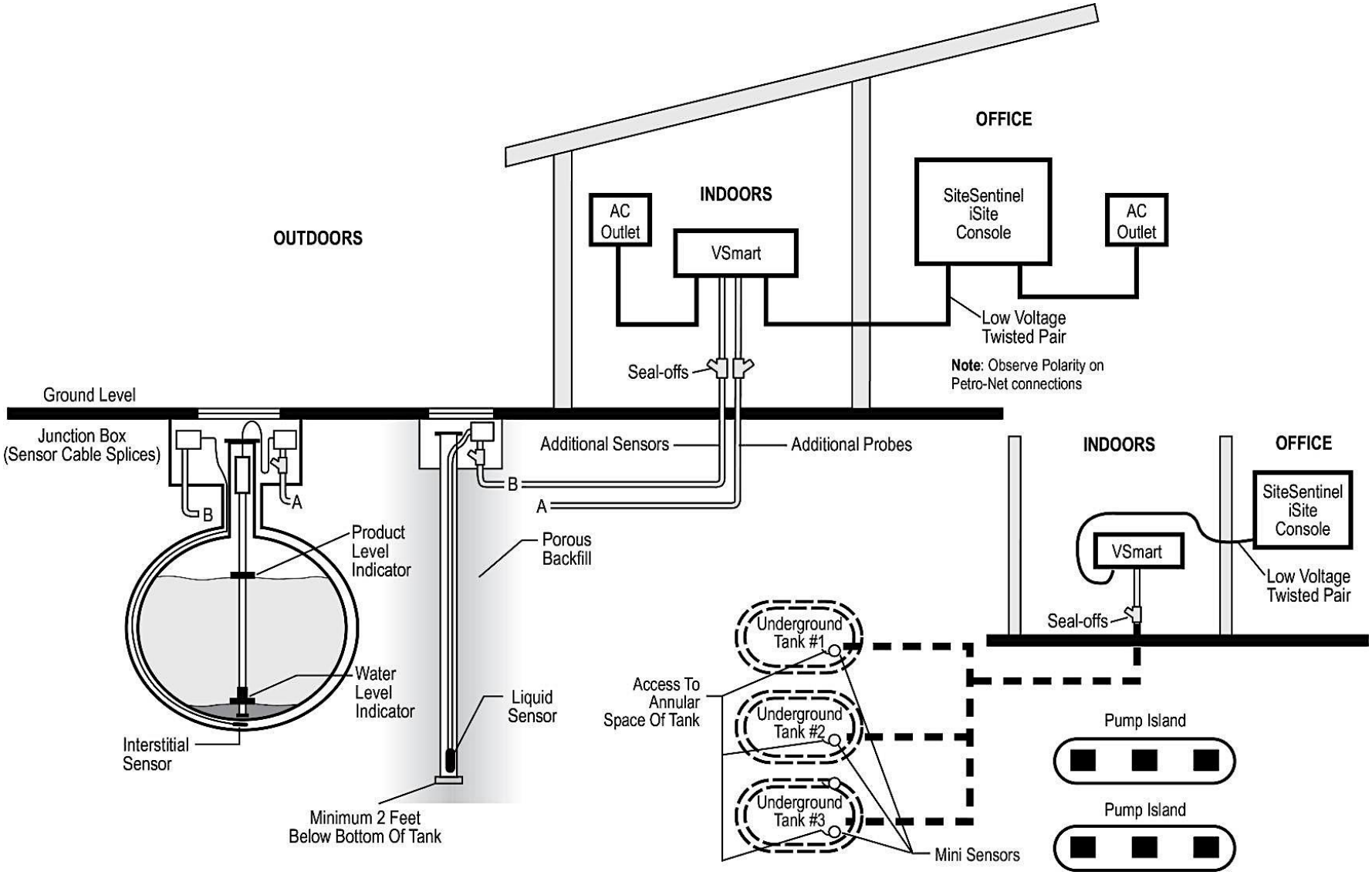


Figure 9-7 Double-Wall Tank with Well Monitoring

10 Probe-Cable Seal-Offs

Seal-off probe cables *before* they enter the VSmart Module! This prevents explosive vapors from entering the module. Remove enough of the jacket to allow approximately 3 inches (7.6 cm) of wire leads to extend past each seal-off. ***DO NOT nick the wire insulation.***

Probe or sensor wires using prepared Belden or Alpha cable go through NPT bushings into a weatherproof junction box. *Bushings must be used in all junction boxes.* The cable is then routed—via rigid steel conduit—out of the box and directly to the VSmart Module. Label each cable and wire. See Figure 10-1.

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

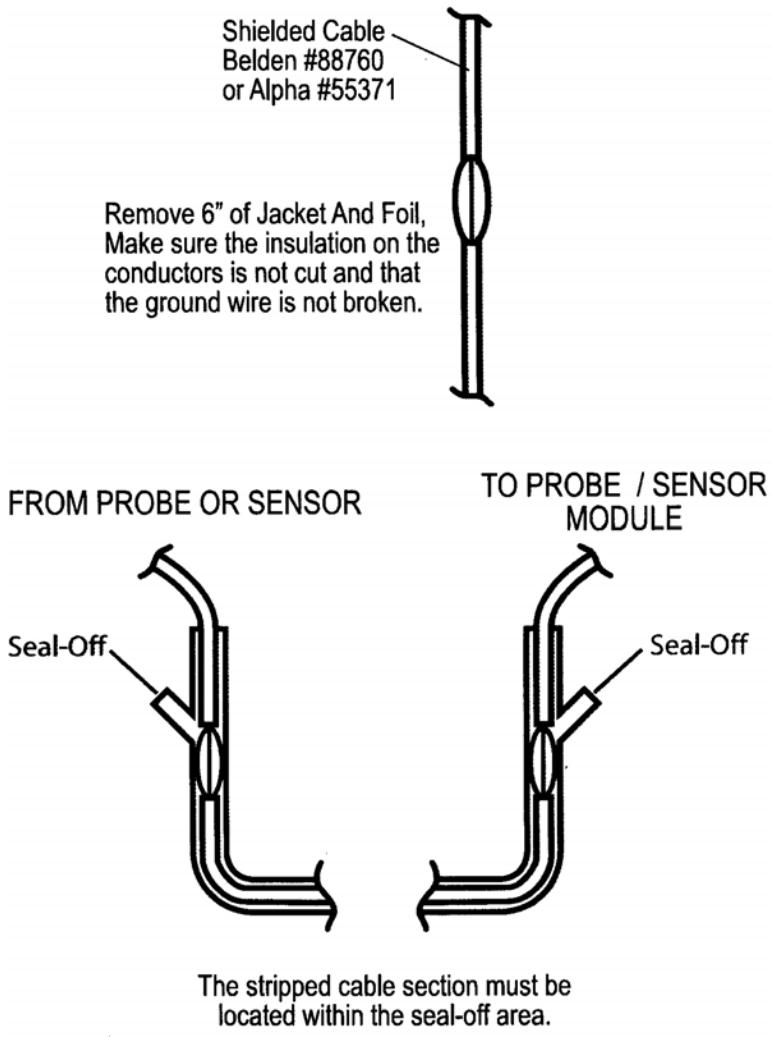


Figure 10-1 Probe-Cable Seal-Offs

11 Other System Parameters

11.1 VSmart Module Petro-Net™ Addressing

VSmart Modules and I/O Modules must each be assigned a unique identification number. Module numbers must be unique within the *Module Group*; that is, you can assign the same number to both a VSmart Module and to an I/O Module, but you *cannot* assign the same number to more than one VSmart Module or to more than one I/O Module. The module numbers are used when the system is configured. Refer to your *SiteSentinel® iSite™ Configuration Manual* for details about system setup.

A small, red rotary switch is located at the top of the PC board inside each module. The switch has 10 positions, marked “0” to “9.” A small arrow on the switch points to the current position. Default switch setting is “1.”

> Although the switch has 10 settings, only settings 1-8 are valid. DO NOT set the switch to either “0” or “9” – the module will NOT be recognized by the system!

Follow these steps to set the Petro-Net™ Address:

1. Turn the module power OFF.
2. Use a ¼-inch (6 mm) blade screwdriver to gently rotate the small white screw inside the rotary switch to the desired location.
3. Turn the module power to ON.

> DO NOT change the module number while the module power is ON.

> The eight-position dipswitch should remain in the closed position for normal operation.

12 Installation with Existing OPW/EECO Equipment

12.1 Model 924A Probes

CANNOT BE MULTI-DROPPED ON VSmart.

The Model 924A Probe (Figure 12-1) utilizes magnetostrictive technology to derive accurate product and water levels. It is primarily used in underground storage tanks for inventory and leak detection. Two floats can be fitted to the probe shaft; the product float sits on top of the product and the water float (optional) sinks through the product and sits on top of the water at the bottom of the tank.

924A Probe Specifications	
Operating Temperature:	-40°F to 158°F (-40°C to +70°C)
Head Dimensions:	≈ 2.2” (5.6 cm) x 7.5” (19.1 cm)
Required Cable:	6’ (1.8 m), gas/oil-resistant cable
Sensor Power Supply:	Must be by provided by OPW's IS barrier
Certifications:	Division I Group D Group IIA
Linearity:	+/- 0.040” (1.01 mm) over entire length
Hysteresis:	+/- 0.004” (0.1 mm)
Temperature Resolution:	+/- 0.1°C, +/- 1°C
VSmart I.S. Barrier:	12V; P/N: 4344
Installation:	Requires one (1) I.S. Barrier position per probe

Five temperature sensors reside in the probe shaft for measuring product temperature at different levels in the tank. They are located at positions of approximately 20%, 40%, 60% and 80% of the tank’s volume. The sensors feed the data of the temperature of the fuel to the console. The console software is then able to make the calculations to produce a net corrected product volume.

Figure 12-1 Model 924A Probe

12.2 Model EECO Probes

CANNOT BE MULTI-DROPPED ON VSmart.

The Model EECO Probe is primarily used in underground storage tanks for inventory and leak detection. Two floats can be fitted to the probe shaft; the product float sits on top of the product and the water float (optional) sinks through the product and sits on top of the water at the bottom of the tank.

EECO Probes	
Probe Type:	Magnetostrictive with Floats
Probe Length:	From 4’ to 16’, in 6-inch increments
Material:	Stainless Steel Shaft
Level Precision: Accuracy:	 ± 0.0005” (.01 mm) ± .05% Full Scale or 0.006” (whichever is greater)
Temperature Resolution: Accuracy:	 ±0.02ºF (0.01º C) ±2.34ºF/ ±1.3ºC (over a -40ºC to +70ºC / -40ºF to 158ºF)
Intrinsic Safety:	Hazardous Class I, Division 1, Group D
Temperature Detection Measurement: Methodology: Range:	 Five (5) equally spaced RTDs for volumetric measurement STANDARD: -4ºF to 158ºF (-20ºC to 70ºC) X-TENDED TEMP: -40ºF to 158ºF (-40ºC to 70ºC)
I.S. Barrier:	24 V Barrier Part number 20-4345
Multi-Drop Restriction:	Requires one (1) I.S. barrier position per probe

Five temperature sensors reside in the probe shaft for measuring product temperature at different levels in the tank. They are located at positions of approximately 20%, 40%, 60% and 80% of the tank’s volume. The sensors feed the data of the temperature of the fuel to the console. The console software is then able to make the calculations to produce a net corrected product volume.

Figure 12-2 Model EECO Probe

12.3 SiteSentinel® iSite™ Smart Module

The Smart Module gathers probe and sensor data. Up to four devices can be connected to the Intrinsically Safe (I.S.) barrier in the Smart Module. The barrier isolates the module from hazardous areas where probes and sensors are installed. Up to four (4) barriers can be in each module, a total of 16 devices per module. Up to eight modules can be connected to the console via Petro-Net™ (twisted-pair) wiring, for a total of 128 devices per system. Conduit is recommended for the Petro-Net™ wiring between the Smart Module and the console, but it is *not* required.

> The standard Smart Module includes one I.S. barrier. The part number for additional I.S. barriers is 20-4343.

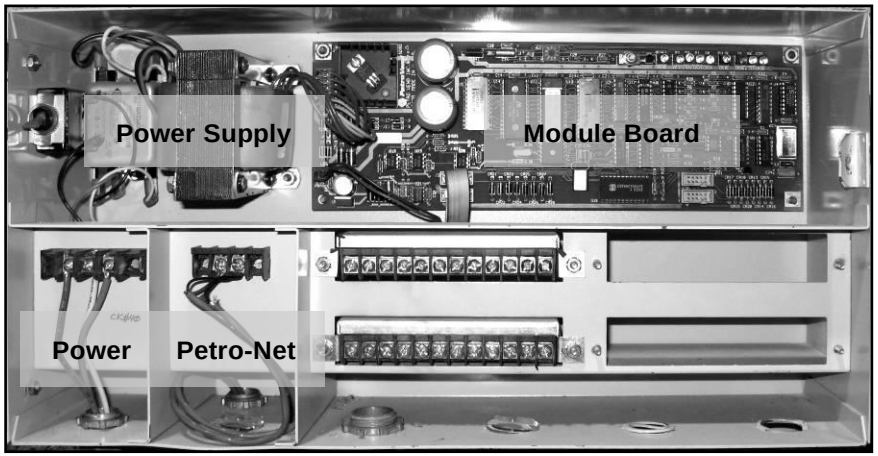


Figure 12-3 SiteSentinel® iSite™ Smart Module Connections

Smart Module Specifications	
Electrical Requirements Standard Voltage Supply: Optional Voltage Supply: Power Consumption:	 105 to 125 VAC, 60 Hz 220 to 240 VAC, 50 Hz 60 W maximum
Dimensions Width: Height: Depth:	 17” (43.2 cm) 9.75” (24.8 cm); Mounting Tabs add 1” (2.5 cm) top and bottom 5.5” (14 cm); Key adds 1.5” (3.8 cm)
Mounting Centers:	16.5” (41.9 cm) width by 11” (27.9 cm) height
Temperature Range:	32°F to 104°F (0°C to 40°C)
Device Capacity per I.S. Barrier: per Smart Module: per System:	 up to four (4) devices up to 16 devices up to 128 devices
Probe Cable Requirement:	Belden #88760 or Alpha #55371 cable (shielded two-wire twisted pair)
Sensor Wiring Requirement:	14- to 18-AWG oil-and-gas resistant (TFFN, THHN or THWN)
Petro-Net™ Communication Wiring Requirement:	18-AWG, twisted pair, oil-and-gas resistant (TFFN, THHN or THWN)
Maximum Petro-Net™ Extension:	5,000’ (1.5 km)

12.4 Waterproof Field Electrical Connections

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

1. Twist bare ends of wires together.
2. Secure the connection with a wire nut.

> DO NOT use electrical tape on any connections! Tape prevents proper sealing of the epoxy.

3. Waterproof the connections with the supplied SCOTCHCAST™ epoxy resin Insulating Resin Seal packs. They are provided to seal the electrical connections from moisture and water and prevent corrosion of the connections. Install one for each cable connection.
4. Bend the seal pack until the barrier between the two resins weakens.
5. Force the clear and the black resins together and mix thoroughly.
6. Move the mixture to one end of pack, then clip the other end.
7. Insert wires, wire nuts and the cable insulation end into the seal pack.
8. Work the resin mixture into the ends of the wire nuts and around both cable jackets.
    - Secure the seal pack around the cables with a tie wrap and cable tie.

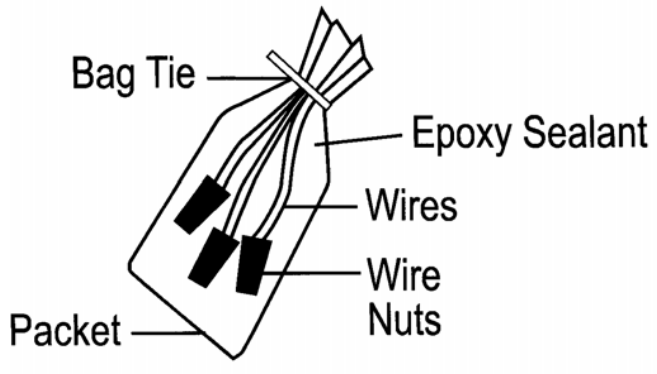


Figure 12-4 Epoxy Sealant Pack

13 ACR/RIM

The ACR/RIM collects pump transaction data from electronic pumps to provide the OPW tank gauges required data for auto-recalibration and reconcile transactions against tank inventories.

- ACR - Automatic Calibration and Reconciliation
- RIM - Reconciliation Interface Module

Due to the flexibility of the system and the unique nature of every site, it is not possible to show every possible installation scenario.

Local codes may dictate specific installation requirements. Installation is subject to approval by the local authority having jurisdiction at the site.

The system installation instructions are the same for all ACR/RIM systems. Specific differences between the systems are noted within the text.

These Installation instructions are for a typical installation.

> Do not mount your system site controller, or any other electrical part of the system, including printers and modems, within or above the defined "hazardous" areas.

ACR/RIM Specifications	
Cabinet Dimensions: (H x W x D)	10” x 12-1/2” x 5-11/16” (25.4 cm x 31 cm x 14.6 cm)
Power Requirements:	115/230 VAC; 50/60 Hz; 1.0/0.6 A
Operating Temperature Range:	-32°F - 122°F (0°C - 50°C)
Interface:	Current Loop – Passive or Active
Pump Compatibility:	Wayne Electronic; Gilbarco Electronic

Figure 13-1 ACR/RIM Enclosure (inside view)

Installation Codes

- Any fuel dispenser is a hazardous area as defined in the National Electrical Code. Installation must be in accordance with the following:
- National Electrical Code NFPA No.70 Automotive and Marine Service Station Code (NFPA No. 30A). The installer is responsible for investigating and following any local codes applicable in the country of installations.

Hazardous Areas

- ACR/RIM is listed for use in a non-classified area. All of the equipment must be installed outside of the hazardous areas.

13.1 Prior to Installation

Check the following:

1. **Enclosure Mounting:**
   Knockouts and mounting means are provided for all cabinetry**.**

> Do not drill holes in any of the enclosures.

   Doing so would violate the safety listing of the system.
2. **Grounding**:

> For applications where wire conduits are used, follow the applicable local codes and requirements.

   An ACR/RIM system incorporates internal noise suppression circuitry. In order to ensure proper operation of the equipment and provide the necessary safety must be grounded. A ground wire - if applicable, per local code - must be connected between the ACR/RIM ground terminal and the main electrical service panel.

> In applications using conduit, the conduit should not be used as ground!

3. **Circuit Breakers:**
   Power to the ACR/RIM must be supplied from dedicated circuit breakers.
   No other equipment should be powered from these breakers including the pumps that are monitored (passively) or controlled (actively).

13.2 Installation Procedure

All dispensers and controller are installed according to manufacturer's specifications and should be tested for proper operation.

1. OPW Tank Gauge is installed to specifications
2. Mount ACR/RIM
3. Connect ACR/RIM to specific dispenser box
4. Test ACR/RIM
5. Connect ACR/RIM
6. Conduit Requirements: (if applicable, per local code)

ACR/RIM Power Conduit

- Where applicable, this conduit, following all local codes, should run from the main circuit panel to the ACR/RIM.
- This conduit should only contain the Terminal Feed, Neutrals and Ground wires.

ACR/RIM Pump Loop Listener

- This conduit should run from the ACR/RIM to the location of the Pump D-Box.

13.2.1 ACR/RIM Hardware Installation

Installing ACR/RIM Interface:

1. Attach the enclosure to a wall with fasteners (not-supplied) within 5 feet (1.5 m) of the SiteSentinel® iSite™ controller.

Enclosure needs to be in a non-hazardous location.

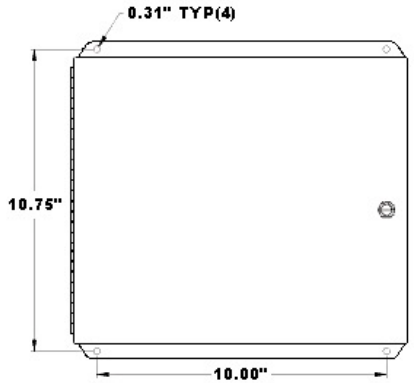


Figure 13-2 ACR/RIM Interface Mounting Enclosure

2. Install the following 1/2-inch or 3/4-inch steel conduits and wires:
   - Direct Pump Control (DPC) power source conduit and pull three 14-AWG wires from the breaker panel.
   - ACR/RIM must be powered from a dedicated single circuit breaker. Do not use a switch neutral breaker. The neutral must come directly from the neutral bus in the electrical supply panel. No other neutral circuits may be connected to this wire.
   - Pump Communication Conduit and pull two (2) wires from pump distribution box.
3. Mount the ACR/RIM board on the left-side stand-offs in the enclosure.

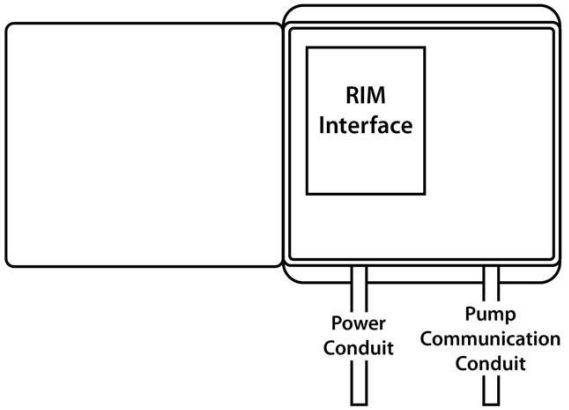


Figure 13-3 ACR/RIM Power/Pump Conduit

   - Remove connector from CN12 ACR/RIM board and attach output wiring from the power supply to the connector (Polarity is NOT essential).
   - Reconnect connector to CN12 on the ACR/RIM board.
4. Attach line, neutral, and ground wires from the breaker panel to the power connection block. ().

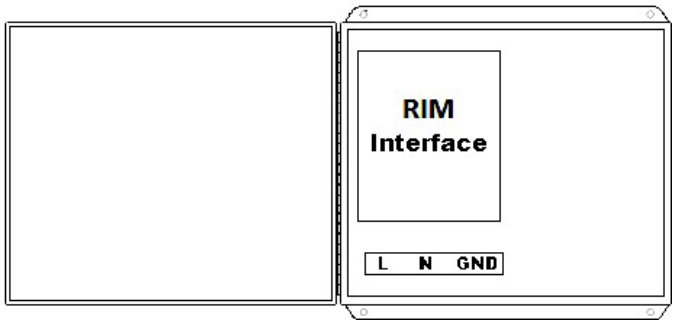


Figure 13-4 ACR/RIM Wiring

5. Locate Wayne Distribution box and wire from CN9 connector to an unused pump position in the D-Box.
   - Set Jumpers on RIM interface for Wayne
   - Locate Wayne/Dresser distribution box and wire the other end into an unused pump position in the D-Box.

In the event that the D-Box board is full, wire in “series” with an existing pump.

ACR/RIM can only support 1-loop Wayne pump installations.

In the event that the D-BOX is full, wire in “series” with one existing pump.

6. Gilbarco (to be supplied when Gilbarco ACR/RIM has been completed)
7. Attach cable 20-1586 to connector CN2 as below:

1	Green/White
2	Green
3	Brown

   - Then run cable from RIM interface to the RS-232 configure for ACR/RIM on the SiteSentinel® iSite™ controller (Figure 13-6).

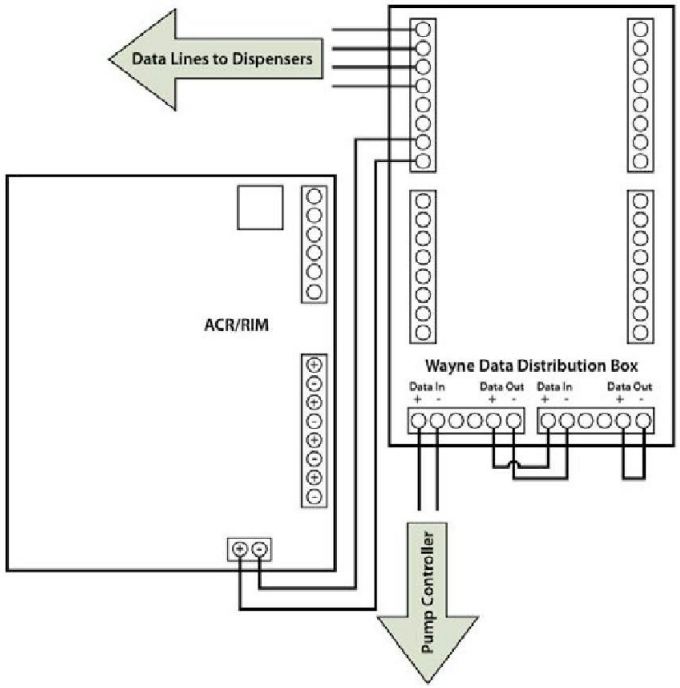


Figure 13-5 Locate Wayne D-Box

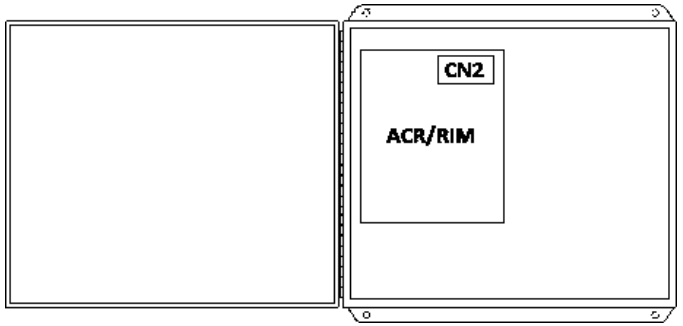
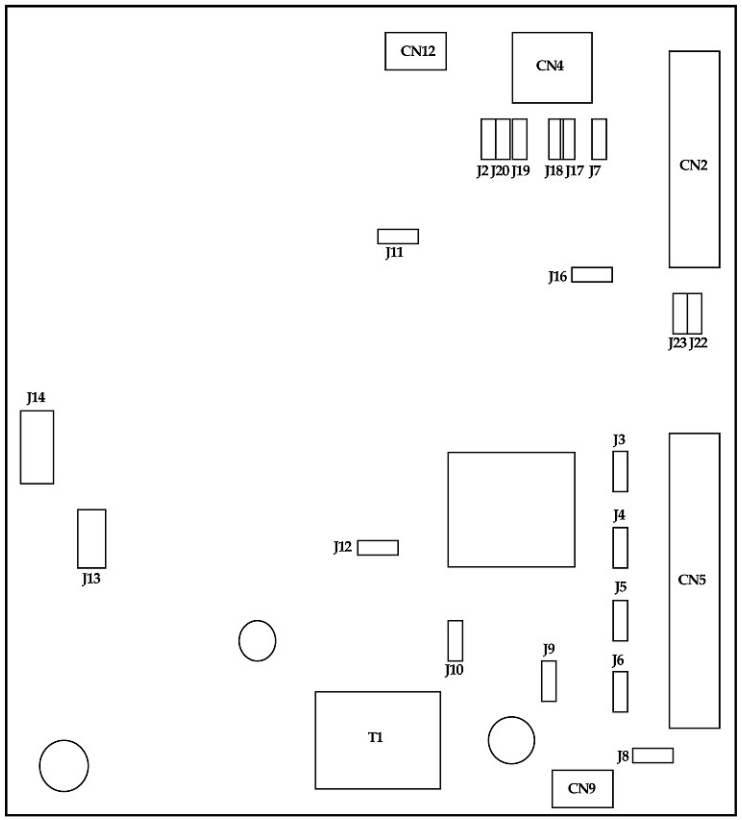


Figure 13-6 Connect to Controller

13.2.2 ACR/RIM Board Jumper Setup

Setup jumpers to match pump type being connected. When a jumper is set as ON, this means the jumper will tie both pins together. When OFF, the jumper should be set on one pin. Some jumpers have three pins, when the jumper says pins 1-2 this means the jumper should be set on pins 1 and 2 of the three-pin jumper. On three-pin jumpers, the board is labeled which pin is number one (see Figure 13-7).

Jumper #	Pins	Function	Pump Type	
			Gilbarco	Wayne
J2	1-2	N/A	OFF	
J3	1-2	N/A	ON	
J4	1-2	N/A	ON	
J5	1-2	N/A	ON	
J6	1-2	N/A	ON	
J7	1-2	RTS/CTS Loopback	OFF	
J8	1-2	Loop Mode	OFF	
J9	1-3	Loop Mode	ON	
J10	1-3	Loop Mode	Pins 2-3	
J11	1-2	ECHO-Enabled	OFF	ON – FSC3000 controller OFF – NO ON – FSC3000 controller
J12	1-2	Current Selection	ON (45 mA)	OFF (34mA)
J14	1-2 & 3-4	Normal	ON	
		Erase Non-Volatile	OFF	
	5-6	Liters	ON	
		Gallons	OFF	
	7-8	Totalizers SUMM	OFF	
		Totalizers SUMM	ON	
J16		N/A	OFF	
J17		N/A	OFF	
J18		N/A	ON	
J19		N/A	OFF	
J20		N/A	OFF	
J22		COMM Mode	Pins 1-2 (RS232)	
J23		COMM Mode	Pins 1-2 (RS232)	



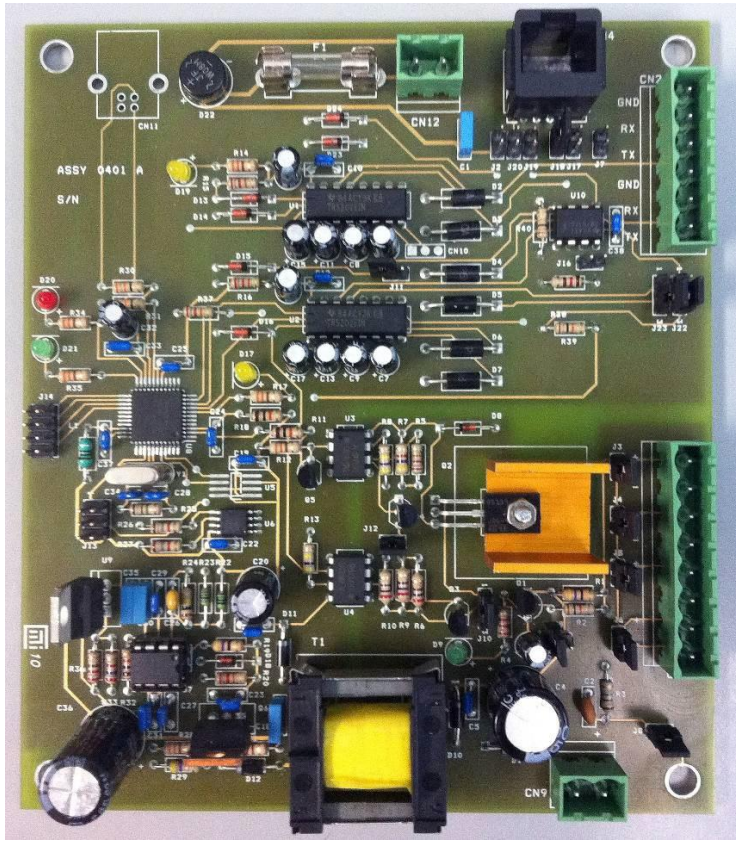


Figure 13-7 ACR/RIM Jumper Board

Appendix A: Model 924B Probe Part Numbers

Model 924B Probe Part Numbers			
Probe Length		**Length (cm)**	**Part Number**
53”	Probe for 4’ (122 cm) Diameter/Height Tank	134.6 cm	30-B053
69”	Probe for 5’ (152 cm) Diameter/Height Double-Wall Tank	175.3 cm	30-B069
77”	Probe for 6’ (183 cm) Diameter/Height Tank	195.6 cm	30-B077
89”	Probe for 7’ (213 cm) Diameter/Height Tank	226.1 cm	30-B089
101”	Probe for 8’ (244 cm) Diameter/Height Tank	256.5 cm	30-B101
105”	Probe for 8’ (244 cm) Diameter/Height Double-Wall Tank	266.7 cm	30-B105
113”	Probe for 9’ (274 cm) Diameter/Height Tank	287.0 cm	30-B113
125”	Probe for 10’ (305 cm) Diameter/Height Tank	317.5 cm	30-B125
137”	Probe for 11’ (335 cm) Diameter/Height Tank	348.0 cm	30-B137
149”	Probe for 12’ (366 cm) Diameter/Height Tank	378.5 cm	30-B149

Appendix B: Output Relay Installation Report

Output Relay Installation Records			
Output Location: (Internal/External OM4)	Output Controls: (External Alarm, Dispenser etc.)	Normally Open/Normally Closed	I/O Module Number
SiteSentinel® iSite™ Internal Relay Output 1			
SiteSentinel® iSite™ Internal Relay Output 2			
External Output 1 Position 1			
External Output 1 Position 2			
External Output 1 Position 3			
External Output 1 Position 4			
External Output 2 Position 1			
External Output 2 Position 2			
External Output 2 Position 3			
External Output 2 Position 4			
External Output 3 Position 1			
External Output 3 Position 2			

Appendix B (cont.)

Output Relay Installation Records			
Output Location (Internal/External OM4)	Output Controls: (External Alarm, Dispenser etc.)	Normally Open/Normally Closed	I/O Module Number
External Output 3 Position 3			
External Output 3 Position 4			
External Output 4 Position 1			
External Output 4 Position 2			
External Output 4 Position 3			
External Output 4 Position 4			

Appendix C: Sensor Labels

Installed Sensor Labels	Description (Location, e.g. Sump, Sensor #)
Place Label Here	
Place Label Here	

Appendix C (continued)

Installed Sensor Labels	Description (Location, e.g. Sump, Sensor #)
Place Label Here	
Place Label Here	

Appendix D: 7100V Flex Probe Installation Records

7100V Flex Probe Installation Records					
Probe Serial Number	Probe Part Number (Catalog #)	Tank #	Product in Tank	VSmart Module Number 1–8	Barrier Position 0–3

Appendix D (continued)

7100V Flex Probe Installation Records					
Probe Serial Number	Probe Part Number (Catalog #)	Tank #	Product in Tank	VSmart Module Number 1–8	Barrier Position 0–3

Appendix E: Model 924B Probe Installation Records

Model 924 Probe Installation Records				
Probe Serial Number	Tank Number	Product in Tank	VSmart Module Number (1-8)	Barrier Position (1-4) (Number in chain, if applicable, 1-4)

Appendix E (continued)

Model 924 Probe Installation Records				
Probe Serial Number	Tank Number	Product in Tank	VSmart Module Number (1-8)	Barrier Position (1-4) (Number in chain, if applicable, 1-4)

Appendix F: Icon Glossary

Sensor Alarms in the Alarm Calendar						
Description	**Normal**	**Alarm**	**Acknowledged**	**Alarm Ended But Not Acknowledged**	**Alarm Condition Ended**	**Unavailable**
Part numbers and description that would be associated with the conditions.	Icon only seen during auto-detection process to show sensor type.	Icon outlined with a dotted red line and red triangle. Occurs when an alarm condition is seen.	Icon outlined in blue with red triangle. Occurs when user clicks on alarm in alarm screen.	Icon outlined in blue and triangle is blue. Occurs when alarm has ended, but not acknowledged.	Icon completely gray. Occurs after alarm has been acknowledged and the alarm event has ended.	Displayed when the item is currently unavailable. Icon is completely grayed.
Hydrocarbon Liquid Sensor with Water Indicator: 30-0234-HW-06; 30-0234-HW-15; 30-0234-HW20 3						
Hydrocarbon Alarm: Occurs when the sensor's resistance is between the thresholds for the alarm condition.						N/A
Water Alarm: Occurs when the sensor's resistance is between the thresholds for the alarm condition.						N/A
Disconnect Alarm/Communication Loss: Occurs when the sensor has either been disconnected from the barrier or the sensor fails.						N/A
Discriminating STP Sump Sensor: 30-0232-DH-20; Magnetostrictive Sump Sensor: 30-3233-24						
High-Hydrocarbon Alarm: **STP Sump**: Occurs when the upper and lower floats are raised and the resistance is between the thresholds for the alarm condition. **Mag Sump**: Occurs when the product (HC) float is above the threshold for the alarm condition.	 STP Mag					N/A
Low-Hydrocarbon Alarm: **STP Sump**: Occurs when the lower float is raised and the resistance is between the thresholds for the alarm condition. **Mag Sump**: Occurs when the product (HC) float is above the threshold for the alarm condition.	 STP Mag					N/A
NOTE: When sensors are added manually to the system when using non-smart sensors or adding sensors to a VSmart Module, the icons will have a little man in the upper-left-hand corner of the icons, as shown to the right.						

Appendix F – Icon Glossary (cont.)

Sensor Alarms in the Alarm Calendar						
Description	**Normal**	**Alarm**	**Acknowledged**	**Alarm Ended But Not Acknowledged**	**Alarm Condition Ended**	**Unavailable**
Part numbers and description that would be associated to the conditions.	Icon only seen during auto-detection process to show sensor type.	Icon outlined with a dotted red line and red triangle. Occurs when alarm condition is seen.	Icon outlined in blue with red triangle. Occurs when user clicks on alarm in alarm screen.	Icon outlined in blue and triangle is blue. Occurs when alarm has ended but has not been acknowledged.	Icon completely gray. Occurs after alarm has been acknowledged and the alarm event has ended.	Displayed when the item is currently unavailable. Icon is completely grayed.
High-Water Alarm **STP Sump**: Occurs when the upper and lower floats are above the threshold of the alarm condition. **Mag Sump**: Occurs when the water float is above the threshold for the alarm condition.	 STP Mag					N/A
Low-Water Alarm **STP Sump**: Occurs when the lower float is above the threshold of the alarm condition. **Mag Sump**: Occurs when the water float is above the threshold for the alarm condition.	 STP Mag					N/A
Disconnect Alarm / Communication Loss Occurs when the sensor has been disconnected from the barrier or the sensor fails.						N/A
Disconnect Alarm / Communication Loss Occurs when the sensor has been disconnected from the barrier or the sensor fails.						N/A
Single Level Sump Sensor: 30-0231-L						
Alarm Conditions Occurs when the float in the sensor is above the threshold of the alarm condition.						N/A
Disconnect Alarm/ Communication Loss Occurs when the sensor has been disconnected from the barrier or the sensor fails.						N/A
NOTE: When sensors are added manually to the system when using non-smart sensors or adding sensors to a Smart Module, the icons will have a little man in the upper-left-hand corner of the icons, as shown to the right.						

Appendix F- Icon Glossary (cont.)

Sensor Alarms in the Alarm Calendar						
Description	**Normal**	**Alarm**	**Acknowledged**	**Alarm Ended But Not Acknowledged**	**Alarm Condition Ended**	**Unavailable**
Part numbers and description that would be associated to the conditions.	Icon only seen during auto-detection process to show sensor type.	Icon outlined with a dotted red line and red triangle. Occurs when an alarm condition is seen.	Icon outlined in blue with red triangle. Occurs when user clicks on alarm in alarm screen.	Icon outlined in blue and triangle is blue. Occurs when alarm has ended but has not been acknowledged.	Icon completely gray. Occurs after alarm has been acknowledged and the alarm event has ended.	Displayed when the item is currently unavailable. Icon is completely grayed.
Hydrocarbon Vapor Sensor: 30-0235-V						
Alarm Conditions Occurs when the resistance is above the threshold for the alarm condition.						N/A
Disconnect Alarm/Communication Loss Occurs when the sensor has been disconnected from the barrier or the sensor fails.						N/A
Liquid Only Float Sensor (Brass): 30-0231-S						
Alarm Conditions Occurs then the float is above the threshold for the alarm condition.						N/A
Disconnect Alarm/Communication Loss Occurs when the sensor has been disconnected from the barrier or the sensor fails.						N/A
Discriminating Interstitial Sensor (Optical): 30-0236-LW						
Hydrocarbon Alarm Occurs when the resistance is above the threshold for the alarm condition.						N/A
NOTE: When sensors are added manually to the system when using non-smart sensors or adding sensors to a VSmart Module, the icons will have a little man in the upper-left-hand corner of the icons, as shown to the right.						

Appendix F- Icon Glossary (cont.)

Sensor Alarms in the Alarm Calendar						
Description	**Normal**	**Alarm**	**Acknowledged**	**Alarm Ended But Not Acknowledged**	**Alarm Condition Ended**	**Unavailable**
Part numbers and description that would be associated to the conditions	Icon only seen during auto-detection process to show sensor type.	Icon outlined with a dotted red line and red triangle. Occurs when an alarm condition is seen.	Icon outlined in blue with red triangle. Occurs when user clicks on alarm in alarm screen.	Icon outlined in blue and triangle is blue. Occurs when alarm has ended but has not been acknowledged.	Icon completely gray. Occurs after alarm has been acknowledged and the alarm event has ended.	Displayed when the item is currently unavailable. Icon is completely grayed.
Water Alarm: Occurs when the resistance is above the threshold for the alarm condition.						N/A
Disconnect Alarm/Communication Loss: Occurs when the sensor has been disconnected from the barrier or the sensor fails.						N/A
Interstitial Hydrocarbon Liquid Sensor with Water Indicator: 30-0234-HW-01						
Hydrocarbon Alarm: Occurs when the resistance is above the threshold for the alarm condition.						N/A
Water Alarm: Occurs when the resistance is above the threshold for the alarm condition.						N/A
Disconnect Alarm/Communication Alarm: Occurs when the sensor has been disconnected from the barrier or the sensor fails.						N/A
Interstitial Level Sensor- Float Switch: (30-0231-S)						
Alarm Condition: Occurs when the float is above the threshold for the alarm condition.						N/A
NOTE: When sensors are added manually to the system when using non-smart sensors or adding sensors to a VSmart Module, the icons will have a little man in the upper–left-hand corner of the icons, as shown to the right.						

Appendix F- Icon Glossary (cont.)

Sensor Alarms in the Alarm Calendar						
Description	**Normal**	**Alarm**	**Acknowledged**	**Alarm Ended But Not Acknowledged**	**Alarm Condition Ended**	**Unavailable**
Part numbers and description that would be associated to the conditions	Icon only seen during auto-detection process to show sensor type.	Icon outlined with a dotted red line and red triangle. Occurs when an alarm condition is seen.	Icon outlined in blue with red triangle. Occurs when user clicks on alarm in alarm screen.	Icon outlined in blue and triangle is blue. Occurs when alarm has ended but has not been acknowledged.	Icon completely gray. Occurs after alarm has been acknowledged and the alarm event has ended.	Displayed when the item is currently unavailable. Icon is completely grayed.
Disconnect Alarm/Communication Loss Occurs when the sensor has been disconnected from the barrier or the sensor fails.						N/A
Discriminating Dispenser Pan Sensor: 30-2232-DH-10 Magnetostrictive Sump Sensor: 30-3233-12						
High-Hydrocarbon Alarm **STP Sump**: Occurs when the upper and lower floats are raised and the resistance is between the thresholds for the alarm condition. **Mag Sump**: Occurs when the product (HC) float is above the threshold for the alarm condition.	 STP Mag					N/A
Low-Hydrocarbon Alarm **STP Sump**: Occurs when the lower float is raised and the resistance is between the thresholds for the alarm condition. **Mag Sump**: Occurs when the product (HC) float is above the threshold for the alarm condition.	 STP Mag					N/A
High-Water Alarm **STP Sump**: Occurs when the upper and lower float are above the threshold of the alarm condition. **Mag Sump**: Occurs when the water float is above the threshold for the alarm condition.	 STP Mag					N/A
Low-Water Alarm **STP Sump**: Occurs when the lower float is above the threshold of the alarm condition. **Mag Sump**: Occurs when the water float is above the threshold for the alarm condition.	 STP Mag					N/A
NOTE: When sensors are added manually to the system when using non-smart sensors or adding sensors to a VSmart Module, the icons will have a little man in the upper-left-hand corner of the icons, as shown to the right.						

Appendix F - Icon Glossary (cont.)

Sensor Alarms in the Alarm Calendar						
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Disconnect Alarm/Communication Loss: Occurs when the sensor has been disconnected from the barrier or the sensor fails.						N/A
Disconnect Alarm/Communication Loss: Occurs when the sensor has been disconnected from the barrier or the sensor fails.						N/A
Dual Float Dispenser Sump Sensor - 30-0232-D-10						
High-Level Alarm: Occurs when the upper and lower floats are above the threshold for the alarm condition.						N/A
Low-Level Alarm: Occurs when the bottom float is above the threshold for the alarm condition.						N/A
Disconnect Alarm/Communication Loss: Occurs when the sensor has been disconnected from the barrier or the sensor fails.						N/A
NOTE: When sensors are added manually to the system when using non-smart sensors or adding sensors to a VSmart Module, the icons will have a little man in the upper-left-hand corner of the icons, as shown to the right.						

Appendix F- Icon Glossary (cont.)

Sensor Alarms in the Alarm Calendar						
Description	**Normal**	**Alarm**	**Acknowledged**	**Alarm Ended But Not Acknowledged**	**Alarm Condition Ended**	**Unavailable**
Part numbers and description that would be associated to the conditions.	Icon only seen during auto-detection process to show sensor type.	Icon outlined with a dotted red line and red triangle. Occurs when an alarm condition is seen	Icon outlined in blue with red triangle. Occurs when user clicks on alarm in alarm screen.	Icon outlined in blue and triangle is blue. Occurs when alarm has ended but has not been acknowledged.	Icon completely gray. Occurs after alarm has been acknowledged and the alarm event has ended.	Displayed when the item is currently unavailable. Icon is completely grayed.
Dual Float STP Sump Sensor: 30-0232-D-20						
High-Level Alarm: Occurs when the upper and lower floats are above the threshold for the alarm condition.						N/A
Low-Level Alarm: Occurs when the bottom float is above the threshold for the alarm condition.						N/A
Disconnect Alarm/Communication Loss: Occurs when the sensor has been disconnected from the barrier or the sensor fails.						N/A
Dual Float Brine Sensor: 30-0232-D-10B						
High Level Alarm: Occurs when the upper and lower float is above the threshold for the alarm condition.						N/A
NOTE: When sensors are added manually to the system when using non-smart sensors or adding sensors to a VSmart Module, the icons will have a little man in the upper-left-hand corner of the icons, as shown to the right.						

Appendix F- Icon Glossary (cont.)

Sensor Alarms in the Alarm Calendar						
Description	**Normal**	**Alarm**	**Acknowledged**	**Alarm Ended But Not Acknowledged**	**Alarm Condition Ended**	**Unavailable**
Part numbers and description that would be associated to the conditions.	Icon only seen during auto-detection process to show sensor type.	Icon outlined with a dotted red line and red triangle. Occurs when an alarm condition is seen.	Icon outlined in blue with red triangle. Occurs when user clicks on alarm in alarm screen.	Icon outlined in blue and triangle is blue. Occurs when alarm has ended but has not been acknowledged.	Icon completely gray. Occurs after alarm has been acknowledged and the alarm event has ended.	Displayed when the item is currently unavailable. Icon is completely grayed.
Low-Level Alarm: Occurs when the bottom float is below the threshold for the alarm condition.						N/A
Disconnect Alarm/Communication Loss: Occurs when the sensor has been disconnected from the barrier or the sensor fails.						N/A
Dual Float Brine Sensor: 30-0232-D-20B						
High-Level Alarm: Occurs when the upper and lower floats are above the threshold for the alarm condition.						N/A
Low-Level Alarm: Occurs when the bottom float is below the threshold for the alarm condition.						N/A
Disconnect Alarm/Communication Loss: Occurs when the sensor has been disconnected from the barrier or the sensor fails.						N/A
NOTE: When sensors are added manually to the system when using non-smart sensors or adding sensors to a VSmart Module, the icons will have a little man in the upper-left-hand corner of the icons, as shown to the right.						

Appendix F- Icon Glossary (cont.)

Probe/Tank Alarms						
Description	**Normal**	**Alarm**	**Acknowledged**	**Alarm Ended But Not Acknowledged**	**Alarm Condition Ended**	**Unavailable**
Part numbers and description that would be associated to the conditions.	Icon only seen during auto-detection process to show sensor type.	Icon outlined with a dotted red line and red triangle. Occurs when an alarm condition is seen.	Icon outlined in blue with red triangle. Occurs when user clicks on alarm in alarm screen.	Icon outlined in blue and triangle is blue. Occurs when alarm has ended but has not been acknowledged.	Icon completely gray. Occurs after alarm has been acknowledged and the alarm event has ended.	Displayed when the item is currently unavailable. Icon is completely grayed.
UST Tank Alarms						
High-High Product Alarm: Occurs when the product float is above the threshold for the condition.						N/A
High-Product Alarm: Occurs when the product float is above the threshold for the alarm condition.						N/A
Low-Product Alarm: Occurs when the product float is below the threshold for the alarm condition.						N/A
Low-Low Product Alarm: Occurs when the product float is below the threshold for the alarm condition.						N/A
High-High Water Alarm: Occurs when the water float is above the threshold for the alarm condition.						N/A
NOTE: When sensors are added manually to the system when using non-smart sensors or adding sensors to a VSmart Module, the icons will have a little man in the upper-left-hand corner of the icons, as shown to the right.						

Appendix F- Icon Glossary (cont.)

Probe/Tank Alarms						
Description	**Normal**	**Alarm**	**Acknowledged**	**Alarm Ended But Not Acknowledged**	**Alarm Condition Ended**	**Unavailable**
Part numbers and description that would be associated to the conditions.	Icon only seen during auto-detection process to show sensor type.	Icon outlined with a dotted red line and red triangle. Occurs when an alarm condition is seen.	Icon outlined in blue with red triangle. Occurs when user clicks on alarm in alarm screen.	Icon outlined in blue and triangle is blue. Occurs when alarm has ended but has not been acknowledged.	Icon completely gray. Occurs after alarm has been acknowledged and the alarm event has ended.	Displayed when the item is currently unavailable. Icon is completely grayed.
High-Water Alarm: Occurs when the water float is above the threshold for the alarm condition.						N/A
High-Temperature Alarm: Occurs when the temperature read by the probe is above the threshold for the condition. Thermometer filled in red.						N/A
Low-Temperature Alarm: Occurs when the temperature read by the probe is below the threshold for the condition. Thermometer filled in blue.						N/A
Theft Alarm: Occurs when the site is closed and there is a decrease in the tank's volume.						N/A
Tank-Down Alarm: Occurs when the console loses communication with the probe.						N/A
NOTE: When sensors are added manually to the system when using non-smart sensors or adding sensors to a VSmart Module, the icons will have a little man in the upper-left-hand corner of the icons, as shown to the right.						

Appendix F- Icon Glossary (cont.)

Probe/Tank Alarms						
Description	**Normal**	**Alarm**	**Acknowledged**	**Alarm Ended But Not Acknowledged**	**Alarm Condition Ended**	**Unavailable**
Part numbers and description that would be associated to the conditions.	Icon only seen during auto-detection process to show sensor type.	Icon outlined with a dotted red line and red triangle. Occurs when an alarm condition is seen.	Icon outlined in blue with red triangle. Occurs when user clicks on alarm in alarm screen.	Icon outlined in blue and triangle is blue. Occurs when alarm has ended but has not been acknowledged.	Icon completely gray. Occurs after alarm has been acknowledged and the alarm event has ended.	Displayed when the item is currently unavailable. Icon is completely grayed.
High-Water Alarm: Occurs when the water float is above the threshold for the alarm condition.						N/A
High-Temperature Alarm: Occurs when the temperature read by the probe is above the threshold for the condition. Thermometer filled in red.						N/A
Low-Temperature Alarm: Occurs when the temperature read by the probe is below the threshold for the condition. Thermometer filled in blue.						N/A
Theft Alarm: Occurs when the site is closed and there is a decrease in the tank's volume.						N/A
Tank-Down Alarm: Occurs when the console loses communication with the probe.						N/A
NOTE: When sensors are added manually to the system when using non-smart sensors or adding sensors to a VSmart Module, the icons will have a little man in the upper-left-hand corner of the icons, as shown to the right.						

Appendix F- Icon Glossary (cont.)

Probe/Tank Alarms						
Description	**Normal**	**Alarm**	**Acknowledged**	**Alarm Ended But Not Acknowledged**	**Alarm Condition Ended**	**Unavailable**
Part numbers and description that would be associated to the conditions.	Icon only seen during auto detection process to show sensor type.	Icon outlined with a dotted red line and red triangle. Occurs when an alarm condition is seen.	Icon outlined in blue with red triangle. Occurs when user clicks on alarm in alarm screen.	Icon outlined in blue and triangle is blue. Occurs when alarm has ended but has not been acknowledged.	Icon completely gray. Occurs after alarm has been acknowledged and the alarm event has ended.	Displayed when the item is currently unavailable. Icon is completely grayed.
Manifold Tank Alarms						
High-High Product Alarm: Occurs when the product float is above the threshold for the condition.						N/A
High-Product Alarm: Occurs when the product float is above the threshold for the alarm condition.						N/A
Low-Product Alarm: Occurs when the product float is below the threshold for the alarm condition.						N/A
Low-Low Product Alarm: Occurs when the product float is below the threshold for the alarm condition.						N/A
NOTE: When sensors are added manually to the system when using non-smart sensors or adding sensors to a VSmart Module, the icons will have a little man in the upper-left-hand corner of the icons, as shown to the right.						

Appendix F- Icon Glossary (cont.)

Probe/Tank Alarms						
Description	**Normal**	**Alarm**	**Acknowledged**	**Alarm Ended But Not Acknowledged**	**Alarm Condition Ended**	**Unavailable**
Part numbers and description that would be associated to the conditions	Icon only seen during auto detection process to show sensor type.	Icon outlined with a dotted red line and red triangle. Occurs when an alarm condition is seen.	Icon outlined in blue with red triangle. Occurs when user clicks on alarm in alarm screen.	Icon outlined in blue and triangle is blue. Occurs when alarm has ended but has not been acknowledged.	Icon completely gray. Occurs after alarm has been acknowledged and the alarm event has ended.	Displayed when the item is currently unavailable. Icon is completely grayed.
Delivery Alarms		***In Progress***	***Unstable***		***Delivery Ended***	
Delivery Alarms: Occur when there is an increase in product height over a period of time above the threshold set for the condition.				N/A		N/A
Probe Alarms						
924 Probe Down: Occurs when the console loses communication to the probe.						N/A
Density Probe: Occurs when the console loses communication to a density probe.						N/A
AST Long Probe Alarms:						
EECO Probe Alarms:						
System Alarms						
Line Leak .01:						N/A

Appendix F- Icon Glossary (cont.)

System Alarms						
Description	**Normal**	**Alarm**	**Acknowledged**	**Alarm Ended But Not Acknowledged**	**Alarm Condition Ended**	**Unavailable**
Part numbers and description that would be associated to the conditions.	Icon only seen during auto-detection process to show sensor type.	Icon outlined with a dotted red line and red triangle. Occurs when an alarm condition is seen.	Icon outlined in blue with red triangle. Occurs when user clicks on alarm in alarm screen.	Icon outlined in blue and triangle is blue. Occurs when alarm has ended but has not been acknowledged.	Icon completely gray. Occurs after alarm has been acknowledged and the alarm event has ended.	Displayed when the item is currently unavailable. Icon is completely grayed.
Line Leak .02:						N/A
Line Leak .03:						N/A
Communication:	N/A					N/A
Leak Alarms: Occurs when a leak test has been run on a tank and fails, resulting in a leak detected.						N/A
Reconciliation:	N/A					N/A
System:	N/A					N/A
Subsystem: Occurs when the console loses communication to an external module (VSmart, Smart, OM4)	N/A					N/A

Appendix F- Icon Glossary (cont.)

System Alarms						
Description	**Normal**	**Alarm**	**Acknowledged**	**Alarm Ended But Not Acknowledged**	**Alarm Condition Ended**	**Unavailable**
Part numbers and description that would be associated to the conditions.	Icon only seen during auto-detection process to show sensor type.	Icon outlined with a dotted red line and red triangle. Occurs when an alarm condition is seen.	Icon outlined in blue with red triangle. Occurs when user clicks on alarm in alarm screen.	Icon outlined in blue and triangle is blue. Occurs when alarm has ended but has not been acknowledged.	Icon completely gray. Occurs after alarm has been acknowledged and the alarm event has ended.	Displayed when the item is currently unavailable. Icon is completely grayed.
SLD Leak Test:						N/A
SLD Manifolded Leak Test:						N/A
Manifold Broken Alarm:						N/A
Leak Test Warning:						N/A

Appendix F- Icon Glossary (cont.)

Communication Ports					
Port	**Available**	**Unavailable**	**Icon**	**Available**	**Unavailable**
	Displayed when the port is available for selection. Icon is outlined in blue.	Displayed when the item is currently unavailable. Icon is completely grayed.		Displayed when the port is available for selection. Icon is outlined in blue.	Displayed when the item is currently unavailable. Icon is completely grayed.
Other Sensors: Occurs on sensors that do not have a specific association, like float-switch sensors.			**Back/Left:** Used to go back to the previous screen or scroll left.		
Modem: Used for communication to and from console via internal modems (Fax or Remote Dial-In)			**Next/Right:** Used to go to the next page or scroll to the right.		
Serial: Used for serial communication for POS and other interfaces.			**Up:** Used to scroll up.		
USB: Used to communicate to external devices, such as thumb drives, mouse or keyboard.			**Down:** Used to scroll down.		
Wireless: Used for communication between console and modules.			**Contact:** Used to determine if contact is available or unavailable.		
LAN/WAN: Used for remote access to the system or to communicate with VSmart Modules.			**Hose:** Used to determine if a hose is available or unavailable.		

Appendix F- Icon Glossary (cont.)

Miscellaneous Icons					
Icon	**Available**	**Unavailable**	**Icon**	**Available**	**Unavailable**
	Displayed when the port is available for selection. Icon is outlined in blue.	Displayed when the item is currently unavailable. Icon is completely grayed.		Displayed when the port is available for selection. Icon is outlined in blue.	Displayed when the item is currently unavailable. Icon is completely grayed.
Add: Used to add a new entry to the system.			**Help:** Used to view the Help section for the current page.		
Cancel: Used to cancel the current action.			**Home:** Used to return to the Home screen.		
Delete: Used to delete the current selection from the system.			**Keyboard:** Used to bring up the on-screen keyboard.		
Apply: Used to save the current settings to the system.			**Login/Logout:** Used to login or logout of the system.		
Edit: Used to edit the current selection.			**Settings:** Used to go to the Settings menu.		
Print: Used to print the current selection.			**Report:** Used to identify on which dates reports are scheduled.		

Appendix F- Icon Glossary (cont.)

Miscellaneous Icons					
Icon	**Available**	**Unavailable**	**Icon**	**Available**	**Unavailable**
	Displayed when the port is available for selection. Icon is outlined in blue.	Displayed when the item is currently unavailable. Icon is completely grayed.		Displayed when the port is available for selection. Icon is outlined in blue.	Displayed when the item is currently unavailable. Icon is completely grayed.
Touchscreen Calibration:			N/A	N/A	N/A
Description	**Normal**	**Alarm**	**Acknowledged**	**Alarm Ended But Not Acknowledged**	**Alarm Condition Ended**
Part numbers and description that would be associated to the conditions.	Icon only seen during auto-detection process to show sensor type.	Icon outlined with a dotted red line and red triangle. Occurs when an alarm condition is seen.	Icon outlined in blue with red triangle. Occurs when user clicks on alarm in alarm screen.	Icon outlined in blue and triangle is blue. Occurs when alarm has ended but has not been acknowledged.	Icon completely gray. Occurs after alarm has been acknowledged and the alarm event has ended.
Density Probe Down:	N/A				
924 Probe Down:	N/A				
Manually Added Probe Down:	N/A				

Appendix F- Icon Glossary (cont.)

Miscellaneous Icons					
Description	**Normal**	**Alarm**	**Acknowledged**	**Alarm Ended But Not Acknowledged**	**Alarm Condition Ended**
Part numbers and description that would be associated to the conditions.	Device icon in normal state.	Icon outlined with a dotted red line and red triangle. Occurs when alarm condition is seen.	Icon outlined in blue with red triangle. Occurs when user clicks on alarm in alarm screen.	Icon outlined in blue and triangle is blue. Occurs when alarm has ended but has not been acknowledged.	Icon completely gray. Occurs after alarm has been acknowledged and the alarm event has ended.
Density Meter Alarm (UST):					
Density Meter Alarm (AST):					
System Shutdown:					
LTNV Memory Failure:					
Leak .1:					
Leak .2:					

Appendix F- Icon Glossary (cont.)

Miscellaneous Icons					
Description	**Normal**	**Alarm**	**Acknowledged**	**Alarm Ended But Not Acknowledged**	**Alarm Condition Ended**
Part numbers and description that would be associated to the conditions.	Icon only seen during auto-detection process to show sensor type.	Icon outlined with a dotted red line and red triangle. Occurs when an alarm condition is seen.	Icon outlined in blue with red triangle. Occurs when user clicks on alarm in alarm screen.	Icon outlined in blue and triangle is blue. Occurs when alarm has ended but has not been acknowledged.	Icon completely gray. Occurs after alarm has been acknowledged and the alarm event has ended.
Battery Alarm:					
Printer Communication Break:					
STP Start Failed Alarm:					
STP Stop Failed Alarm:					

Appendix G: Maintenance Functions

Use of Maintenance Kit

Part # 20-4407

The Hardware Maintenance Kit includes a USB key and a USB mouse. The two (2) USB devices can be plugged into either of the external USB ports on the left-hand side of the console. The two devices can be used in the event of system failure or when retrieving key troubleshooting files.

USB Mouse

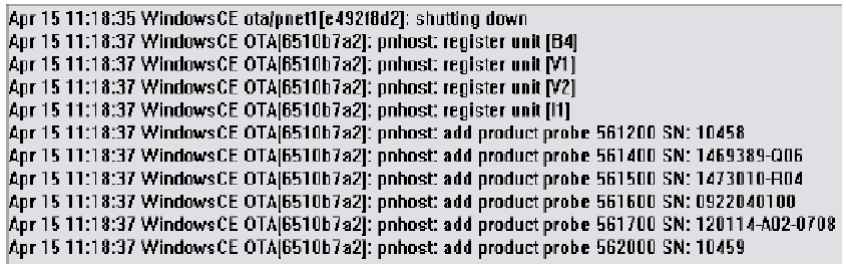
USB Key

The USB mouse will be used in the event of the touchscreen losing calibration, not being calibrated or touchscreen failure. This will allow the navigation of the mouse to get the screen back into working order.

The USB key contains a file (from the factory) that will be used to access the Windows®-side of the console, view log files or transfer files to and from the console. This key will temporarily shut down the user interface (not causing anything to stop running). This key should not be used on a regular basis. In the event of a system problem that cannot be resolved over the phone, users should insert the key into one of the external USB ports on the console and after a few seconds the user interface will shutdown, giving you access to the Windows® platform. From here users will be able to retrieve files to send to the technician for evaluation. After the files are removed, remove the key and the system will return back to a normal state.

> Do not delete any files off of the system unless instructed to do so by an OPW technician.

Factory USB Files



Backup and Restore of Configuration & Backup Database

Through the user interface, users have the ability to backup the configuration and the database. To do this, log into the Console and go to Settings>Utilities. On this screen, you will see the options Backup Configuration and Restore Configuration. To backup the configuration, press the Backup Configuration button. There will be an option to save it to the local disk and external USB drive, or if on a remote connection to the computer you are using. If local, the users will be shown a dialogue box displaying backup-drive choices. Choose which drive they wish to save it to and press Apply. If on a remote PC, you will be shown the typical “Save As” box; a choose where you would like to save the file.

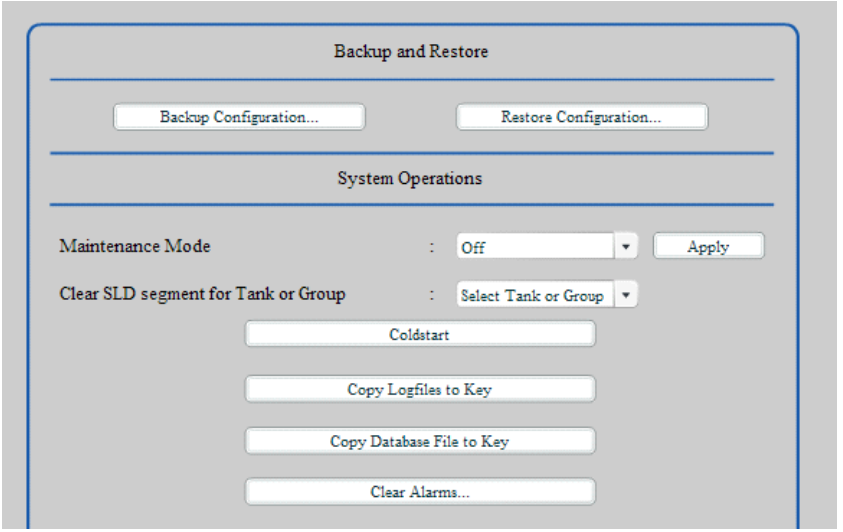
To Restore the configuration back to the console, log in and go to Settings>Utilities. Once on this screen, press the Restore Configuration button. You will be prompted to choose a file for which you want to restore the system with. If there are multiple backups, all of these files will be displayed. Once the file is chosen, press Apply and the process of restoration will begin. To finalize the restore, log out and log back into the system.

> Backing up the configuration will save only the aspects required during the configuration process. This will not save any event history (alarms, deliveries, inventories, leak alarms) on the system.

To backup the database file on the system, login and go to Settings> Utilities. On this screen, press the Backup Database File To key. There are two choices here: back the database file up to a local drive or to an external USB key. Once a selection is made, you will be prompted to press Apply to start the process.

> The system will be rebooted during this process. Once Apply is pressed, the process will begin and the system will return to a normal state after reboot.
>
> Backing up the database file copies all event history, including the configuration of the system.

Restore Configuration

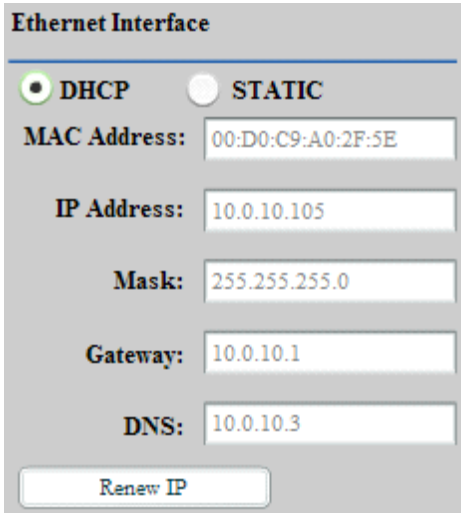


Connecting Directly via Crossover Cable

To connect to the console directly using a crossover cable, connect a crossover cable from a PC directly to the SiteSentinel® iSite□ Ethernet port. Once this is done, the user's PC will come up with a message stating "limited or no connectivity." *This is normal*. Once the cable is connected, the user can log into the SiteSentinel® iSite□ and go the settings>system>networking to the SiteSentinel® iSite□ IP address. Once the IP address is found, enter that IP into the address bar of the Internet browser. This should bring up the SiteSentinel® iSite□ login screen. The user may now login and explore/configure the SiteSentinel® iSite™.

> If the SiteSentinel® iSite□ or PC is setup to static IP, it must be either changed to DHCP or set the PC to 1 IP below or above the SiteSentinel® iSite™ IP address in order to connect.

Error: Limited or No Connectivity



Once the IP address is found and recorded, enter this IP address into the address bar on Internet Explorer and press Enter to access the page. This will load the login screen for the console. Once logged in, you will have the same access as if you were pressing the screen on the console.

> Not all Utilities functions are available with a remote connection.

Connecting USB Keyboard

If you do not want to use the on-screen keyboard for configuring the system you can connect a USB keyboard to the system for configuration purposes. Plug in the USB keyboard to one of the external USB ports for instant use of the keyboard.

> There is a PS2 port on the inside of the console if you do not have a USB keyboard available. See Appendix J: Console Boards for the location of the port. In most cases the system will need to be rebooted to recognize a keyboard plugged into this port.

Other connections used for polling POS information:

- via FSC3000□ passthru 20-1613
- via System2□ passthru 20-1456
- direct serial 20-1520-05

Appendix H: OM4 Output Module for SiteSentinel® iSite□

Part # 20-8312-iSite

The OM4 Output Module (see image on right) expands your SiteSentinel® iSite□ capabilities by allowing you to connect as many as 16-relay activated output devices to the SiteSentinel® iSite□controller. The OM4 Output Module communicates with the controller via Petro-Net™. Up to four OM4 Output Modules can be connected for a total of 16 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. Unlike the physically similar OM4 used on the SiteSentinel® 1, the OM4 for the SiteSentinel® iSite□ derives its power from a 12 VAC wall pack source that is supplied with the unit. Follow wiring instructions inside the unit for the correct Petro- Net™ communications and power wiring connection instructions.

> See your SiteSentinel® iSite□ Configuration Manual to program the alarms or events and to associate them with the Output Module relays.

> 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.

OM4 Output Module

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 other applicable local codes prevalent in the country\county of installation.

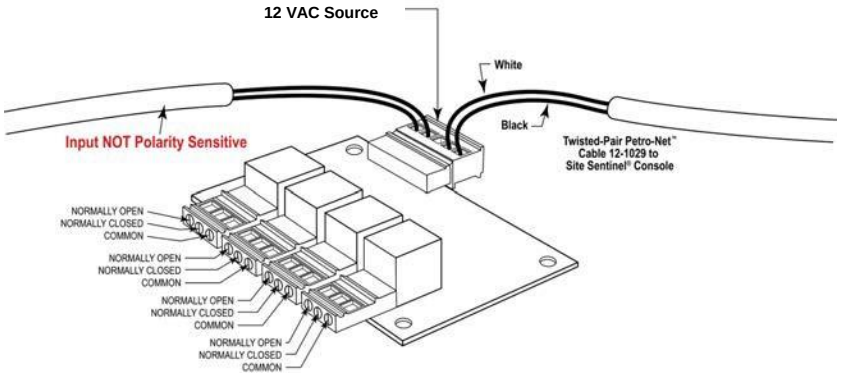
Hazardous Area Definition

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

Connections

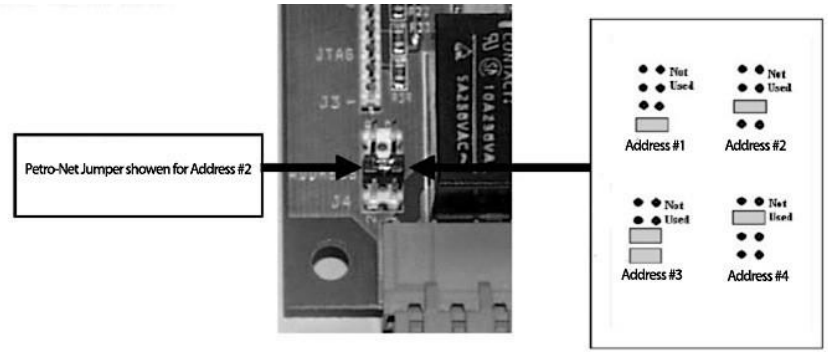
Connect all relay field wiring to the appropriate terminal block(s). See figure on right.

I/O Module Terminal Outputs



When installing *two or more* OM4 Output Module boxes, place the address jumpers on the OM4 circuit boards as shown below. To do this, take off the four nuts securing the aluminum cover and remove it, exposing the circuit board. Set the jumpers and replace the cover.

OM4 Module Jumper Settings



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

Appendix I: SiteSentinel® and EMCO Sensors without IntelliSense™ Board

Hydrocarbon Liquid/Water Sensor

Part # 30-3210-nn

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

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.

Hydrocarbon Liquid/Water Sensor

Hydrocarbon Liquid/Water Sensor	
Typical Uses:	Monitoring Wells
Substances Detected:	Hydrocarbon and Water
Available Lengths:	6'–20' (1.8–6.1 m)
Operating Temperature:	-4°F to 122°F (-20°C to 50°C)
Dimensions:	0.7" x 6'–20' (1.8 cm x 1.8–6.1 m)
Required Cable:	10' (3.1 m) gas-and-oil resistant cable
Maximum Wiring Length*:	1,000' (305 m)
Nominal resistance (uncontaminated):	1K–3K ohms per foot
Nominal resistance (contaminated):	30K - 200K ohms
Multi-Drop Restrictions:	One (1) per channel
Connections:	Red = Power, Black = Signal

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

Hydrocarbon Vapor Sensor

Part No. 30-3222

The Hydrocarbon Vapor Sensor is designed to detect hydrocarbon vapors in dry monitoring wells. 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. This process could take up to 30 minutes depending on the saturation factor. In the event of a break in the cable or any sensor malfunctions, the system will activate the alarm.

Hydrocarbon Vapor Sensor

Hydrocarbon Vapor Sensor	
Operating Temperature:	-40°F to 158° F (-40°C to 70°C)
Dimensions:	D= 0.9“ (2.3 cm), L= 3.5“ (8.9 cm)
Required Cable:	Belden® #88760 or Alpha #55371
Maximum Wiring Length*:	1,000’ (305 m)
Connections:	Red = Power, Black = Signal
Nominal Resistance (uncontaminated):	3K – 5K ohms
Nominal Resistance (contaminated):	10K – 200K ohms
Multi-Drop Restriction:	One (1) per channel

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

Installation Procedure

1. Check Dry Monitoring Wells for vapors before installing.
2. Mount Sensor close to the top, above the water level, if applicable.
3. If sensor is submerged in water it will not function.

Combo Single Level / Hydrocarbon Liquid Sump Sensor

Part #30-3224

This sensor is made from the Hydrocarbon Liquid Sump Sensor (30-3219-12) with an Interstitial Level Sensor (30-3221-1A) clipped to its side. The combination 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 resistance when exposed to liquid hydrocarbons. The level sensor portion simply clips onto the hydrocarbon sensor and can be positioned at any desired height to activate in the presence of liquid.

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

Combo Single Level / Hydrocarbon Liquid Sump Sensor

Combo Single Level/Hydrocarbon Liquid Sump Sensor	
Substances Detected:	Liquid Hydrocarbon and Water
Operating Temperature:	-4°F to 122°F (-20°C to +50°C)
Dimensions: 30-3221-1A 30-3219-12	 1.3” x 3.9” (3.4 cm x 10 cm) 1.7” x 13.2” (4.4 cm x 33.5 cm)
Required Cable:	12’ (3.6 m) gas-and-oil resistant cable
Maximum Wiring Length*:	1,000’ (305 m)
Nominal Resistance (uncontaminated):	1K - 5K ohms
Nominal Resistance (contaminated):	30K - 200K ohms
Multi-Drop Restriction:	1 per channel
Connections:	Channel 1: Red = Power, Black = Signal Channel 2: White = Signal

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

Combo Dual Level/ Hydrocarbon Liquid Sump Sensor

Part #30-3225

This sensor is made from the Hydrocarbon Liquid Sump Sensor (30-3219-12) with a Dual-Level Reservoir Sensor (30-3221-2) clipped to its side. The combination 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 resistance when exposed to liquid hydrocarbons. The level sensor portion simply clips onto the hydrocarbon sensor and can be positioned at any desired height to activate in the presence of liquid.

Combo Dual Level / Hydrocarbon Liquid Sump Sensor

Combo Dual Level/Hydrocarbon Liquid Sump Sensor	
Substances Detected:	Liquid Hydrocarbon and Water
Operating Temperature:	-4°F to 122°F (-20°C to +50°C)
Dimensions: 30-3221-2 30-3219-12	 2.4” x 14” (6 cm x 35.6 cm) 1.7” x 13.2” (4.4 cm x 33.5 cm)
Required Cable:	12’ (3.6 m) of gas-and-oil resistant cable
Maximum Wiring Length*:	1,000’ (305 m)
Nominal resistance (uncontaminated):	1K - 5K ohms
Nominal resistance (contaminated):	30K - 200K ohms
Multi-Drop Restriction:	1 per channel
Connections:	Channel 1: Red = Power, White = Signal Channel 2: Black = Signal

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

Single Level Sump Sensor

Part #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 a liquid is normally present. The sensor contains a float switch that activates in the presence of liquid. In the event of a break in the cable, the system will activate the alarm.

Single Level Sump Sensor

Single Level Sump Sensor	
Substance Detected:	Liquid
Operating Temperature:	-4°F to 122°F (-20°C to +50°C)
Dimensions:	2.9” x 3.7” (7.4 cm x 9.5 cm)
Required Cable:	15’ (4.6 m) of gas-and-oil resistant cable
Maximum Wiring Length*:	1,000’ (305 m)
Multi-Drop Restriction:	1 per channel
Connections:	Red = Power, Black = Signal

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

Dual Level Reservoir Sensor

Part # 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.

Dual Level Reservoir Sensor

Dual Level Reservoir Sensor	
Substance Detected:	Liquid
Operating Temperature:	-4°F to 122°F (-20°C to +50°C)
Dimensions:	2.4” x 14” (6 cm x 35.6 cm)
Required Cable:	15’ (4.6 m) gas-and-oil resistant cable
Maximum Wiring Length*:	1,000’ (305 m)
Multi-Drop Restriction:	1 per channel
Connections:	Red = Power, White = Signal

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

Interstitial Level Sensors

Part #30-3221-1A, 30-3221-1B

The Interstitial Level Sensors 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 Interstitial Level Sensor is available in two configurations.

The 30-3221-1A is constructed from chemical-resistant non-metallic material.

The 30-3221-1B 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.

Interstitial Level Sensor

Interstitial Level Sensor	
Substance Detected:	Liquid
Operating Temperature:	-4°F to 122°F (-20°C to +50°C)
Dimensions: 30-3221-1A 30-3219-1B	 1.3” x 3.9” (3.4 cm x 10 cm) 1.4” x 3.5” (3.5 cm x 9 cm)
Required Cable:	15’ (4.6 m) gas-and-oil resistant cable
Maximum Wiring Length*:	1,000’ (305 m)
Multi-Drop Restriction:	1 per channel
Connections:	Red = Power, Black = Signal

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

Hydrocarbon Liquid Sump Sensor

Part #30-3219-12

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

The Hydrocarbon Liquid Sump 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.

Hydrocarbon Liquid Sump Sensor

Hydrocarbon Liquid Sump Sensor	
Substance Detected:	Liquid Hydrocarbon
Operating Temperature:	-4°F to 122°F (-20°C to +50°C)
Dimensions:	1.7” x 31.2” (4.4 cm x 33.5 cm)
Required Cable:	12’ (3.6 m) gas-and-oil resistant cable
Maximum Wiring Length:	1000’ (305 m)
Nominal resistance (uncontaminated):	1K - 5K ohms
Nominal resistance (contaminated):	30K - 200K ohms
Multi-Drop Restriction:	1 per channel
Connections:	Red = Power, Black = Signal

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

Interstitial Optical Liquid Sensor

Part #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 between water and hydrocarbon liquid. In the event of a break in the cable, the system will activate the alarm.

Interstitial Optical Liquid Sensor

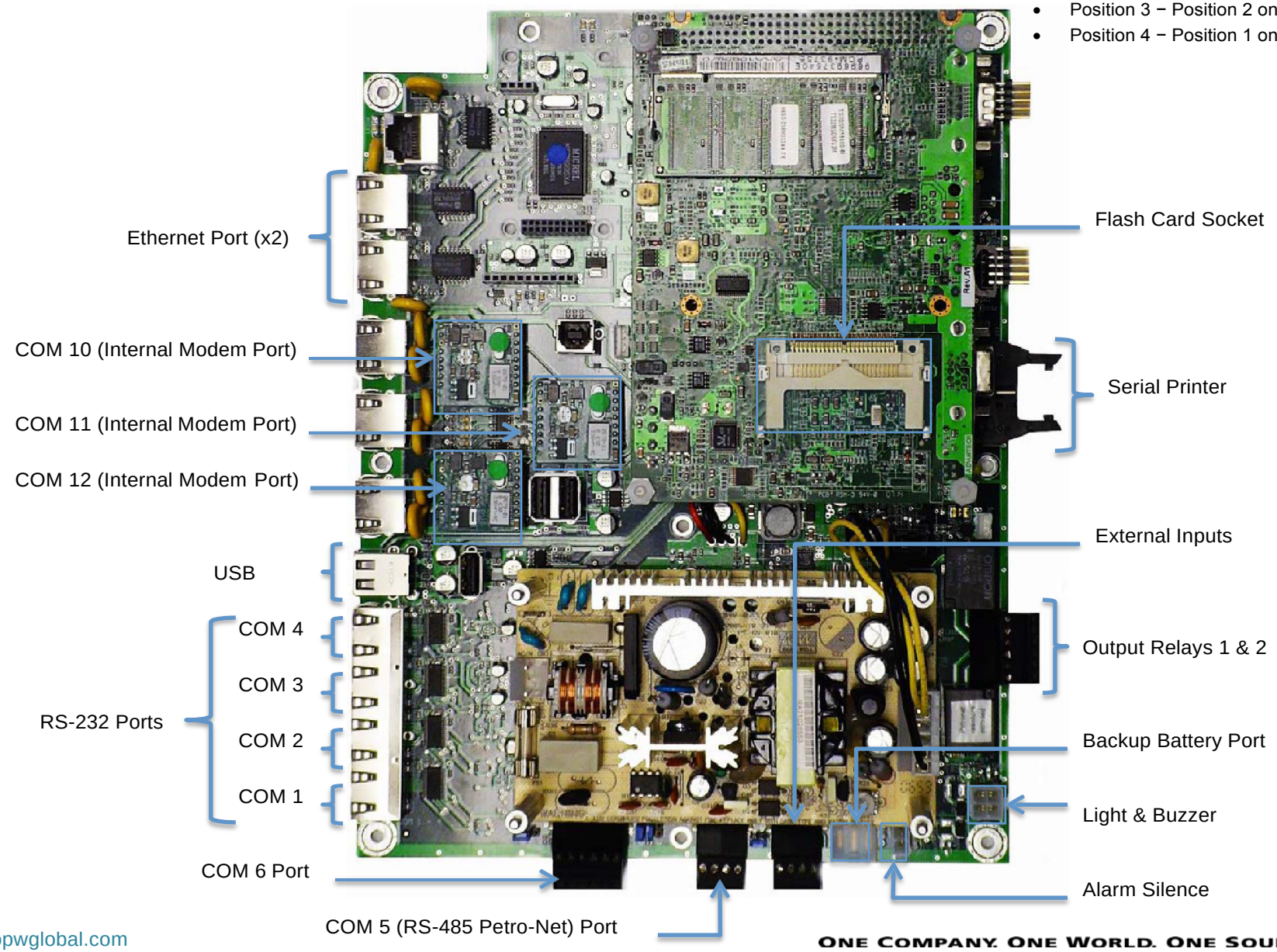
Interstitial Optical Liquid Sensor	
Substance Detected:	Liquid
Operating Temperature:	-4°F to 122°F (-20°C to +50°C)
Dimensions:	0.7” x 2.8” (1.8 cm x 7 cm)
Required Cable:	20’ (6 m) gas-and-oil resistant cable
Maximum Wiring Length*:	1,000’ (305 m)
Multi-Drop Restriction:	1 per channel
Connections:	Red = Power, White = Signal, Black = Ground

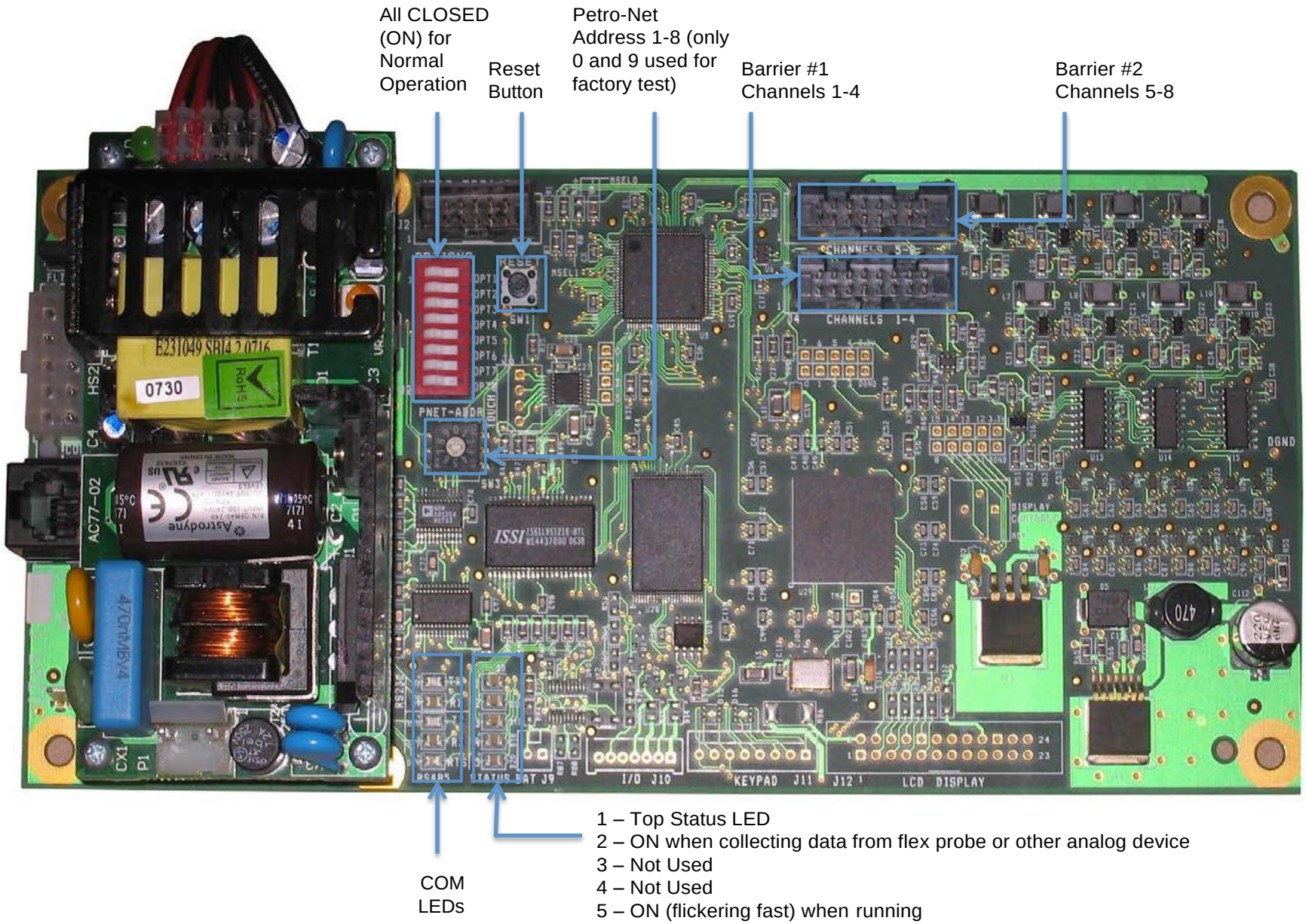
*Maximum Wiring Length is the maximum length of cable to be used to connect all sensors on an individual channel. The length includes run of cable from VSmart to each sensor board in the string.

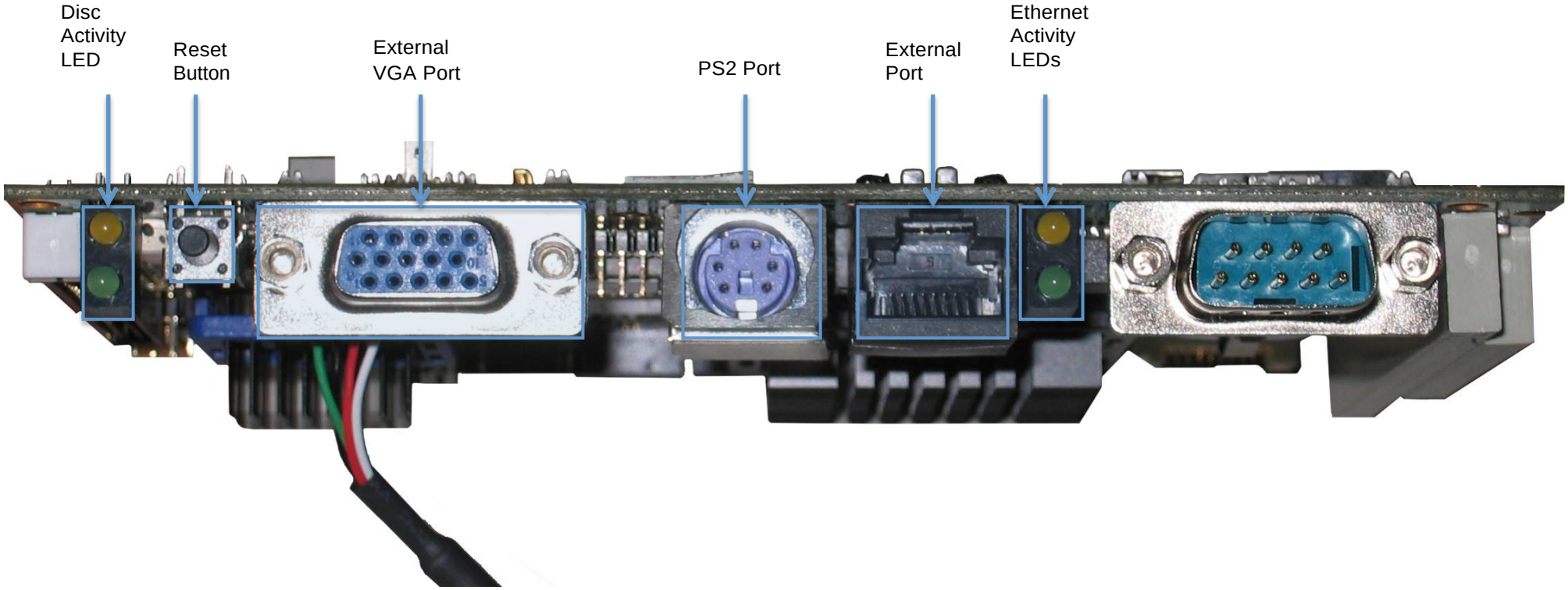
Appendix J: Console Boards

NOTE: For COM 5 (RS-485 Petro-Net Port

- Position 3 − Position 2 on VSmart
- Position 4 − Position 1 on VSmart




All CLOSED (ON) for Normal Operation
Reset Button
Petro-Net Address 1-8 (only 0 and 9 used for factory test)
Barrier #1 Channels 1-4
Barrier #2 Channels 5-8
COM LEDs
1 – Top Status LED
2 – ON when collecting data from flex probe or other analog device
3 – Not Used
4 – Not Used
5 – ON (flickering fast) when running


Disc Activity LED
Reset Button
External VGA Port
PS2 Port
External Port
Ethernet Activity LEDs

Appendix K: System Functional Testing

1) Tank-Level Monitor Functions

a) Confirm Probe reading correct product level: ☐Yes ☐ No

b) Print inventory report, measure product level at or near Probe riser and confirm probes reading correctly**:** ☐Yes ☐ No

2) Leak-Sensor Functions

a) Sensor Function Tests:

b) Sensor Model(s) 30-0231-S, 30-0230-S, 30-0232-D-10 &30-0232-D-20 &30-0232-D-10B, 30-0232-D-20B:

c) Individually remove sensor from mounting bracket/riser, then place sensor upside down (on sensor models 20-0232-D-XX- remove sensor from wet monitoring well and leave bottom of sensor in up-right position):

i) All sensors initiate individual alarm on console: ☐Yes No N/A

ii) All sensors indicate alarm on correctly labeled channels: Yes No N/A

iii) All sensors alarms activate appropriate relay on Multi-Relay board: Yes No ☐N/A

d) If sensors utilized for line-leak detection and positive shutoff of pressurized system:

i) All designated sensor alarms activate appropriate relay in Multi-Relay: Yes No ☐N/A

ii) Module and/stops operation to the appropriate submerged pump: ☐Yes No N/A

3) Line Leak Detector Functions

a) 3-GPH shutdown test:

i) Observe Lockout/Tagout procedures and de-energize submerged pump power. Have appropriate approved container and spill-containment material on hand. Individually install calibrated 3-GPH leak-generating apparatus into each piping system and into approved container. Re-energize submerged pump power, authorizes and cycles power to submerged pump relay.

b) All test indicates alarm for and shuts down appropriate submerged pump: Yes No N/A ☐

i) Observe Lockout/Tagout procedures and de-energize submerged pump power and have appropriate approved container and spill-containment material on hand when removing the leak-generating apparatus

4) System Status Tests, History, Setup and Checklist Verification

a) Configuration Report printed and reviewed for proper programming: Yes No

b) Console audible and visual alarm tested and functioning properly: Yes No

c) Print Leak Sensor Status: Review data for “Normal” conditions of sensors.

i) Leak Sensor Status printed and reviewed: ☐Yes ☐ No ☐N/A

d) Print TLM Leak Test History Information: Review Leak Test History for proper recording of all applicable leak tests.

i) TLM Leak Test History Printed and Reviewed: ☐Yes ☐ No

e) Print Line Leak Test History Information: Review Line Leak Test history for proper recording of all applicable leak tests.

i) Line Leak Test History Printed and Reviewed: ☐Yes ☐ No ☐N/A

f) Print System Event History: Review data for alarms, troubles and long period of times that the system power was interrupted and not

monitoring the site.

Must be last function performed for checklist verification!

i) All event History printed and reviewed for proper operation and verification: ☐Yes ☐ No

5) Attach all required printouts and reports.

6) Document all "No" answers, actions taken to correct those items, and/or comments.

7) Include site drawing with layout and approximate distances (use space provided below):

This checklist is for annual verification of the OPW Fuel Management Systems' SiteSentinel® iSite™ Tank Gauge System and must be performed by an OPW Fuel Management Systems' Authorized Service Contractor.

The compilation of this checklist and any subsequent work or parts required to address any non-conformity is the sole responsibility of the equipment owner.

As an OPW Fuel Management Systems' Authorized Service Contractor I certify the above information and data is correct.

Technician's Name (Print):_____Signature: _____

Company Name:_____Date:_____/_____/_____

OPW-FMS Certification #:_____ Exp. Date:____/____/_____

Appendix L: Annual Inspection Checklist

Facility ID#:	Facility Name/Address:	Qualified Technician Signature:	Date:
If any problem is found, contact:		Contact information:	

Console	Description	N/A	Tank 1	Tank 2	Tank 3	Tank 4	Tank 5
External Alarm	Alarm is functional						
	Alarm sounds at the proper product level						
Leak Detection							
ATG Console	Console has no active warnings or alarms						
	Alarm history shows no recurring leak alarms						
	Verify in-tank leak-detection tests are being completed (if used for leak detection)						
	Verify correct setup parameters for electronic line-leak detector (if present)						
	Verify piping leak-detection tests are being completed (if used for leak detection)						
Interstitial Monitoring	Tank interstitial access is present						
	“Dry” tank sensor tested and functional, replaced at bottom of tank						
	“Wet” tank sensor functional, replaced in proper position						
	“Wet” tank leak-detection liquid depth within range specified by manufacturer						
Sump & Pan Monitoring	“Dry” Sump and Pan sensor tested and functional, replaced at bottom of Pan/Sump						

Soil Vapor Monitoring	Sensing device calibrated and tested						
Groundwater Monitoring	Sensing device tested						
Electronic Line-Leak Detection	Verify that no line sensors have been disabled and electrically by-passed						
	Evaluate the leak-test history for information indicating that the system is successfully performing the desired tests						
	Evaluate the alarm history for a pattern of leak-test failures or system problems						
	3-GPH shutdown test performed						

Describe any deficiencies:

Mark each tank where no problem is observed with a checkmark: √

If certain equipment is not required and/or not present, mark checklist in the N/A column.

If a defect is found, mark the checklist with an "X," describe the problem in the "DEFICIENCIES" section and notify the appropriate person.

Declaration of Conformity

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

DECLARATION OF CONFORMITY

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

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

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

Place: Hodgkins, IL.

Date: 30 December 2019

Nicole Chavez
Engineering Compliance Technician

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

DECLARATION OF CONFORMITY

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

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

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

Place: Hodgkins, IL.

Date: 30 March 2018

Nicole Chavez
Engineering Compliance Technician

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DECLARATION OF CONFORMITY

In accordance with Article 9 of the Council Directive 94/9/EC, equipment intended for use in potentially explosive atmospheres. Given in Annex II to the Directive.

Standard (s) to which conformity is declared:	EN 60079-0:2012+A11:2013 EN 60079-11:2012 EN 60079-26:2015
Manufacturers Name:	OPW Fuel Management Systems, Inc.
Manufacturers Address:	6900 Santa Fe Drive Hodgkins, IL. 60525 USA
Type of Equipment:	Intrinsically Safe Interface with and without Sensors
Model:	Models: 20-0349-ISI, 30-0230-S, 30-0231 followed by –L or –S, 30-0232 followed by -D-XX or –DH-XX, 30-0233 followed by -H or –HW, 30-0234 followed by –H-XX or -HW-XX or 30-0235 followed by –V or –VW, 30-0236 followed by –L or –LW.
Marking:	Ⓔx II 1G Ex ia IIA T4
Notified Body:	UL International Demko A/S. Notified Body Number 0539
EC Type Certificates:	DEMKO 07 ATEX 0633790X

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

Place: Hodgkins, IL.

Date: 10 December 2019

Nicole Chavez
Engineering Compliance Technician

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DECLARATION OF CONFORMITY

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

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

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

Place: Hodgkins, IL.

Date: 30 December 2019

Nicole Chavez
Engineering Compliance Technician

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