

OilTector® Control Panel System

Single Phase Simplex | Type 4X (Indoor/Outdoor)
Models: OTC Series, Standard with Remote Alarm

Operation, Maintenance, and Installation Manual | 7612000C

Liberty Pumps®

A Family and Employee Owned Company

Introduction

Read all instructions thoroughly. Installation of the OilTector® control system must comply with all federal, state, and local codes, regulations, and practices. 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 OilTector control system is designed and approved for the safe operation of pumping, alarming, and monitoring of elevator sump pits, transformer vaults, and leachate well applications. The OilTector control panel will activate 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 will 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 auxiliary contacts will activate on power loss, high oil, high water, pump running, or the various alarm conditions. These contacts are connected to the OilTector remote alarm panel which provides audio and visual indication of an alarm condition with built-in auxiliary contacts for connection to a building automation system (BAS) or SCADA system and phone dialers.

The OilTector control system has configurable features including: level sensor error detection, 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.

Safety Guidelines

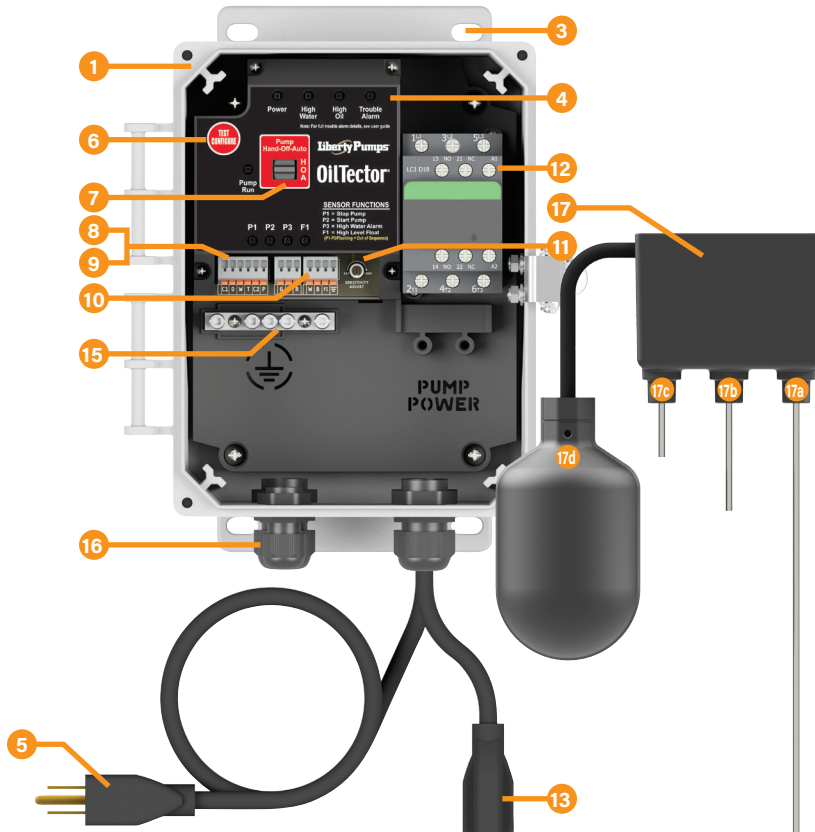


1. DISCONNECT ALL ELECTRICAL SERVICE BEFORE WORKING ON OR HANDLING THE OILTECTOR SYSTEM.
2. DO NOT USE WITH FLAMMABLE OR EXPLOSIVE FLUIDS SUCH AS GASOLINE, FUEL OIL, KEROSENE, ETC. DO NOT USE IN EXPLOSIVE ATMOSPHERES. SENSOR MODULE SHOULD ONLY BE USED WITH WATER.
3. DO NOT HANDLE THE OILTECTOR CONTROL SYSTEM WITH WET HANDS, WHEN STANDING ON A WET OR DAMP SURFACE, OR IN WATER.
4. INCOMING VOLTAGE MUST MATCH OILTECTOR CONTROL SYSTEM VOLTAGE.
5. TO PREVENT ELECTRICAL SHOCK AND EQUIPMENT MALFUNCTION, USE ONLY WITH A PUMP SUPPLIED WITH A GROUNDING CONDUCTOR AND GROUNDING-TYPE ATTACHMENT PLUG. MAKE SURE TO PLUG THE OILTECTOR CONTROL PANEL INTO A PROPERLY GROUNDED, GROUNDING-TYPE RECEPTACLE.
6. CONTROL PANEL CAN BE MOUNTED INDOORS OR OUTDOORS. ALARM PANEL MUST BE MOUNTED INDOORS. FOR OUTDOOR ALARM APPLICATIONS, CONSULT FACTORY.
7. 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 on page 5 of this manual). FAILURE TO PROPERLY MOUNT THE PRESET LEVEL SENSOR MODULE MAY CAUSE UNINTENDED CONSEQUENCES.
8. **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.

IMPORTANT

Refer to the included electrical schematic for all incoming power connections and pump connections which may include optional field wiring connections. This operation and installation manual covers models: OTC-115, OTC-115-5, OTCV-115, OTC-230, OTC-230-5, OTCV-230, and OTC-230H. System includes: control panel, remote alarm panel, and preset level sensor module.

STANDARD FEATURES & SPECIFICATIONS | CONTROL PANEL



- (1) Type 4X Enclosure (indoor/outdoor rated)
- (2) Clear Cover to view Interior Components (not shown)
- (3) Mounting Brackets
- (4) OilTector Circuit Board, Status Indicators
- (5) Incoming System Power (control/alarm, pre-wired male plug)
- (6) Test/Configure Pushbutton
- (7) Pump Hand-Off-Auto Selector Switch
- (8) Remote Alarm Panel Auxiliary Contacts
- (9) Pump Run Auxiliary Contacts
- (10) Preset Level Sensor/Function Input Terminals (sensor only, pre-wired at factory; not shown)
- (11) Sensitivity Adjustment Dial (water sensors)
- (12) IEC Motor Contactor
- (13) Pump Power Receptacle (pre-wired female plug)
- (14) Pump Connection Terminals (pre-wired to female receptacle plug; not shown)
- (15) Ground Bar (5-position)
- (16) Pre-Installed Cable Grips (4)
- (17) Preset Level Sensor
 - 17a) Pump Stop, Sensor Level Probe
 - 17b) Pump Start, Sensor Level Probe
 - 17c) High Water, Sensor Level Probe
 - 17d) Oil Detection, High Liquid Level Switch

Primary Power

120VAC, 1-14A or 1-18A, 60 Hz (120VAC pump)
Models: OTC-115, OTC-115-5, and OTCV-115

230VAC, 1-14A or 1-18A, 60 Hz (230VAC pump)
Models: OTC-230, OTC-230-5, OTCV-230, and OTC-230H

Phase/Pump Type

Single Phase, Simplex

Pump Power Receptacle Cable

120VAC or 230VAC, 15A or 20A, 60 Hz
Female Plug (voltage/amps depends on model number)

Incoming System Power Cable

120VAC or 230VAC, 15A or 20A, 60 Hz, 6-foot cable
Male Plug (voltage/amps depends on model number)

IEC Motor Contactor

120VAC or 230VAC, 18A, 50/60 Hz
3-Pole, Normally Open

Auxiliary Dry Alarm Contacts

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-foot or 50-foot cable
SJEOOW (UL) / SJTOOW (CSA)
18 AWG, 5-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)

Three-Year Limited Warranty

Note: Refer to page 9 for the OilTector remote alarm panel specifications

Description of Operation

The OilTector 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 and 230VAC, 1.0-14.0 Amps or 14.0-18.0 Amps, and a Type 4X (indoor/outdoor) enclosure. The control panel comes with a pre-installed female pump power receptacle, incoming system power cable, and preset level sensor. 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 and the pump continues to run (will also act as a redundant pump start/pump run function). 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 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 while the auxiliary contacts send a signal to activate the OilTector remote alarm panel and the alarm buzzer annunciates, alarm LED indicator(s) illuminate, and auxiliary contacts activate. The auxiliary contacts of the alarm panel can be connected to a building automation system (BAS) or SCADA system and phone dialers for remote notification of alarm conditions.

The control panel includes the following configurable features:

Refer to the setting the device configurations section on page 7 for more information on how to changes these settings.

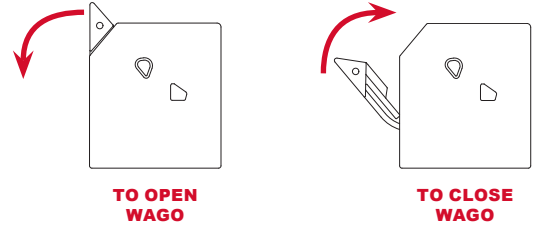
1. Level Sensor Error Detection
 - Factory Default: Enabled (P1 LED is ON).
 - Description: A trouble alarm condition occurs if the probes on the preset level sensor are activated out of sequence (i.e., the start probe activates before the stop probe). This can be used to indicate faulty sensor wiring or that the sensor needs to be replaced.
 - If Disabled: Level sensor errors will not be detected (P1 LED is OFF).
2. 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).
3. 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 titled down (deactivated), it will activate the trouble alarm and stop the pump from running.
4. 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.

Pre-installation Note | Installing Wire into WAGO

Before making wire connections and terminations, carefully read this section to ensure proper function of the system and the WAGO connectors included with this control panel.

WARNING: Improper use of the connectors will cause damage, DO NOT use mechanical tools to open or close, hand usage only.

- 1) Press tab(s) outward. DO NOT open past 40° angle.
- 2) Insert wire(s) into slot.
- 3) Press tab(s) inward.
- 4) Make sure wire(s) are secured.



Installation of the OilTector Control Panel

1. This model comes with four pre-installed cable grips (Fig. 1) and pre-wired: preset level sensor, pump power receptacle (female plug), and incoming system power cable (male plug). The wiring for the remote alarm panel should be routed through cable grip 1A (no factory wiring; remove plug). Make sure all conduits/cable grips are sealed and waterproof per local codes.

- 1A = Low Voltage, Remote Alarm Panel (field wired)
- 1B = Low Voltage, Preset Level Sensor Cable (pre-wired)
- 1C = High Voltage, Incoming Pump Power Cable (pre-wired)
- 1D = High Voltage, Incoming System Power Cable (pre-wired)

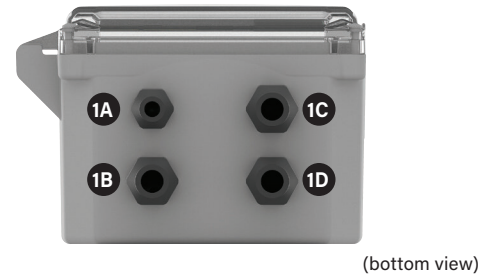
*Note: If the control panel is to be installed with conduit, the pre-installed cable grips must first be removed. Make note of the pre-wired factory connections before removing cable grips or wiring and these wires **MUST** be re-wired to the same inputs for the system to function properly. Refer to 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.

2. Determine the mounting location (Fig. 2) for the OilTector control panel and mount at the desired location within 5-feet of the electrical receptacle. The enclosure size for all models is 8x6x4 (inches). Hold control panel in desired location, mark and drill pilot holes then mount using screws (not included) and wall mount anchors (not included) if necessary. Recommended to use four mounting screws.

Note: The control panel should be mounted within 25-feet or within 50-feet (depending on model) of the preset level sensor module which is mounted in the sump/monitoring area. Splicing may be required for some installations.

(Fig. 1)



(bottom view)

(Fig. 2)



(front view)

Installation of the Preset Level Sensor

1. Determine the mounting location and attach the preset level sensor to the discharge pipe (Fig. 3A) or a separate pipe mounted to a side wall (not shown) using the provided stainless steel pipe clamp and sensor pipe clamp bracket. Make sure the preset level sensor is clear of inlet water.

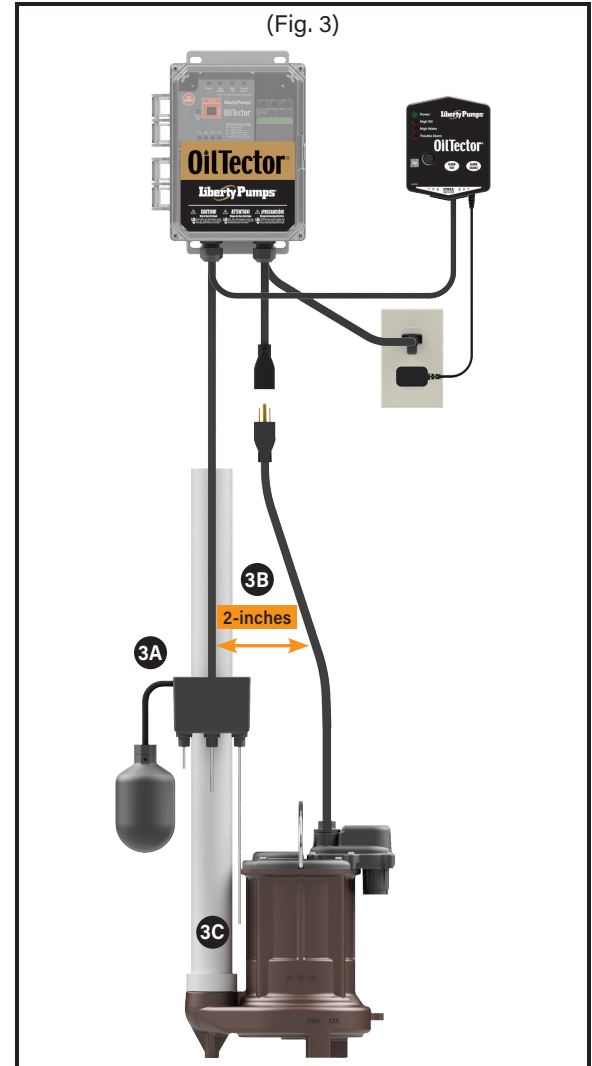
CAUTION: To maintain system integrity, it is recommended to separate the pump power receptacle cable and preset level sensor cable by at least 2-inches (3B) whether the cables are in the tank or when they are above ground in separate conduits/cable grips or junction box. Conductive material could affect the performance of the sensor.

2. The preset level sensor "stop level" (3C) 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 OilTector control panel sealed conduit/cable grip or junction box and connect the wires to the circuit board terminals. Refer to the wiring section below (Fig. 4) for information on the control panel sensor connections.

Note: 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 as these inputs are normally closed contacts. Once the preset level sensor is re-wired, these LEDs will deactivate and the system will return to a normal state. Do not connect power until all steps of the wiring and installation are completed.

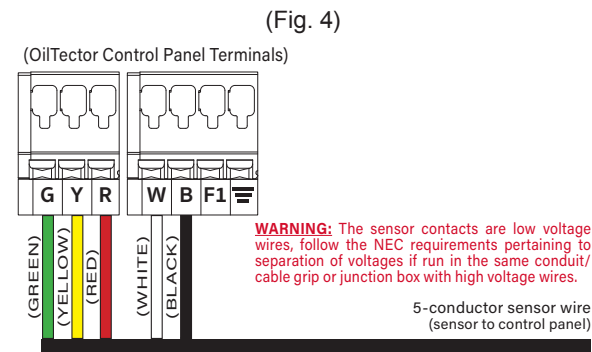
4. If sensor cable splicing is required, use liquid tight junction boxes, conduit, and connectors per NEC/local codes. It is recommended to use standard THHN wire, 600VAC, 18 AWG minimum. For applications where splicing longer than 300 feet is required, consult factory.



System Wiring | Preset Level Sensor

1. 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 OilTector control panel and connect the wires to the terminals listed below and shown in the diagram (Fig. 4).

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)

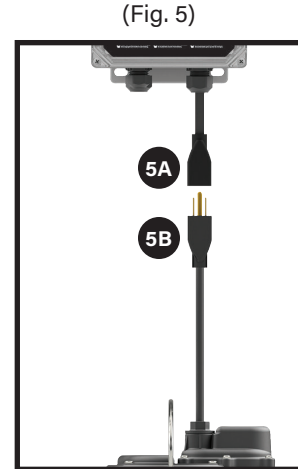


System Wiring | Pump Power Receptacle

Make sure all the steps of the installation and wiring for the pump, control panel, preset level sensor, and remote alarm panel have been completed prior to connecting power to the system or perform testing.

1. The pump power receptacle (female plug; 5A) comes pre-installed from the factory for a quick and easy installation of the OilTector control panel (Fig. 5).
2. After all the steps of the installation process have been completed and the panel is ready for testing, connect the pump power cable (5B) into the pre-installed pump power receptacle (5A) of the OilTector control panel.

Note: The pump power must match the voltage of the OilTector control panel. Refer to the included electrical schematic for complete wiring and voltage information. Models with a 15 Amp receptacle are rated 1.0 - 14.0 Amps and models with a 20 Amp receptacle are rated 14.0 - 18.0 Amps.



Settings | Device Configurations

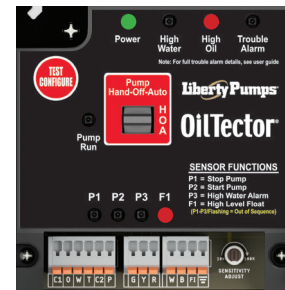
Make sure the installation process is completed and there are no cables or wires to interfere with the operation of the system.

1. After the pump power cable is connected to the OilTector control panel's pump power receptacle (Fig. 5) and the OilTector 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 (Fig. 6) and the pump should be off if the system was installed properly.

(Fig. 6)



(Fig. 7)



Device Configurations:

Refer to pages 3, 7, and 8 for more information on how to change the settings for device configurations. These 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.

Testing:

Refer to pages 13 and 14 for testing the OilTector system.

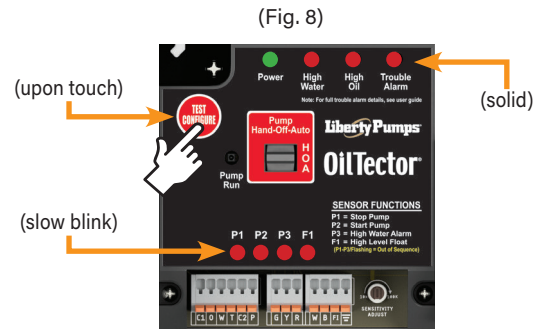
Power Mode if Preset Level Sensor is Disconnected:

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 (Fig. 7) as these inputs are normally closed contacts. Once the preset level sensor is re-wired, these LEDs will deactivate and the system will return to a normal state (Fig. 6).

Settings | Device Configurations (continued)

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 page 3 for configuration descriptions.

Press and hold the test/configure pushbutton (Fig. 8), test pattern will begin immediately. Holding the pushbutton down for at least 5-seconds (Fig. 9) will display all activated (enabled) settings and if the pushbutton continues to be pressed for another 5-seconds (Fig. 10, 10-seconds total), the system will toggle between P1 and F1 LEDs to enable or disable the current state of each setting. See below for more information.

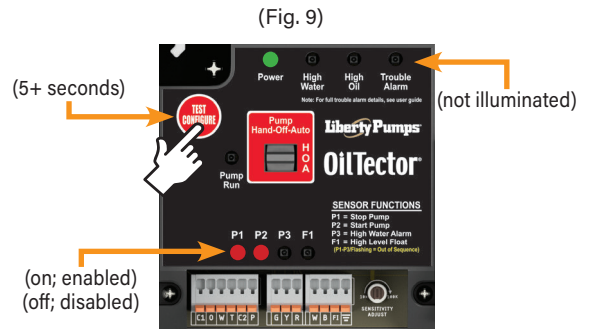


1. **LED Test Pattern;** press and hold the test/configure pushbutton (Fig. 8) on the OilTector control panel, the system will immediately begin a test pattern of the LEDs (all except pump run).

- a. LEDs will illuminate in a solid and slow blinking pattern:
 - i. High Water, High Oil, and Trouble Alarm (solid)
 - ii. P1, P2, P3, and F1 (slow blink)

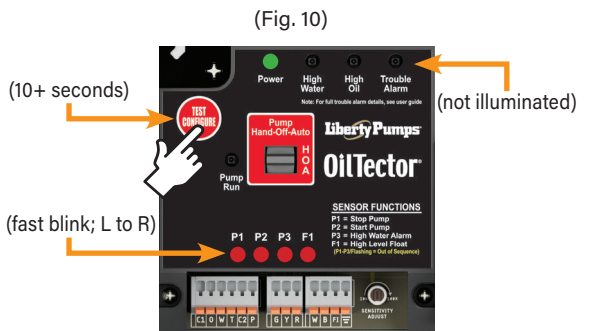
2. **View Settings;** press and hold the test/configure pushbutton (Fig. 9) on the OilTector control panel for at least 5-seconds to view the current settings of the system.

- a. High Water, High Oil, and Trouble Alarm LEDs deactivate.
- b. P1-F1 LEDs will indicate the current system settings:
 - i. LED on (solid), indicates setting is enabled (activated)
 - ii. LED off, indicates setting is disabled (deactivated)
- c. P1 = Level Sensor Error Detection
- d. P2 = Automatic Alarm Reset
- e. P3 = Function Input (FI; Fire Alarm / Redundant Off Input)
- f. F1 = Pump Exerciser



3. **Toggle Settings;** press and hold the test/configure pushbutton (Fig. 10) on the OilTector control panel for at least 10-seconds to toggle (change) the current settings of the system.

- a. High Water, High Oil, and Trouble Alarm LEDs deactivate.
- b. P1-F1 LEDs will pulse in a fast blinking pattern then begin to move left to right from P1 to F1 LEDs.
- c. Release the test/configure pushbutton while the fast blinking LED pattern is on the desired setting to toggle (change).
- d. 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.



4. **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 (Fig. 8). The pushbutton can then be released without saving any settings.

The OilTector default factory configurations are listed below:

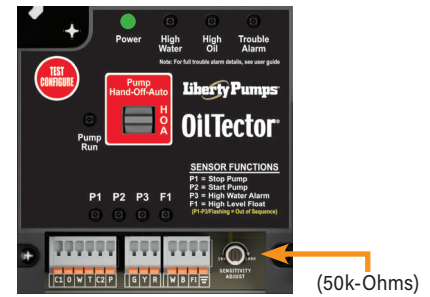
- Level Sensor Error Detection: Enabled (P1 LED is ON)
- Automatic Alarm Reset: Enabled (P2 LED is ON)
- Function Input (FI): Fire Input (P3 LED is OFF)
- Pump Exerciser: Disabled (F1 LED is OFF)

Settings | Water Sensor Sensitivity Adjustment

The OilTector 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 (Fig. 11) 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.

(Fig. 11)

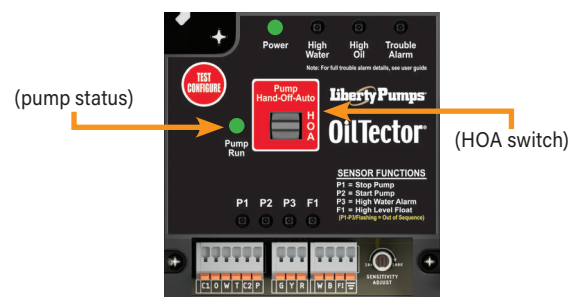


Settings | Pump Hand-Off-Auto (HOA) Selector Switch

The pump hand-off-auto (HOA) selector switch (Fig. 12) is used to control the desired operation mode of the pump. The pump run LED illuminates when the pump is running (Fig. 12). See below for more information on the three operating positions, the "normal" operating position is Auto Mode.

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

(Fig. 12)

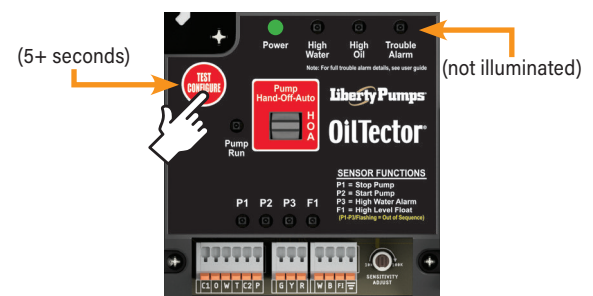


User Input | Clearing Alarms

If the automatic alarm reset is disabled in the system settings (see page 3 and page 7 for more information), 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 (Fig. 13). This will clear the alarm and the system will recheck its inputs for any active alarm conditions. If the alarm condition is still present, the alarm will reactivate.

(Fig. 13)





OilTector Remote Alarm Panel Introduction



Before proceeding with the installation or operation of the product, make sure to read all instructions thoroughly, as well as complying with all Federal, State and Local Codes, Regulations and Practices. The product must be installed by qualified personnel familiar with all applicable local electrical and mechanical codes. Refer to the National Electrical Code (NFPA 70). Failure to properly install, test, and operate this product can result in personal injury or equipment malfunction.

Safety Guidelines

1. DISCONNECT ALL ELECTRICAL SERVICE BEFORE WORKING ON OR HANDLING THE PRODUCT.
2. DO NOT USE WITH FLAMMABLE OR EXPLOSIVE FLUIDS SUCH AS GASOLINE, FUEL OIL, KEROSENE, ETC. DO NOT USE IN EXPLOSIVE ATMOSPHERES.
3. ALARM PANEL MUST BE MOUNTED INDOORS. FOR OUTDOOR APPLICATIONS, CONSULT FACTORY.

Specifications

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 @ 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
Removable cover

Certifications
CSA (US and Canada)

Three-Year Limited Warranty

Description of Operation

The OilTector 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. The alarm panel is used with Liberty Pumps® OilTector control panels for the safe operation of pumping, alarming, and monitoring of: elevator sump pits, transformer vaults, and leachate well applications. The OilTector 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 and may include power loss, 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 is pressed during an alarm condition, it will silence the buzzer while the alarm LED(s) remain on. The silence condition 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.

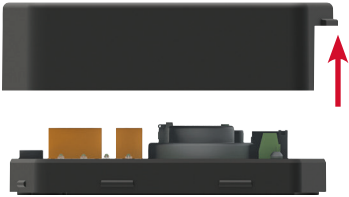
Installation of the Alarm Panel

1. To install/replace the battery for the backup power feature, remove the enclosure cover (Fig. 1) and install a 9VDC battery (not included) by pressing down into the positive (+) and negative (-) terminal connections (Fig. 2). After installing battery, perform a quick test, press and hold the alarm test pushbutton (Fig. 2 and Fig. 3) 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.

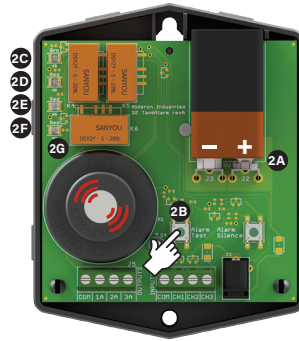
Note: When on battery backup, the green power LED will not illuminate to conserve battery power.

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.

(Fig. 1)



(Fig. 2)



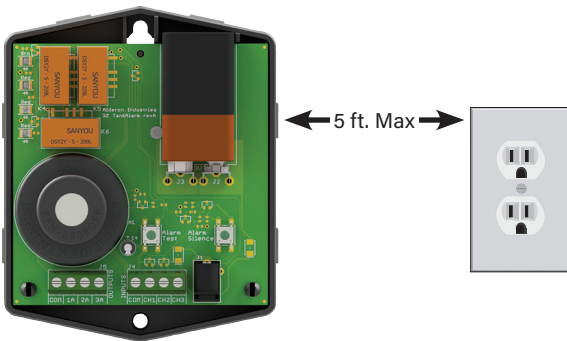
2A = Battery Connections
2B = Alarm Test Pushbutton
2C = Power LED (green)
2D = High Oil Alarm LED (red)
2E = High Water Alarm LED (red)
2F = Trouble Alarm LED (red)
2G = Alarm Buzzer

(Fig. 3)



2. 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 (Fig. 4). 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 / Fig. 5). Use two (2) #8 plastic anchors (not included / Fig. 6) if mounting the alarm panel to sheet rock.

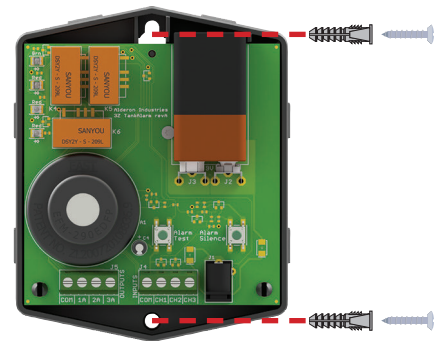
(Fig. 4)



(Fig. 5)



(Fig. 6)



Installation of the Alarm Panel (continued)

- 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 OilTector alarm panel (Fig. 7). See below for wiring information. The auxiliary contacts of the OilTector alarm panel are activated when the OilTector 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 (Fig. 9 and Fig. 10).
- Connect the OilTector control panel auxiliary contacts (signaling device) to the INPUTS terminal block on the OilTector alarm panel (Fig. 8), 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 (Fig. 9 and Fig. 10).

Note: 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.

Auxiliary Contacts (OUTPUTS):

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

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

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

Note: Terminal 3A will monitor power loss, level sensor error detection (if enabled), fire mode indication (if enabled), and low level/redundant off alarm (if field configured). For remote monitoring of pump run status, connect an external monitoring device to the OilTector 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)

Note: The auxiliary dry contacts of the OilTector 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 OilTector Control Panel, TB-C1 (common)

Terminal CH1
Connects to OilTector Control Panel, TB-O (oil alarm)

Terminal CH2
Connects to OilTector Control Panel, TB-W (water alarm)

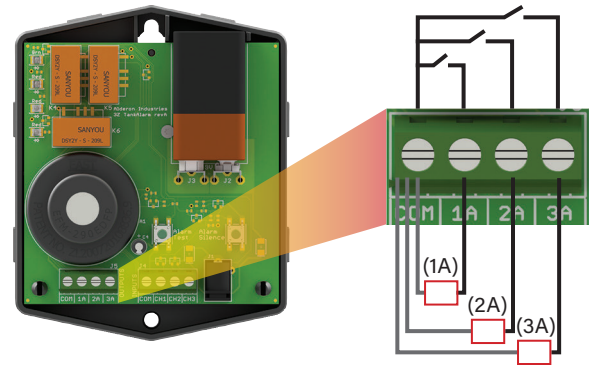
Terminal CH3
Connects to OilTector Control Panel, TB-T (trouble alarm)

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

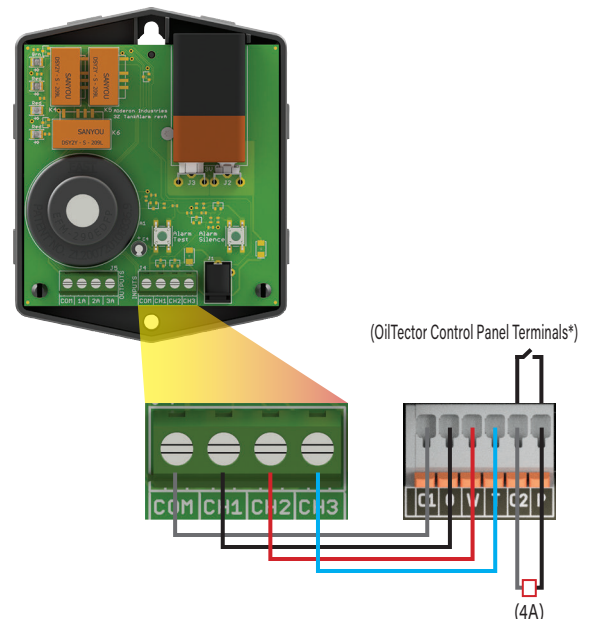
(*) OilTector Control Panel Terminals, Pump Run Auxiliary Contacts:

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

(Fig. 7)



(Fig. 8)



Installation of the Alarm Panel (continued)

- 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. 9 and Fig. 10).

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

(Fig. 9)

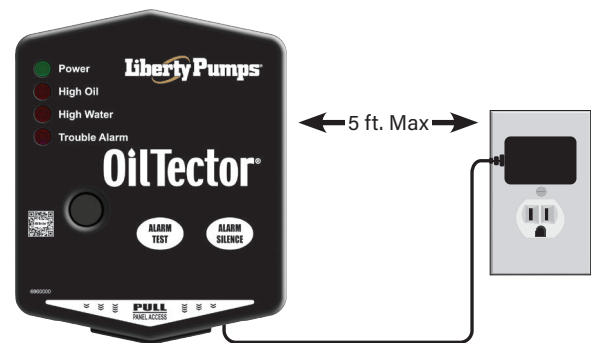


(Fig. 10)



- 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. 11).

(Fig. 11)



Testing the Alarm Panel

- Test the alarm panel by pressing and holding the alarm test pushbutton (Fig. 12). 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.

(Fig. 12)



Testing | OilTector Control Panel System

1. Make sure all the steps of the installation and wiring for the pump, control panel, preset level sensor module, and remote alarm panel have been completed prior to testing. The incoming voltage and all power receptacles used must match the OilTector 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 page 3 and page 7 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.
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:
 - i. When raised, the high oil alarm (oil detected) LED should illuminate, the high level float (F1) LED should illuminate, the high oil alarm auxiliary contacts on the control panel should activate, and remote alarm panel should activate.
 - ii. 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 remote alarm panel 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:
 - i. 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.
 - ii. 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.

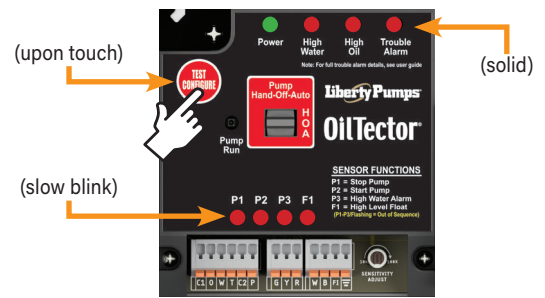
Note: Check the discharge plumbing for leaks and make sure the discharge is going to the correct output area.

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:
 - i. 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.
 - ii. 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.
 - iii. 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, high water auxiliary contacts should activate, and the remote alarm panel should activate. 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 remote alarm panel for a power loss event.
 - i. 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.

Diagnostic System Test | Test/Configure Button (OilTector Control Panel System)

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

(Fig. 1)



(Note: press and hold for less than 5-seconds)

1. **Test Mode;** press and hold the test/configure pushbutton (Fig. 1) on the OilTector control panel for less than 5-seconds, the system will immediately begin a test pattern of the LEDs (all except pump run) and close the alarm auxiliary contacts. This test will check all alarm circuitry and connections to ensure local building automation systems or remote alarms are functioning properly.
 - a. LEDs will illuminate in a solid and slow blinking pattern:
 - i. High Water, High Oil, and Trouble Alarm (solid)
 - ii. P1, P2, P3, and F1 (slow blink)
 - b. Remote alarm panel auxiliary contacts will activate (if used).

Note: Test pump run auxiliary contacts by placing the pump hand-off-auto (HOA) selector switch in the HAND position, this will activate 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.

System Maintenance

Weekly:

The alarm panel should be tested to ensure system integrity.

Monthly:

The preset level sensor module must be kept clean and free of rust, mud, soap, or any conductive material. Test the full OilTector control panel system to ensure proper system integrity.

Yearly:

Clean the probes keeping them free of debris, calcium, or iron deposits to ensure proper system operation. Replace the 9VDC battery on the OilTector remote alarm panel for backup power feature.

Basic Troubleshooting

PROBLEM	PROBABLE CAUSE	SOLUTION
Pump does not run	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	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 or system ground Preset level sensor has dirty or damaged probes	Check grounding system and wire terminations Clean or replace the preset level sensor
Pump runs continuously	Pump hand-off-auto (HOA) in the HAND position Improper installation of the preset level sensor	Toggle HOA selector switch to OFF or AUTO 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 page 7 for complete wiring information
Trouble alarm is activated	Pump is clogged or defective	Clear any debris from the pump and check the pump for normal operation, if needed replace the pump
High oil alarm (oil detected) activated with no oil present in the sump basin	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 another item in the basin and contacts activated)	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