



ELEVATOR PUMP CONTROL SYSTEM

EPC-115-25 MODEL

PN995 (04-01-2024)



INSTALLATION AND OPERATIONS MANUAL

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IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS: This manual contains important instructions that should be followed during installation, operation, and maintenance of the product. Always refer to the equipment manual for safety information relevant to that product.

 This is the safety alert symbol. When you see this symbol on your product or in this manual, look for one of the following signal words and be alert to the potential for personal injury!


 **DANGER** warns about hazards that will cause serious personal injury, death or major property damage if ignored.

 **WARNING** warns about hazards that can cause serious personal injury, death or major property damage if ignored.

 **CAUTION** indicates a hazard which, if not avoided, could result in minor or moderate injury.


The word **NOTE** indicates special instructions that are important but not related to hazards.

CALIFORNIA PROPOSITION 65 WARNING


 **WARNING** This product and related accessories contain chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

GENERAL SAFETY

- ♦ Carefully read and follow all instructions in this manual and on product.
- ♦ Installation of the Oil Detection System must comply with all federal, state, and local codes.
- ♦ **DO NOT** use with flammable or explosive fluids such as gasoline, fuel oil, kerosene, etc. **DO NOT** use in explosive atmospheres.
- ♦ **DO NOT** handle the Oil Detection System with wet hands, when standing on wet or damp surface, or in water.

- ♦ Sensor Module should **ONLY** be used with water.
- ♦  **CAUTION** Remove any float switch that is currently used or supplied with the pump. If the float cannot be removed, secure float switch so that it is always on.
- ♦ The Control System must be installed by qualified personnel familiar with all applicable local electrical and mechanical codes. Refer to the National Electrical Code (NEC) (NFPA 70). Failure to properly install, test, and operate this product can result in personal injury or equipment malfunction.
- ♦ The Control Panel can be mounted indoors or outdoors. The Alarm Panel (optional) must be mounted indoors. For outdoor alarm applications, consult factory.
- ♦ Secure the Preset Level Sensor Module on the discharge pipe at a level that guarantees partial pump submergence when the water level is just below the Pump Stop Probe (longest probe; see Step 2 of this manual). Failure to properly mount the Preset Level Sensor Module may cause unintended consequences.

ELECTRICAL SAFETY

 **WARNING** **RISK OF ELECTRIC SHOCK. CAN SHOCK, BURN OR KILL.** All wiring should be done by a qualified electrician.

- ♦ Disconnect **ALL** electrical service power before working on unit.
IMPORTANT: Refer to the included electrical schematic for all incoming power connections and pump connections which may include optional field wiring connections.
- ♦ Incoming voltage **MUST** match the Oil Detection System voltage.
- ♦ To prevent electrical shock and equipment malfunction, use **ONLY** with a pump supplied with a grounding tor and grounding-type attachment plug. Make sure to plug the Oil Detection System Control Panel into a properly grounded, grounding-type receptacle.

INTRODUCTION

INTRODUCTION

The Oil Detection System pumps, sends alarms, and monitors elevator sump pits, transformer vaults, and leachate well applications.

The Control Panel activates a pump to remove water from elevator pits in accordance with ASME A17.1, stopping the pump before oil or other harmful substances enter the water supply.

The Control Panel includes LED indicators that illuminate while monitoring various conditions including but not limited to power, pump running, high oil, high water, power loss, level sensor error detection (if enabled), fire alarm mode (if enabled), and low level alarm/redundant off (if enabled).

The included alarm buzzer and/or auxiliary contacts will activate on power loss, high oil, high water, or the various alarm conditions.

The system also includes auxiliary contacts for pump run monitoring. The alarm auxiliary contacts of the control panel can be connected to an optional Oil Detection System remote alarm panel, building automation system (BAS) or SCADA system, and phone dialers for remote notification of alarm conditions.

The Oil Detection System has configurable features including level sensor error detection, an automatic or manual alarm condition reset, function input to be used for a fire system or low level/redundant off float switch, and a weekly pump exerciser.

An integrated pump hand-off-auto (HOA) selector switch is included to set the desired operation mode of the pump and a sensitivity adjustment dial enables fine tuning of the water sensors.

PRESET LEVEL SENSOR

The Preset Level Sensor, standard model, is used with Oil Detection System control panels for the safe operation of pumping, alarming, and monitoring of: elevator sump pits, transformer vaults, and leachate well applications. The control panel will activate a pump to remove water from pits in accordance with ASME A17.1, stopping the pump before oil or other harmful substances enter the water supply.

The control panel is operated by the preset level sensor module for pump stop, pump start, high water alarm, and high oil detection alarm (high level float switch). As the water level rises touching the pump start probe (middle), the pump will start and continue to run until the water level recedes below the pump stop probe (longest) to complete the pump cycle.

The pump stop probe senses air or oil and when water is no longer touching this probe, the pump stops running so the oil layer will not be pumped out of the sump. Oil will float on top of water, so if oil is present and touching this probe, the pump will also stop running. If the water level rises to activate the high water probe (shortest) and/or simultaneously activating the high level float switch, then a high water and/or high oil (oil detected) alarm condition will occur.

The preset level sensor module is mounted at the desired level to a discharge or separate pipe (mounted to side wall) using a stainless steel pipe clamp and then wired to the control panel using low voltage wires. The standard preset level sensor has a fixed pumping range of 6.0", the distance between the pump stop (longest) and pump start (middle) probes.

3-ZONE REMOTE ALARM (OPTIONAL)

The Oil Detection System 3-Zone Alarm is an indoor rated alarm panel, powered by a standard 120VAC wall outlet. The green power LED will illuminate (solid) when powered. This alarm panel is used with Pentair/Pentek® Oil Detection System control panels for the safe operation of pumping, alarming, and monitoring of: elevator sump pits, transformer vaults, and leachate well applications. The control panel will activate a pump to remove water from pits in accordance with ASME A17.1, stopping the pump before oil or other harmful substances enter the water supply.

The alarm panel is equipped with audible and visual alarm indication for high oil, high water, and trouble alarm events. A preset level sensor is wired to the control panel from the monitoring area and the control panel auxiliary contacts are wired to the terminal block on the alarm panel. Installing a 9VDC battery (not included) provides battery backup during power outages. Use the auxiliary contacts to connect to building automation systems (BAS) and phone dialers.

An alarm condition occurs when the control panel's sensor for high oil, high water, and/or trouble alarm activates the control panel's auxiliary contacts (which are field connected to the alarm panel inputs terminal block), during which the red alarm LED(s) will illuminate (solid), buzzer will annunciate (solid), and the auxiliary contacts will activate. The trouble alarm input is activated by multiple alarms depending on the model of the control panel and may include power loss, pump overload, sensor error, and other trouble alarms. The alarm condition will stay on until the sensor for high oil, high water, and/or trouble alarm deactivates. If the alarm silence pushbutton of the alarm panel is pressed during an alarm condition, it will silence the buzzer while the alarm LED(s) remain on. The silence condition of the alarm panel will reset when the sensor for high oil, high water, and/or trouble alarm deactivates and the alarm panel will auto reset for the next alarm cycle.

NOTE: If zone-1 (high oil) is in an alarm condition and the buzzer is silenced, and then zone-2 (high water) or zone-3 (trouble alarm) goes into an alarm condition, the buzzer will reactivate until the alarm silence pushbutton is pressed to acknowledge that a new alarm condition has occurred.

SPECIFICATIONS

SPECIFICATIONS

SYSTEM:

- ◆ Primary Power: 120VAC, 1-14 AMPS, 60 HZ
- ◆ Phase/Pump Type: Single Phase, Simplex
- ◆ Pump Power Receptacle Cable: 120VAC, 15A, 60 Hz Female Plug
- ◆ Incoming System Power Cable: 120VAC, 15A, 60 Hz 6 ft, Male Plug
- ◆ Buzzer: 5-30VDC, 95 dB at 2 ft
- ◆ Test/Silence Switch: Single Pole, Single Throw
- ◆ Auxiliary Dry Alarm Contacts (Control Panel): 120VAC/24VDC, 250mA maximum (each) Normally Open
- ◆ Fuses: Positive Temperature Coefficient (PTC), Resettable
- ◆ LEDs: Green (power and pump run). Red (alarm, activated sensor, or system setting)
- ◆ Sensor Input Ratings: Float/Function Inputs, 3.3VDC. Water Probe Inputs, 12V
- ◆ Preset Level Sensor: 25 ft cable, SJE00W (UL) / SJT00W (CSA), 18 AWG, 5-conductor, flexible, and water/oil resistant
- ◆ High Level Switch (Preset Sensor): 1 foot cable, Narrow Angle, Normally Closed, SJO0W (UL/CSA), 18 AWG, 2-conductor, flexible, and water/oil resistant
- ◆ Enclosure: Thermoplastic. 8 x 6 x 4 (inches), Type 4X, Indoor/Outdoor, Enclosure Screws
- ◆ Certifications: UL 508 (US and Canada)

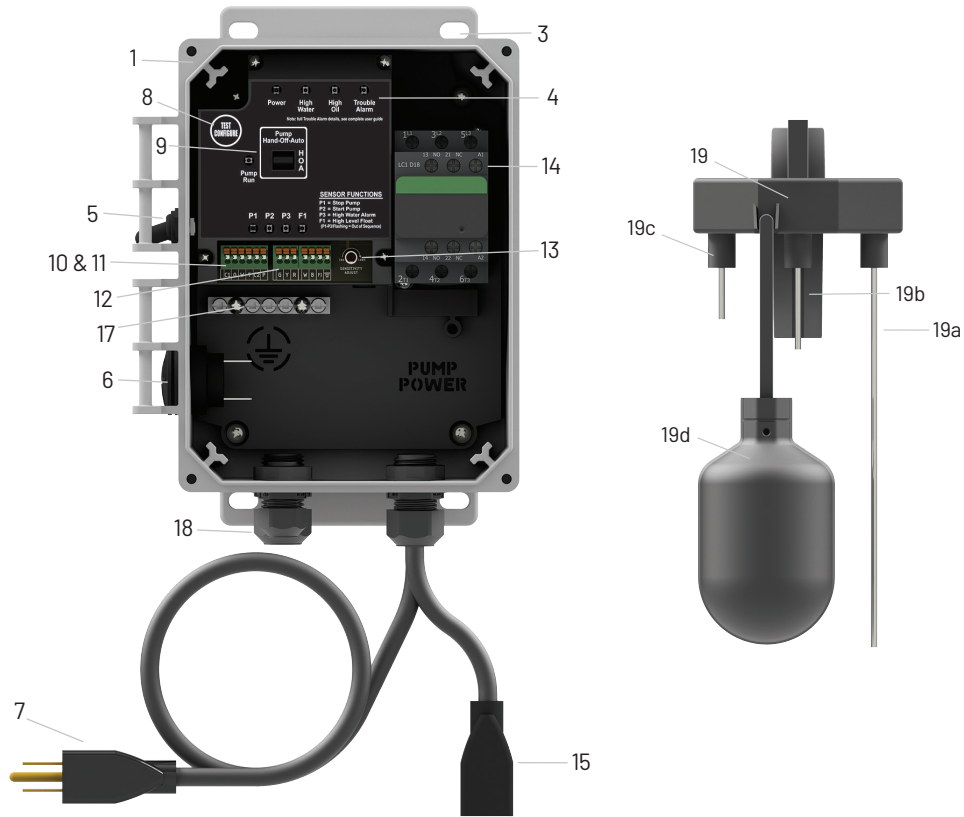
PRESET LEVEL SENSOR:

- ◆ Electrical: 12/24VDC, 500mA
- ◆ Sensor Housing: ABS Plastic
- ◆ Probes: Stainless Steel
- ◆ Pumping Range: Fixed, 6.0 (inches) Primary Power: 120VAC, 50/60 Hz
- ◆ Circuit Board Primary Power: 11.1VDC, 500mA maximum
- ◆ Detection Level: Preset level on discharge pipe in monitoring area
- ◆ Sensor Cable Type: 25-foot cable, SJE00W (UL) / SJT00W (CSA), 18 gauge, 5-conductor, flexible, and water/oil resistant
- ◆ High Level Float Switch Housing: Polypropylene
- ◆ High Level Switch: 1-foot cable, Narrow Angle, Normally Closed, SJO0W (UL/CSA), 18 gauge, 2-conductor, flexible, and water/oil resistant

ALARM PANEL:

- ◆ Primary Power: 120VAC, 50/60 Hz
- ◆ Circuit Board Primary Power: 11.1VDC, 500mA maximum
- ◆ Circuit Board Secondary Power: 9VDC, standard 9VDC battery (battery backup; not included)
- ◆ Watts: 1.4 Watts
- ◆ Field Connection Sensor: 9-10VDC, 200mA minimum (signaling device)
- ◆ Auxiliary Contacts: 24VDC, 500mA maximum (each). Normally Open
- ◆ Auxiliary Alarm Power: 8-10.2VDC, 150mA maximum
- ◆ LEDs: Green (power) and Red (alarm)
- ◆ Buzzer: 85 dB at 10-feet
- ◆ Wall-Mounted Power Supply: 120VAC, 50/60 Hz (input), 11.1VDC, 500mA maximum (output), (6-foot cord)
- ◆ Enclosure: Thermoplastic, 5 x 4 x 1.3 (inches), Type 1, Indoor
- ◆ Certifications: CSA (US and Canada)

SPECIFICATIONS



- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Type 4X Enclosure (indoor/outdoor rated) 2. Clear Cover to view Interior Components (not shown; enclosure includes lockable latch) 3. Mounting Brackets 4. Oil System Circuit Board, Status Indicators 5. Alarm Test/Silence Switch 6. Alarm Buzzer 7. Incoming System Power (pre-wired male plug) 8. Test/Configure Pushbutton 9. Pump Hand-Off-Auto Selector Switch 10. Remote Alarm Panel or BAS Auxiliary Contacts 11. Pump Run Auxiliary Contacts 12. Preset Level Sensor/Function Input Terminals(sensor only, pre-wired at factory; not shown) | <ol style="list-style-type: none"> 13. Sensitivity Adjustment Dial (water sensors) 14. IEC Motor Contactor 15. Pump Power Receptacle (pre-wired female plug) 16. Pump Connection Terminals (pre-wired to female receptacle plug; not shown) 17. Ground Bar (5-position) 18. Pre-Installed Cable Grips (4) 19. Preset Level Sensor <ul style="list-style-type: none"> 19a) Pump Stop, Sensor Level Probe 19b) Pump Start, Sensor Level Probe 19c) High Water Level Probe 19d) Oil Detection, High Liquid Level Switch |
|---|--|

OPERATION

OPERATION

The Oil Detection System single phase simplex control panel is used for the safe operation of pumping, alarming, and monitoring of elevator sump pits, transformer vaults, and leachate well applications. The control panel will activate a pump to remove water from pits in accordance with ASME A17.1, stopping the pump before oil or other harmful substances enter the water supply. Available in 120VAC, 1.0-14.0 Amps, and a Type 4X (indoor/outdoor) enclosure.

The control panel comes with a pre-installed female pump power receptacle, incoming system power cable, preset level sensor, alarm test/silence switch, and alarm buzzer. The incoming and pump power must match system voltage. Refer to included electrical schematic for complete wiring and voltage information.

The control panel is operated by the factory wired preset level sensor module for pump stop, pump start, high water alarm, and oil detection alarm (high level float switch). As the water level rises touching the pump start probe (middle), the pump will start and continue to run until the water level recedes below the pump stop probe (longest) to complete the pump cycle.

The control panel pump run LED will illuminate when the pump is running and pump run auxiliary contacts will activate. Other LED status indicators are included for: power, high water alarm, high oil alarm, trouble alarm, pump stop sensor, pump start sensor, high water alarm sensor, and high level float switch.

The pump stop probe senses air or oil and when the water level is no longer touching this probe, the pump stops running so the oil layer will not be pumped out of the sump. Oil will float on top of water, so if oil is present and touching this probe, the pump will also stop running.

If the water level rises touching the high water probe (shortest), a high water alarm condition occurs, the buzzer annunciates and the pump continues to run (will also act as a redundant pump start/pump run function). If the test/silence switch is toggled upward during an alarm condition, it will silence the buzzer while the red high water alarm LED remains illuminated. The alarm condition automatically resets when water is no longer touching the high water probe.

If oil, hydrocarbon, or other harmful substances are floating on top of the water level touching the high water probe while simultaneously activating the high level float switch, then a high oil alarm (oil detected) condition occurs, the buzzer annunciates and the pump continues to run as long as water and not oil is touching the pump start and pump stop probes. During an alarm condition the control panel LED(s) will illuminate, buzzer annunciates, and the auxiliary contacts send a signal to activate an optional Oil Detection System remote alarm panel or BAS system.

If the test/silence switch is toggled upward during an alarm condition, it will silence the buzzer while the red alarm LED(s) remain illuminated. The alarm auxiliary contacts of the control panel can be connected to an optional Oil Detection System remote alarm, building automation system (BAS) or SCADA system, and phone dialers for remote notification of alarm conditions.

The Oil Detection System control panel includes the following configurable features listed below. Refer to the setting the device configurations section of this manual for more information on how to change these settings.

LEVEL SENSOR ERROR DETECTION

- ◆ Factory Default: Enabled (P1 LED is ON).
- ◆ Description: A trouble alarm condition occurs if the probes on the preset level sensor are activated out of sequence (i.e., the start probe activates before the stop probe). This can be used to indicate faulty sensor wiring or that the sensor needs to be replaced.
- ◆ If Disabled: Level sensor errors will not be detected (P1 LED is OFF).

AUTOMATIC ALARM RESET

- ◆ Factory Default: Enabled (P2 LED is ON). Description: Alarm conditions, including high water, optional low water, high oil, and level sensor errors will automatically reset when the alarm condition is cleared.
- ◆ If Disabled: Even if the alarm condition is cleared, the test/configure pushbutton must be pressed and held for 5-seconds minimum to manually reset the alarm (P2 LED is OFF).

FUNCTION INPUT (FI)

- ◆ Factory Default: Fire Input (P3 LED is OFF).
- ◆ Description: When the building automation system (BAS) dry contact is closed between FI and Ground input terminals, the control panel will allow the pump to run on any of the following level sensor inputs: start probe, high water probe, and high level float switch (oil detection). The pump runs, even during a high oil alarm condition.
- ◆ Field Configured: Low Level/Redundant Off Enabled (P3 LED is ON).
- ◆ Description: Connect a normally open float switch to the FI and Ground input terminals, mount the float switch below the stop probe in the sump basin. During a system normal condition, when enough water is in the tank to tilt up the float switch (activated), normal pump operation will occur. If the float switch lowers and is tilted down (deactivated), it will activate the trouble alarm and stop the pump from running.

OPERATION

PUMP EXERCISER

- ◆ Factory Default: Disabled (F1 LED is OFF).
- ◆ Description: The pump will not be exercised if idle for extended periods of time.
- ◆ Field Configured: Exercise Pump, Enabled (F1 LED is ON).
- ◆ Description: The control panel will run the pump for a three-second interval if it has been idle for more than one week.

APPLICATION EXAMPLE: PRESET LEVEL SENSOR

This example (Fig. 1) shows the basic the functions of the preset level sensor module that is installed in the monitoring area.

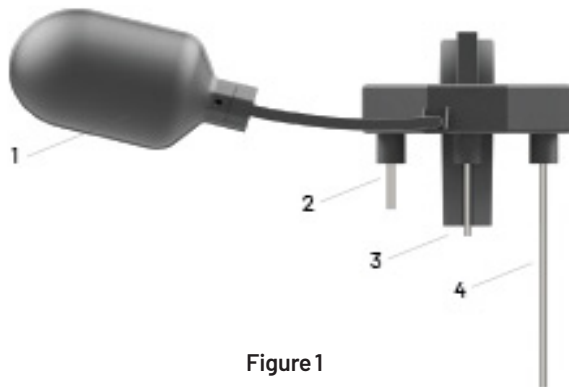


Figure 1

1. Oil Detection - High Level Float: If oil, hydrocarbon, or other harmful substances are floating on top of the water level touching the high water probe while simultaneously activating the high level float switch, then a high oil alarm (oil detected) condition occurs and the pump continues to run as long as water and not oil is touching the pump start and pump stop probes. The high oil and F1 LEDs will illuminate when activated.
2. High Water - Sensor Level Probe: If the water level rises touching the high water probe, a high water alarm condition occurs and the pump continues to run. The alarm condition automatically resets when water is no longer touching the high water probe. The high water and P3 LEDs will illuminate when activated.
3. Pump Start - Sensor Level Probe: As the water level rises touching the pump start probe, the pump will start and continue to run until the water level recedes below the pump stop probe to complete the pump cycle. The pump run and P2 LEDs will illuminate when activated.
4. Pump Stop - Sensor Level Probe: When the water level is no longer touching this probe, the pump will stop running so the oil layer will not be pumped out of the sump. Oil will float on top of water, so if oil is present and touching this probe, the pump will also stop running. The P1 LED will illuminate when activated.

APPLICATION EXAMPLE: OIL DETECTION SYSTEM

This Oil Detection System example (Fig. 2) shows a typical setup for a single phase simplex control panel system and the components included.

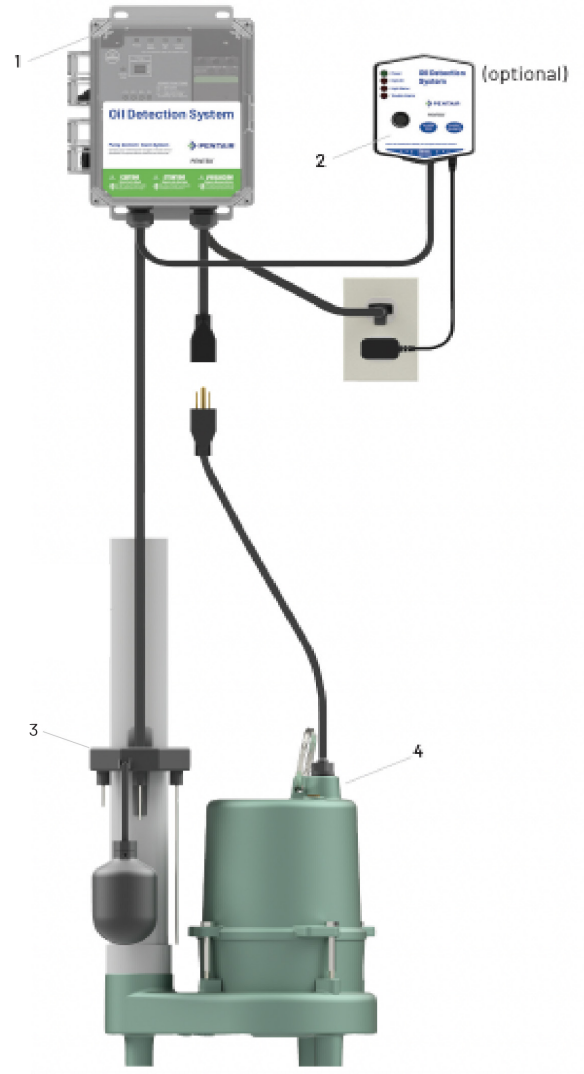


Figure 2

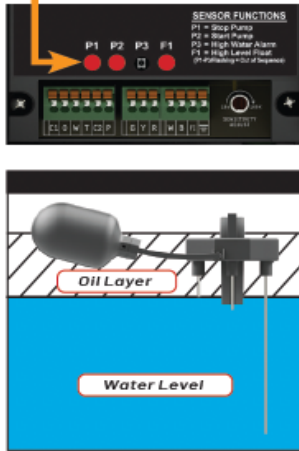
1. Control Panel with Local Alarm
2. Optional Remote Alarm Panel (mounted up to 2,500 feet)
3. Preset Level Sensor
4. Pump (Simplex; one pump)

OPERATION

HIGH OIL ALARM CONDITION (OIL DETECTION) | SUMP LEVEL

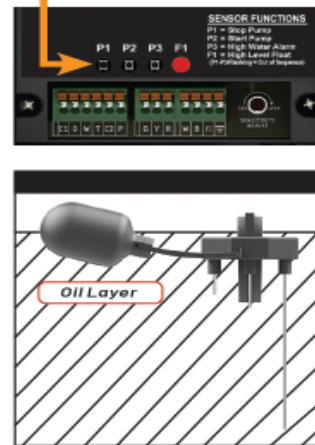
To determine the oil layer thickness in the sump/monitoring area during a high oil alarm condition, review the sensor LED status indicators for an approximate oil level in the sump.

(P1, P2, and F1; solid/illuminated)



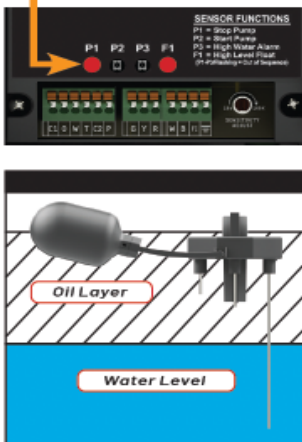
If the P1, P2, and F1 LED status indicators of the preset level sensor are illuminated (solid), then the oil layer will be submerging the high water probe.

(F1 only; solid/illuminated)



If only the F1 LED status indicator of the preset level sensor is illuminated (solid), then the oil layer will be submerging the high water, pump start, and pump stop probes.

(P1 and F1; solid/illuminated)



If the P1 and F1 LED status indicators of the preset level sensor are illuminated (solid), then the oil layer will be submerging the high water and pump start probes.

INSTALLATION

INSTALLATION

OIL DETECTION SYSTEM CONTROL PANEL

1. This model comes with four pre-installed cable grips (Fig. 3) and pre-wired: preset level sensor, pump power receptacle (female plug), and incoming system power cable (male plug).
2. The wiring for the optional remote alarm panel or BAS system should be routed through cable grip 3A (no factory wiring; remove plug).
3. Make sure all conduits/cable grips are sealed and waterproof per local codes.
4. If the control panel is to be installed with conduit, the pre-installed cable grips must first be removed. Make note of the pre-wired factory connections before removing cable grips or wiring and these wires MUST be re-wired to the same inputs for the system to function properly. Refer to the included electrical schematic for complete wiring and voltage information.

⚠ WARNING If the preset level sensor and power wires are run in the same conduit/cable grip or junction box, follow the NEC requirements pertaining to separation of voltages.

5. It is recommended to separate the pump power receptacle cable and preset level sensor cable by at least 2-inches, whether the cables are in the tank or when they are above ground in separate conduits/cable grips or junction box.
6. Determine the mounting location for the Oil Detection System control panel and mount at the desired location within 5-feet of the electrical receptacle. The enclosure size is 8x6x4 (inches).
7. The control panel should be mounted within 25-feet of the preset level sensor module which is mounted in the sump/monitoring area. Splicing may be required for some installations.
8. If sensor cable splicing is required, use liquid tight junction boxes, conduit, and connectors per NEC/local codes. It is recommended to use standard THHN wire, 600VAC, 18 AWG minimum. For applications where splicing longer than 300 feet is required, consult factory.
9. Hold the control panel up to the desired mounting location and mark the drill hole locations (Fig. 3). Once marked, drill pilot holes for screws (not included) and use wall mount anchors (not included) if necessary. Recommended to use four mounting screws.
10. Place the control panel in the mounting location, adjust until the pilot holes are lined up with the enclosure mounting brackets and fasten screws to secure in place.

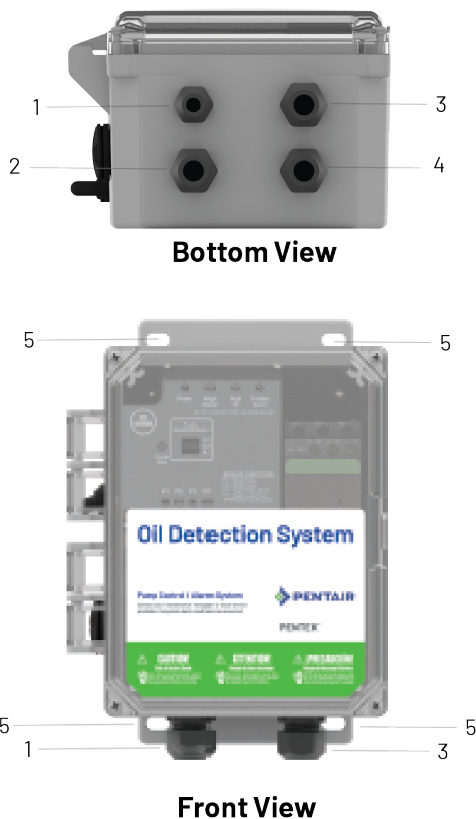


Figure 3

INSTALLATION

PRESET LEVEL SENSOR

1. Determine the mounting location and attach the preset level sensor to the discharge pipe (Fig. 4) or a separate pipe mounted to a side wall (not shown) using the provided stainless steel pipe clamp and sensor holder/stabilizer. Make sure the preset level sensor is clear of inlet water.

CAUTION To maintain system integrity, it is recommended to separate the pump power cable and preset level sensor cable by at least 2 inches whether the cables are in the tank or when they are above ground in separate conduits/cable grips or junction box. Conductive material could affect the performance of the sensor.

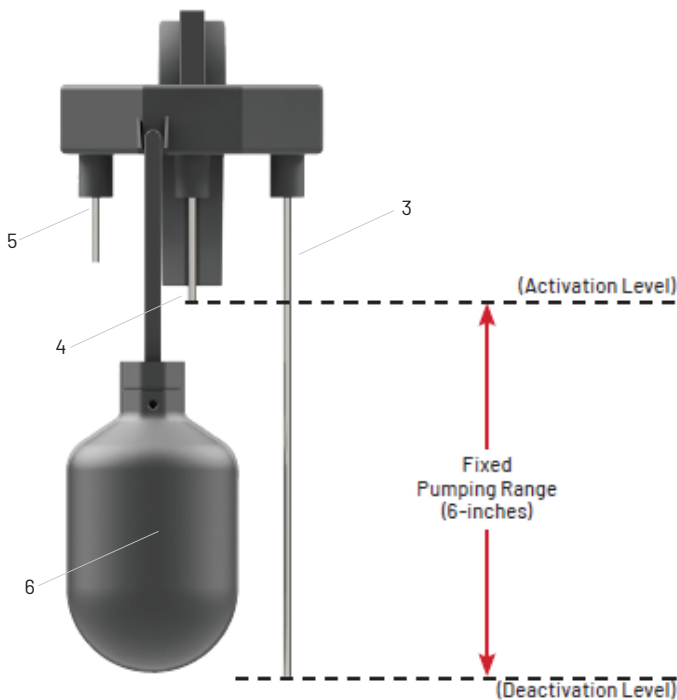
2. The preset level sensor “stop level” (Fig. 4) should be mounted at the same height as the top of the pump or slightly below to ensure the pump intake is completely submerged. Securely fasten the preset level sensor using the pipe clamp to maintain system integrity.
3. The preset level sensor comes pre-installed from the factory. If replacing, route the 5-conductor sensor cable through the Oil Detection System control panel sealed conduit/cable grip or junction box and connect the wires to the circuit board terminals. Refer to the wiring section for information on the control panel sensor connections.

If the preset level sensor is disconnected from the control panel and power is applied to the system, the high oil alarm LED and high level float activated sensor LED will illuminate, plus the alarm buzzer will annunciate as these inputs re normally closed contacts. Once the preset level sensor is re-wired, these LEDs and alarm buzzer will deactivate and the system will return to a normal state.

4. If sensor cable splicing is required, use liquid tight junction boxes, conduit, and connectors per NEC/local codes. It is recommended to use standard THHN wire, 600VAC, 18 AWG minimum. For applications where splicing longer than 300 feet is required, consult factory.

PUMPING RANGE

When the water level is no longer touching the pump stop probe (Fig.4, Item 3; longest), the pump stops running. When the water level rises touching the pump start probe (Fig.4, Item 4; middle), the pump turns on and remains on until the water level recedes below the pump stop probe. This is the pumping range (6-inches).



1. Discharge Pipe
2. Stop Level
3. Pump Stop/Sensor Level Probe (preset)
4. Pump Start/Sensor Level Probe (preset)
5. High Water/Sensor Level Probe (preset)
6. Oil Detection/High Level Float (narrow angle float switch)

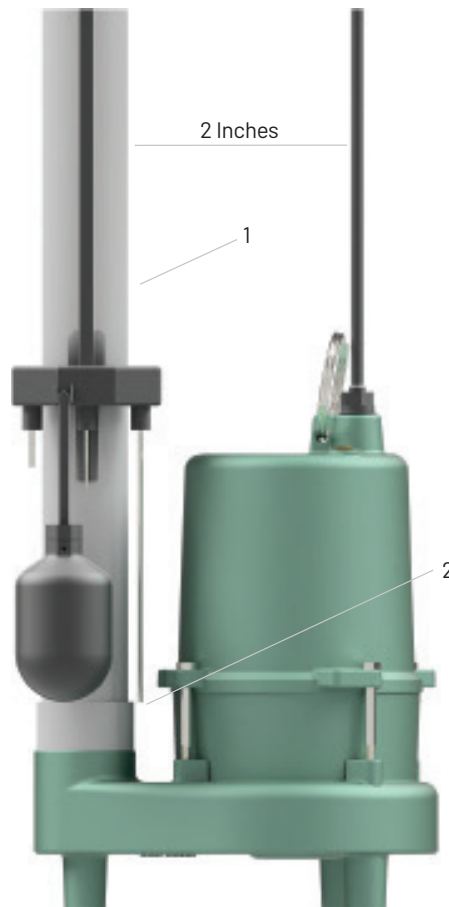


Figure 4

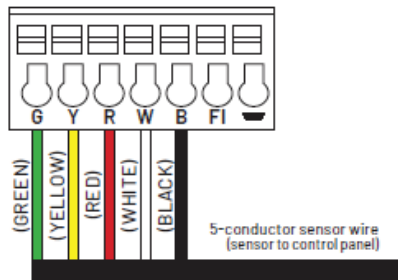
INSTALLATION

SYSTEM WIRING

PRESET LEVEL SENSOR

The preset level sensor comes pre-installed from the factory. If replacing, route the 5-conductor sensor cable from the mounting location in the sump through the low voltage conduit/cable grip into the Oil Detection System control panel and connect the wires to the terminals listed below and shown in the diagram below.

⚠ WARNING The sensor contacts are low voltage wires. Follow the NEC requirements pertaining to separation of voltages if run in the same conduit/cable grip or junction box with high voltage wires.

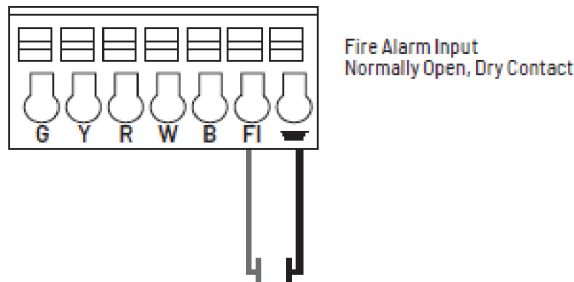


- ◆ GREEN = TB-G (Stop Probe)
- ◆ YELLOW = TB-Y (Start Probe)
- ◆ RED = TB-R (High Water Alarm Probe)
- ◆ WHITE = TB-W (Float Switch Wire 1, Oil Detection)
- ◆ BLACK = TB-B (Float Switch Wire 2, Oil Detection)

FUNCTION INPUT (FI)

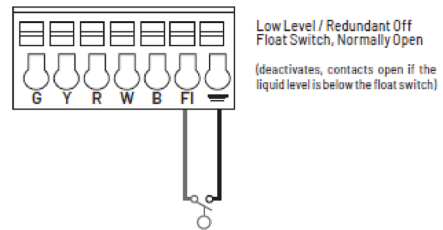
The function input (FI) of the Oil Detection System control panel can be used as a fire alarm input or with a low level alarm/redundant off float switch.

Fire Alarm Input: If connecting to an existing alarm security system or building automation system (BAS), use 18 gauge 2-conductor wire to connect the existing product to the FI input and ground terminal on the Oil Detection System control panel as listed below and shown in the diagram. When connected and activated (contacts close), the system will run the pump on ANY liquid detection during a fire alarm condition, whether oil or water, to empty the sump.



- ◆ Fire Alarm Input Wire 1 = Control Panel TB-FI (function input)
- ◆ Fire Alarm Input Wire 2 = Control Panel TB-Ground (⚡)

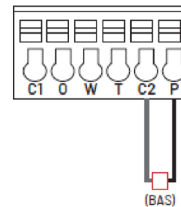
Low Level / Redundant Off Alarm: If installing a normally open float switch, connect one wire to the FI input and the other wire to the ground terminal on the Oil Detection System control panel as listed below and shown in the diagram. When connected, if the liquid level recedes and the float switch deactivates (contacts open), the system will stop the pump and activate a low level alarm condition.



- ◆ Float Switch Wire 1 = Control Panel TB-FI (function input)
- ◆ Float Switch Wire 2 = Control Panel TB-Ground (⚡)

PUMP RUN AUXILIARY CONTACTS

When the Oil Detection System preset level sensor activates the pump to start and the pump is running, the control panel's pump run LED will illuminate and the pump run auxiliary contacts will activate. If desired, connect the pump run auxiliary contacts to an existing alarm security system or building automation system (BAS). Use 18 gauge, 2-conductor wire. See wiring information listed below and shown in the diagram.



- ◆ Control Panel TB-C2 = Pump Run Auxiliary Output
- ◆ Control Panel TB-P = Pump Run Auxiliary Output

INSTALLATION

3-ZONE REMOTE ALARM (OPTIONAL)

- To install/replace the battery for the backup power feature, remove the enclosure cover and install a 9VDC battery (not included) by pressing down into the positive (+) and negative (-) terminal connections.

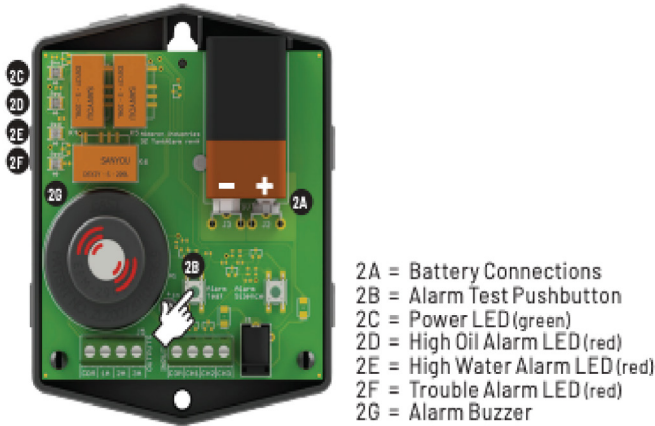


Figure 5

- After installing battery, perform a quick test, press and hold the alarm test pushbutton to activate the alarm and make sure the battery is working properly. The alarm LEDs should illuminate (solid), buzzer should annunciate (solid), and auxiliary contacts should activate. Leave the enclosure cover off until step 3 and step 4 are completed for the auxiliary contact and signaling device wiring.

NOTE: When on battery backup, the green power LED will not illuminate to conserve battery power.

⚠ WARNING DO NOT connect AC power from a standard wall outlet or receptacle to the alarm panel until all steps of the installation are complete and the system is ready for testing.

- Determine the mounting location for the alarm panel and leave the enclosure cover off. Make sure power outlet (120VAC, 50/60 Hz) is within 5-feet of the alarm panel.

The power outlet should be on a separate circuit breaker from any other device and not on a switched receptacle to maintain system integrity. Mount the alarm panel using two (2) #6 self-tapping screws (not included). Use two (2) #8 plastic anchors (not included) if mounting the alarm panel to sheetrock.

- If connecting to an existing alarm security system or building automation system (BAS), use 18 gauge 2-conductor wire to connect the existing product to the OUTPUTS terminal block on the Oil Detection System alarm panel (Fig. 6). See below for wiring information. The auxiliary contacts of the alarm panel are activated when the Oil Detection System control panel's circuit board auxiliary contacts are "closed" during an

alarm condition. When connected, run the wire(s) towards the bottom/center of the alarm panel to go through the wiring access hole once the enclosure cover is replaced.

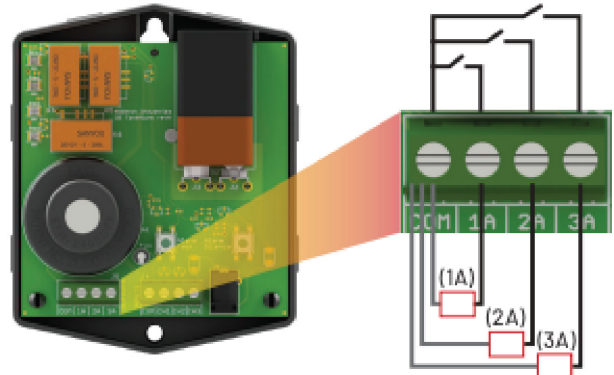


Figure 6

- Connect the Oil Detection System control panel auxiliary contacts (signaling device) to the INPUTS terminal block on the Oil Detection System alarm panel (Fig. 7), use 18 gauge 4-conductor wire. See below for wiring information. The alarm is activated when the auxiliary contacts of the control panel's circuit board are activated indicating an alarm condition has occurred.

When connected, run the wire(s) towards the bottom/center of the alarm panel to go through the wiring access hole once the enclosure cover is replaced. When installing a sensor or connecting to another device, always refer to its installation instructions for complete operating information.

⚠ CAUTION Route all wires away from sharp objects and internal components when installing wires

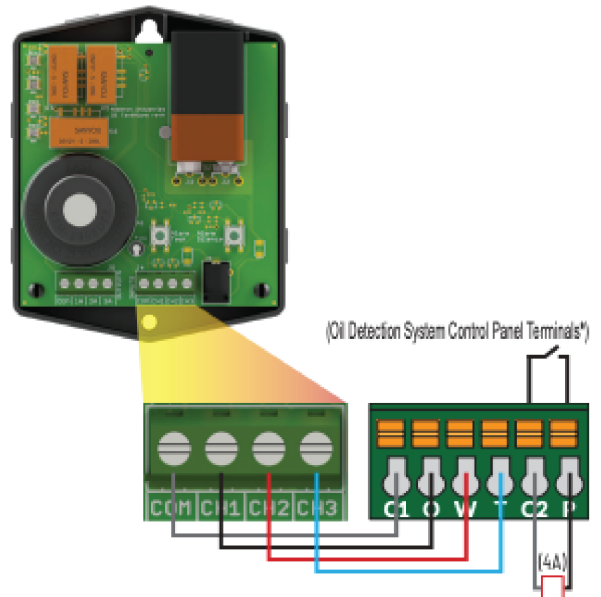


Figure 7

INSTALLATION

- After the wiring is completed and before replacing the enclosure cover, run the wire(s) towards the bottom/center of the alarm panel to go through the wiring access hole once the enclosure cover is replaced. To replace the cover, align the cover with the base and firmly press together as shown in the diagrams (Fig. 8).

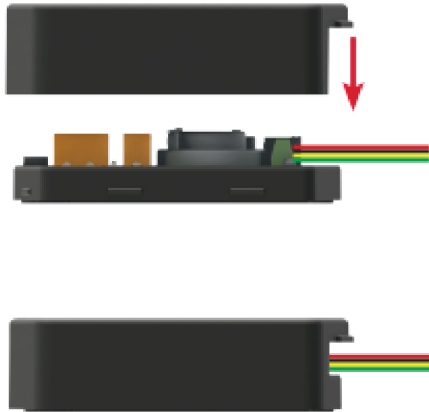


Figure 8

- Plug the alarm panel power supply into a standard wall outlet or receptacle (120VAC, 50/60 Hz), and then plug the quick connect of the power supply cord into the incoming power receptacle of the alarm panel. The green power LED should illuminate (solid) when powered (Fig. 9).

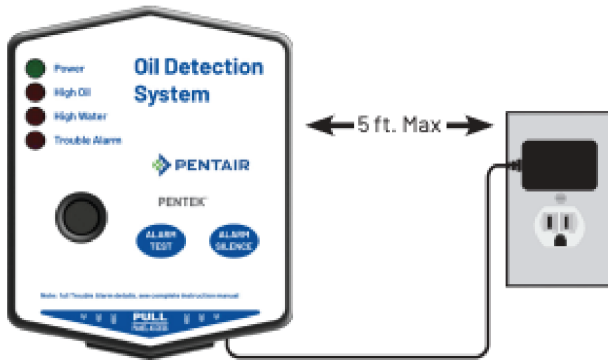


Figure 9

AUXILIARY CONTACTS (OUTPUTS):

Terminals COM and 1A: Zone-1 (High Oil). Connects to external monitoring device

Terminals COM and 2A: Zone-2 (High Water). Connects to external monitoring device

Terminals COM and 3A: Zone-3 (Trouble Alarm). Connects to external monitoring device.

Terminal 3A will monitor power loss, pump overload, input sequence error (if enabled), fire mode indication (if enabled), and redundant off alarm (if enabled) depending on the model of control panel connected to the alarm panel. For remote monitoring of pump run status, connect an external monitoring device to the Oil Detection System control panel terminals C2 and P (Fig. 8; i.e., 4A).

Normally Open Dry Contacts: Normally open dry contacts can switch 24VDC, 500mA maximum (each). The auxiliary dry contacts of the Oil Detection System alarm panel are normally open ONLY, recommended to use 18 gauge 2-conductor wire. Used for remote monitoring.

SIGNALING DEVICE (INPUTS):

Terminal COM : Connects to Oil Detection System Control Panel, TB-C1 (common) Terminal CH1 Connects to Oil Detection System Control Panel, TB-O (oil alarm)

Terminal CH2: Connects to Oil Detection System Control Panel, TB-W (water alarm)

Terminal CH3: Connects to Oil Detection System Control Panel, TB-T (trouble alarm)

Normally Open or Normally Closed: 9-10VDC, 200mA minimum

OIL DETECTION SYSTEM CONTROL PANEL TERMINALS, PUMP RUN AUXILIARY CONTACTS:

Terminals C2 and P: Connect the Oil Detection System control panel pump run auxiliary contacts, terminals C2 and P, to an external monitoring device (Fig. 8; i.e., 4A).

INSTALLATION

PUMP POWER RECEPTACLE

The pump power receptacle (female plug) comes pre-installed from the factory for a quick and easy installation of the Oil Detection System control panel.

After all the steps of the installation process have been completed, connect the pump power cable into the pre-installed pump power receptacle of the Oil Detection System control panel.

NOTE: The pump power must match the voltage of the Oil Detection System control panel. Refer to the included electrical schematic for complete wiring and voltage information.



Figure 10

INCOMING SYSTEM POWER

The 6-foot incoming system power cable (male plug) comes pre-installed from the factory for a quick and easy installation of the Oil Detection System control panel.

After all the steps of the installation process have been completed, connect the incoming system power cable (14A) into a power outlet or receptacle. The control panel should be mounted within 5-feet of the power outlet or receptacle. See installation of the control panel for complete installation information.

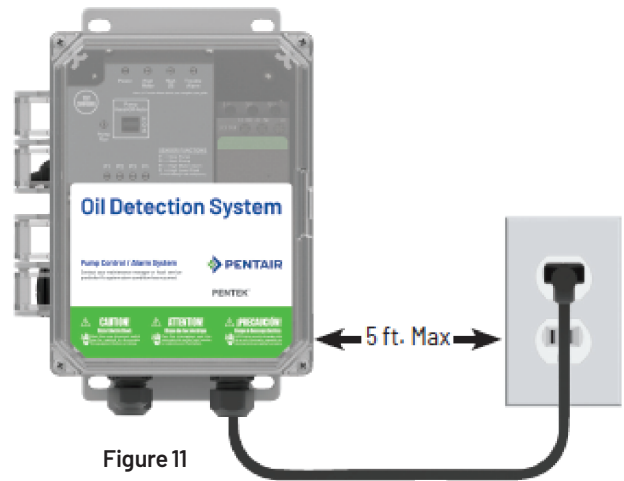


Figure 11

NOTE: The power outlet or receptacle must match the voltage of the Oil Detection System control panel. Refer to the included electrical schematic for complete wiring and voltage information.

POWER CONNECTIONS

Make sure the installation process is completed and there are no cables or wires to interfere with the operation of the system.

After the pump power cable is connected to the Oil Detection System control panel's pump power receptacle and the Oil Detection System control panel's incoming system power cable is plugged into a power outlet or receptacle, the system is ready for device configurations and testing.

When power is applied, the green power LED should illuminate on the control panel and the pump should be off if the system was installed properly.

Device Configurations: Settings include: level sensor error detection, automatic alarm reset, fire alarm, low level/redundant off alarm, pump exerciser, pump hand-off-auto selector switch, water sensor sensitivity, and clearing alarms. See Configuration sections for further details.

Testing: Refer to the Testing section for testing the Oil Detection System.

Power Mode if Preset Level Sensor is Disconnected: If the preset level sensor is disconnected from the control panel and power is applied to the system, the high oil alarm LED and high level float activated sensor LED (F1) will illuminate, plus the alarm buzzer will annunciate as these inputs are normally closed contacts. Once the preset level sensor is re-wired, these LEDs and alarm buzzer will deactivate and the system will return to a normal state.

SETTINGS

SETTINGS

DEVICE CONFIGURATIONS

This section provides information for viewing and changing the system for multiple device configurations including: level sensor error detection, automatic alarm reset, function input (FI), and pump exerciser. See Operations section for configuration descriptions.

1. Press and hold the test/configure pushbutton. The test pattern will begin immediately.
2. Holding the pushbutton down for at least 5 seconds will display all activated (enabled) settings.
3. If the pushbutton continues to be pressed for another 5 seconds, the system will toggle between P1 and F1 LEDs to enable or disable the current state of each setting. See below for more information.

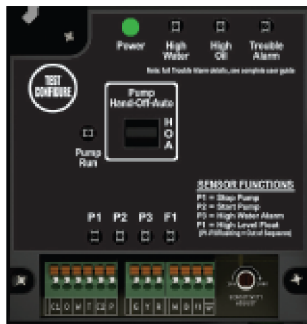


Figure 12

LED Test Pattern: Press and hold the test/configure pushbutton (Fig. 12) on the Oil Detection System control panel, the system will immediately begin a test pattern of the LEDs (all except pump run).

4. LEDs will illuminate in a solid and slow blinking pattern:
 - ◆ High Water, High Oil, and Trouble Alarm (solid)
 - ◆ P1, P2, P3, and F1 (slow blink).
5. Alarm buzzer will annunciate.

View Settings: Press and hold the test/configure push button on the Oil Detection System control panel for at least 5-seconds to view the current settings of the system.

1. High Water, High Oil, and Trouble Alarm LEDs deactivate.
2. Alarm buzzer will deactivate.
3. P1-F1 LEDs will indicate the current system settings:
 - ◆ LED on (solid), indicates setting is enabled (activated)
 - ◆ LED off, indicates setting is disabled (deactivated)
4. P1 = Level Sensor Error Detection
5. P2 = Automatic Alarm Reset
6. P3 = Function Input (FI; Fire Alarm / Redundant Off Input)
7. F1 = Pump Exerciser

Toggle Settings: Press and hold the test/configure pushbutton on the Oil Detection System control panel for at least 10-seconds to toggle (change) the current settings of the system.

8. High Water, High Oil, and Trouble Alarm LEDs deactivate.
9. Alarm buzzer will deactivate.
10. P1-F1 LEDs will pulse in a fast blinking pattern then begin to move left to right from P1 to F1 LEDs.
11. Release the test/configure pushbutton while the fast blinking LED pattern is on the desired setting to toggle (change).
12. After the test/configure pushbutton has been released, a medium blinking pattern will confirm which setting was toggled (changed), after which the system will display the new system settings (solid) followed by a burst of fast blinking patterns on all of the LED indicators before the system returns to normal operation.

Exit without Saving: To exit without saving any selections during the toggle settings process, continue to press and hold the test/configure pushbutton until the fast blinking LED pattern moves past the F1 indicator and the system returns to the test blink pattern with the alarm buzzer annunciating. The pushbutton can then be released without saving any settings.

The Oil Detection System default factory configurations are listed below:

- ◆ Level Sensor Error Detection: Enabled (P1 LED is ON)
- ◆ Automatic Alarm Reset: Enabled (P2 LED is ON)
- ◆ Function Input (FI): Fire Input (P3 LED is OFF)
- ◆ Pump Exerciser: Disabled (F1 LED is OFF).

WATER SENSOR SENSITIVITY ADJUSTMENT

The Oil Detection System water sensors can be configured to activate (trip) at equivalent resistance values of 10k-Ohms (least sensitive) to 100k-Ohms (most sensitive).

1. Recommended Value: Set the sensitivity adjust potentiometer to 50k-Ohms during installation and only adjust if needed.
2. Less Sensitive: Use a slotted screwdriver or similar tool and rotate the sensitivity adjust potentiometer counter clockwise.
3. More Sensitive: Use a slotted screwdriver or similar tool and rotate the sensitivity adjust potentiometer clockwise.

PUMP HAND-OFF-AUTO (HOA) SELECTOR SWITCH

The pump hand-off-auto (HOA) selector switch is used to control the desired operation mode of the pump. The pump run LED illuminates when the pump is running. See below for more information on the three operating positions, the normal operating position is Auto Mode.

TESTING

- ◆ Hand Mode (H): the pump will start and continue to run until the switch is toggled to the off position regardless of sensor status.
- ◆ Off Mode (O): the pump will remain off until the switch is toggled to either the hand or auto positions regardless of sensor status.
- ◆ Auto Mode (A): the pump will operate based only on the status of the system sensors, turning the pump on and off.

CLEARING ALARMS

If the automatic alarm reset is disabled in the system settings, a user input action is required to clear the alarm conditions.

To clear an alarm, press and hold the test/configure pushbutton for at least 5-seconds. This clears the alarm and the system rechecks its inputs for any active alarm conditions. If the alarm condition is still present, the alarm reactivates.

ALARM TEST / SILENCE AND BUZZER

The alarm test/silence switch of the Oil Detection System control panel is used to either test the alarm system or silence the buzzer during an alarm condition.

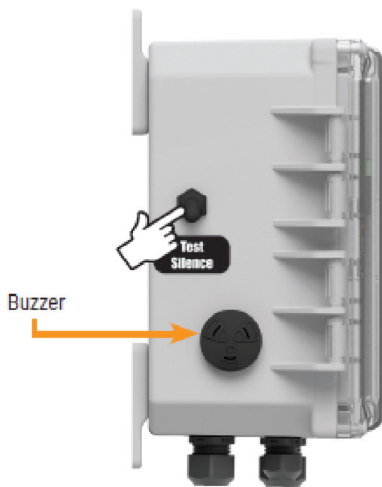


Figure 13

1. Flip upward and hold the test/silence switch (Fig. 13) on the exterior left side of the control panel enclosure.
2. The alarm buzzer and LED test pattern (all except pump run) begin immediately. LEDs illuminate in a solid and slow blinking pattern and include:
 - ◆ High Water, High Oil, and Trouble Alarm (solid)
 - ◆ P1, P2, P3, and F1 (slow blink)
3. The alarm buzzer and LED test pattern continue until the test/silence switch is released.

NOTE: The test/silence switch on the exterior of the control panel used for the alarm system test will not affect the system settings as described in previous sections.

ALARM SILENCE

1. Activate the high level float switch on the preset level sensor. When raised, the high oil alarm (oil detected) LED and the high level float (F1) LED should illuminate, the alarm buzzer should announce, the high oil alarm auxiliary contacts on the control panel should activate, and optional remote alarm panel or BAS system contacts should activate.
2. Flip the test/silence switch upward (Fig. 13) on the exterior left side of the control panel enclosure, the alarm buzzer should silence while the alarm LED remains illuminated.
3. When lowered, the high oil alarm (oil detected) alarm condition should deactivate, the alarm and activated sensor LEDs should turn off, high oil alarm auxiliary contacts should deactivate, and the system should reset for the next alarm cycle (system normal).

The optional remote alarm panel or BAS system should also reset for the next alarm cycle after the alarm condition is deactivated on the control panel.

NOTE: The Oil Detection System control panel includes alarm LED indicators that will illuminate during various alarm conditions along with the alarm buzzer annunciating. The alarm silence function can be used to silence the buzzer during alarm conditions such as: high oil, high water, level sensor error detection (if enabled), fire alarm mode (if enabled), and low level alarm/redundant off (if enabled).

TESTING

OIL DETECTION SYSTEM CONTROL PANEL WITH SENSOR

1. Make sure all the steps of the installation and wiring for the pump, control panel, preset level sensor module, and optional remote alarm panel or BAS system are completed prior to testing. The incoming voltage and all power receptacles used must match the Oil Detection System voltage. These instructions are written based on the factory default system settings, the system may operate differently if any of these settings have been changed (refer to previous sections for system device settings).
2. Verify the pump hand-off-auto (HOA) selector switch is in the OFF position and the incoming power is connected, the green power LED should illuminate and the pump should be off. Toggle the HOA switch to the HAND position and the pump should start, pump run LED should illuminate, and pump run auxiliary contacts should activate. The pump will continue to run until the HOA switch is toggled to the OFF position.

TESTING

3. With the HOA switch in the AUTO position and the probes on the preset level sensor out of the water, test a high oil alarm condition by raising (activate) and lowering (deactivate) the high level float switch to verify:
 - ◆ When raised, the high oil alarm (oil detected) LED should illuminate, the high level float (F1) LED should illuminate, alarm buzzer should annunciate, the high oil alarm auxiliary contacts on the control panel should activate, and optional remote alarm panel or BAS system contacts should activate. While the alarm is activated, flip the test/silence switch upward to silence the buzzer, the alarm LED should remain illuminated.
 - ◆ When lowered, the high oil alarm (oil detected) alarm condition should deactivate, the alarm and activated sensor LEDs should turn off, alarm buzzer should turn off (if not silenced in the previous step), high oil alarm auxiliary contacts should deactivate, and the system should reset for the next alarm cycle (system normal). The optional remote alarm panel or BAS system should also reset for the next alarm cycle after the alarm condition is deactivated on the control panel.
4. With the HOA switch in the AUTO position and the probes on the preset level sensor out of the water, test a pump cycle by slowly filling the tank with water to verify:
 - ◆ When the water level rises and submerges the pump stop probe (longest), the stop pump (P1) LED should illuminate and the pump should not start.
 - ◆ When the water level continues to rise touching the pump start probe (middle), the pump should start, pump run LED should illuminate, start pump (P2) LED should illuminate, pump run auxiliary contacts should activate, and the pump should continue to run until the water level recedes below the pump stop probe (longest). The remote alarm panel should not activate when the pump is running under normal operating conditions. After the pump turns off, the control panel pump run and activated sensor LEDs should turn off.

Check the discharge plumbing for leaks and make sure the discharge is going to the correct output area.
5. With the HOA switch in the AUTO position and the probes on the preset level sensor out of the water, test a high water alarm condition by steadily filling the tank with water to verify:
 - ◆ When the water level rises and submerges the pump stop probe (longest), the stop pump (P1) LED should illuminate and the pump should not start.
 - ◆ When the water level continues to rise touching the pump start probe (middle), the pump should start, pump run LED should illuminate, start pump (P2) LED should illuminate, pump run auxiliary contacts should activate, and the pump should continue to run.
 - ◆ When the pump is running and cannot keep up with demand as the water level continues to rise touching the high water probe (shortest), the high water alarm LED should illuminate, high water alarm (P3) LED should illuminate, alarm buzzer should annunciate, high water auxiliary contacts should activate, and optional remote alarm panel or BAS system contacts should activate. While the alarm is activated, flip the test/silence switch upward to silence the buzzer, the alarm LED should remain illuminated. The high water alarm condition will clear once the water level recedes below the high water probe. The pump should continue to run until the water level recedes below the pump stop probe (longest). After the pump turns off, the control panel pump run and activated sensor LEDs should turn off.
6. With the HOA switch in the OFF position and the probes on the preset level sensor out of the water, test the optional remote alarm panel for a power loss event.

Unplug the incoming system power cable from the control panel receptacle and the remote alarm panel should activate a trouble alarm (power loss) condition with activated auxiliary contacts. The alarm condition on the alarm panel will clear when power is restored to the control panel and the system should return to a "normal" condition.

OIL DETECTION SYSTEM CONTROL WITH SENSOR - BUCKET TEST

When an Oil Detection System full installation test 4 is not possible, perform a quick test of the control panel operation to simulate a pump cycle and high water alarm condition using a 5 gallon pail filled with water. Verify the incoming voltages match the system and all steps of the wiring and installation are completed before applying power for the quick test.

To perform this test, you **MUST** place a ground rod/wire into the pail and connect the ground wire to an open ground terminal on the control panel or the pump will not activate (start).

1. Before lowering the preset level sensor into the water (Fig. 14), test high oil alarm condition by raising (1A, activate) and lowering (1B, deactivate) the high level float switch to verify:
 - ◆ When raised, the high oil alarm (oil detected) condition and auxiliary contacts should activate on the control panel.
 - ◆ When lowered, the high oil alarm (oil detected) condition and auxiliary contacts should deactivate on the control panel. The alarm condition should automatically reset when the float is deactivated.

TESTING

- With the Off/Auto switch in the AUTO position, test a pump cycle by slowly immersing the preset level sensor into the water (Fig. 14) to verify:
 - When the pump stop probe (1C, longest) is immersed in water, the pump should not start.
 - Continue lowering until the pump start probe (1D, middle) is immersed in water, the pump should start and continue to run until the pump stop probe is raised out of the water.
- With the Off/Auto switch in the AUTO position, test a high water alarm condition by slowly immersing the preset level sensor into the water (Fig. 14) to verify:
 - When the pump stop probe (1C, longest), pump start probe (1D, middle), and high water probe (1E, shortest) are immersed in water. The high water alarm condition and auxiliary contacts should activate on the control panel.
 - The alarm condition should automatically reset once the high water probe (1E, shortest) is removed from the water.

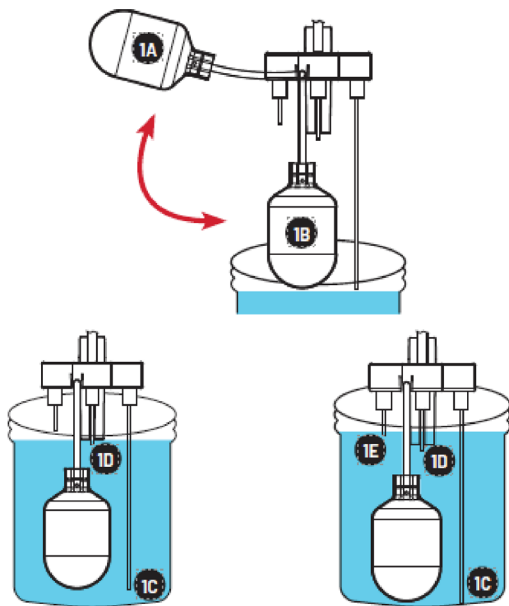


Figure 14

DIAGNOSTIC SYSTEM TEST

The Oil Detection System control panel features a test/configure pushbutton for running a system alarm test and for changing system configurations.

These special testing instructions are written based on the factory default system settings, the system may operate differently if any of these settings have been changed (refer to previous sections for system device settings).

The preset level sensor wiring errors are automatically detected in the application by factory default settings. Holding the test/configure pushbutton (Fig. 12) for longer than 5-seconds will begin the device configurations routine.

Test Mode:

- Press and hold the test/configure pushbutton (Fig. 12) in the Oil Detection System control panel for less than 5-seconds.
- The system will immediately begin a test pattern of the LEDs (all except pump run) while the alarm buzzer annunciates and the alarm auxiliary contacts close. This test will check all alarm circuitry and connections to ensure local building automation systems or remote alarms are functioning properly.
 - LEDs will illuminate in a solid and slow blinking pattern: i. High Water, High Oil, and Trouble Alarm (solid) and P1, P2, P3, and F1 (slow blink).
 - Alarm buzzer annunciates.
 - Remote alarm panel auxiliary contacts activate s (if used).
- Test pump run auxiliary contacts by placing the pump hand-off-auto (HOA) selector switch in the HAND position. This activates the pump run auxiliary contacts (if used).
- Turn the HOA switch to the OFF position, the pump run auxiliary contacts should deactivate. Make sure to return the HOA switch to the AUTO position to ensure the system will operate properly after performing the test.

ALARM PANEL (OPTIONAL) TEST

Test the alarm panel by pressing and holding the alarm test pushbutton. The alarm LEDs should illuminate (solid), buzzer should annunciate (solid), and the auxiliary contacts should activate. Press the alarm silence pushbutton and the buzzer should silence while the alarm LEDs remain on. After the alarm test pushbutton is released, the alarm panel will auto reset for the next alarm cycle. Test product weekly to ensure system integrity.

SYSTEM MAINTENANCE

The preset level sensor module must be kept clean and free of rust, mud, soap, or any conductive material.

Clean the probes every year keeping them free of debris, calcium, or iron deposits to ensure proper system operation.

TROUBLESHOOTING

SYMPTOM	POSSIBLE CAUSE(S)	CORRECTIVE ACTION
Pump does not run	<ul style="list-style-type: none"> ◆ Incoming power cable is unplugged ◆ Pump power cable not plugged into panel ◆ Pump hand-off-auto (HOA) in the OFF position ◆ Improper wiring of the preset level sensor Defective motor contactor ◆ Pump failure 	<ul style="list-style-type: none"> ◆ Plug in power cable and check power ◆ Connect pump power cable into panel receptacle Toggle HOA selector switch to HAND or AUTO Re-seat and check wire connections ◆ Replace motor contactor ◆ Replace pump
Pump turns off before the water level recedes below the pump stop probe (longest)	Poor pump/system ground, or preset level sensor has dirty or damaged probes	Check grounding system, wire terminations, or clean or replace the preset level sensor
Pump runs continuously	Pump hand-off-auto (HOA) in the HAND position or improper installation of the preset level sensor	Toggle HOA selector switch to OFF or AUTO, or re-seat and check wire connections
Level sensor error detected (system setting)	Preset level sensor incorrectly wired to the control panel terminal connections	Refer to the Wiring section for complete wiring information
Trouble alarm is activated	Pump is clogged or defective	Clear any debris, check the pump for normal operation, or if needed replace the pump
High oil alarm (oil detected) activated with no oil present in the sump basin	<ul style="list-style-type: none"> ◆ Improper installation of the preset level sensor ◆ High level float switch has an obstruction in the sump basin (i.e., the float or cable hung up on an-other item in the basin and contacts activated) 	<ul style="list-style-type: none"> ◆ Refer to installation and wiring information ◆ Clear obstruction so the high level float switch can operate properly; the alarm condition should clear when the float switch is deactivated



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