

## 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 pits in accordance with ASME A17.1, stopping the pump before oil or other harmful substances enter the water supply. The control panel programmable logic controller (PLC) will monitor various conditions including but not limited to: power, pump running, high water alarm, and high oil alarm with included auxiliary contacts that activate on power loss or high oil/water 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 for remote notification of alarm conditions. The recommended minimum sump size is Ø18" x 30" high.

## Safety Guidelines

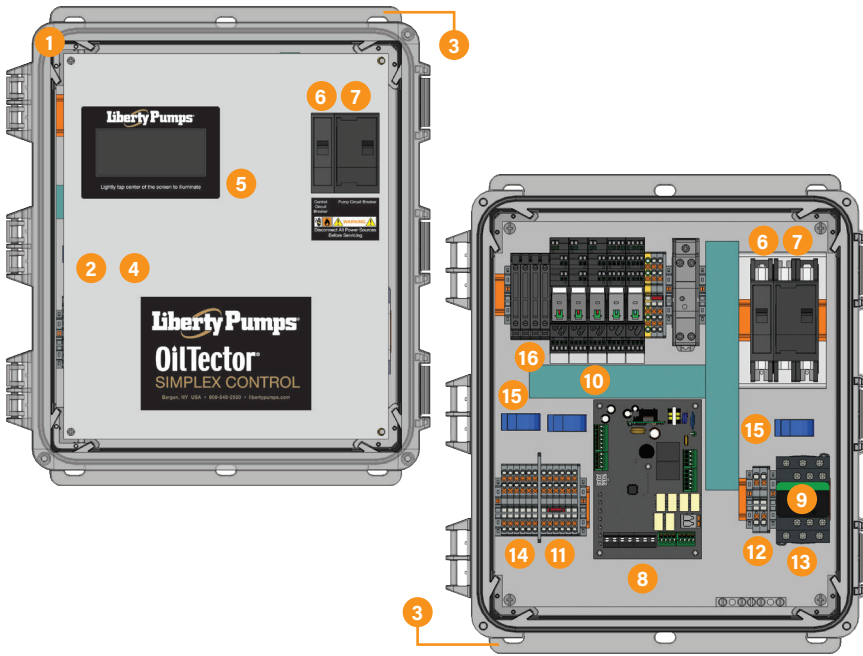


1. DISCONNECT ALL ELECTRICAL SERVICE BEFORE WORKING ON OR HANDLING THE OILTECTOR SYSTEM.
2. DO NOT USE WITH FLAMMABLE OR EXPLOSIVE FLUIDS SUCH AS GASOLINE, FUEL OIL, KEROSENE, ETC. DO NOT USE IN EXPLOSIVE ATMOSPHERES. SENSOR MODULE SHOULD ONLY BE USED WITH WATER.
3. DO NOT HANDLE THE OILTECTOR CONTROL 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 SUBMERSION WHEN THE WATER LEVEL IS JUST BELOW THE PUMP STOP PROBE (longest probe; see preset level sensor 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

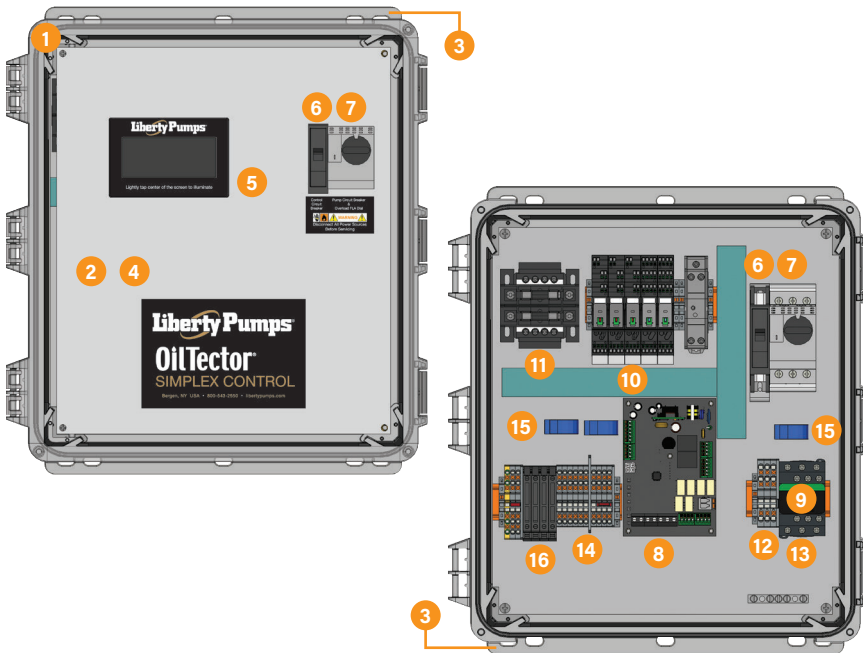
Refer to the included electrical schematic for all incoming power connections and pump connections which may include optional field wiring connections. This manual covers models 6941000 and 6943000 for the ELV-VS and ELV-VST series control panels. System includes: control panel with programmable logic controller (PLC), human machine interface (HMI) touchscreen, remote alarm panel, and preset level sensor module.

STANDARD FEATURES | SINGLE PHASE



- (1) Type 4X Enclosure (indoor/outdoor rated)
- (2) Clear Cover to view Inner Door Components
- (3) Mounting Brackets
- (4) Inner Dead Front Door
- (5) Human Machine Interface (HMI) Touchscreen
- (6) Control Power Circuit Breaker
- (7) Pump Power Circuit Breaker
- (8) Control/Alarm Circuit Board, Status Indicators
- (9) IEC Motor Contactor
- (10) Control Relays
- (11) Incoming Control Power Terminals
- (12) Incoming Pump Power Terminals
- (13) Pump Connection Terminals
- (14) Sensors and Alarm Panel Terminals
- (15) Current Sensors (pump run and valve monitoring)
- (16) Control, Alarm, and Valve Fuses

STANDARD FEATURES | THREE PHASE



- (1) Type 4X Enclosure (indoor/outdoor rated)
- (2) Clear Cover to view Inner Door Components
- (3) Mounting Brackets
- (4) Inner Dead Front Door
- (5) Human Machine Interface (HMI) Touchscreen
- (6) Control Power Circuit Breaker
- (7) Pump Power Motor Protective Switch (MPS)
- (8) Control/Alarm Circuit Board, Status Indicators
- (9) IEC Motor Contactor
- (10) Control Relays
- (11) Transformer
- (12) Incoming Power Terminals
- (13) Pump Connection Terminals
- (14) Sensor and Alarm Panel Terminals
- (15) Current Sensors (pump run and valve monitoring)
- (16) Control, Alarm, and Valve Fuses

## Description of Operation

The OilTector control panel is operated by the programmable logic controller (PLC) using a human machine interface (HMI) touchscreen and a preset level sensor for a simplex (one pump) application with two valve control. Available in Single Phase, 120/230VAC, 7.0-15.0 Amps or Three Phase, 208/230/460VAC, 4.0-6.3 FLA and a Type 4X (indoor/outdoor) enclosure. The incoming and pump power must match system voltage. Refer to included electrical schematic for complete wiring and voltage information.

The preset level sensor module is used 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), solenoid valve #1 (water) opens, the pump will start and continue to run until the water level recedes below the pump stop probe (longest) to complete the pump cycle and closes solenoid valve #1. The included current sensors verify the status of the valves and pump for data logging.

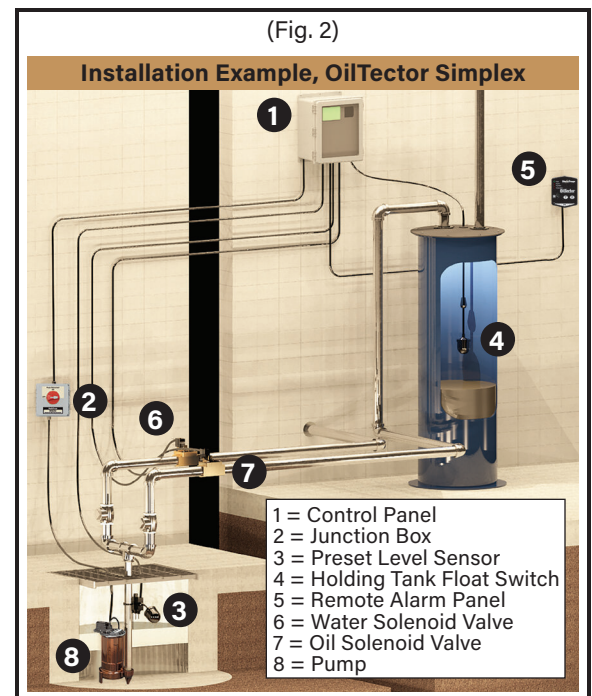
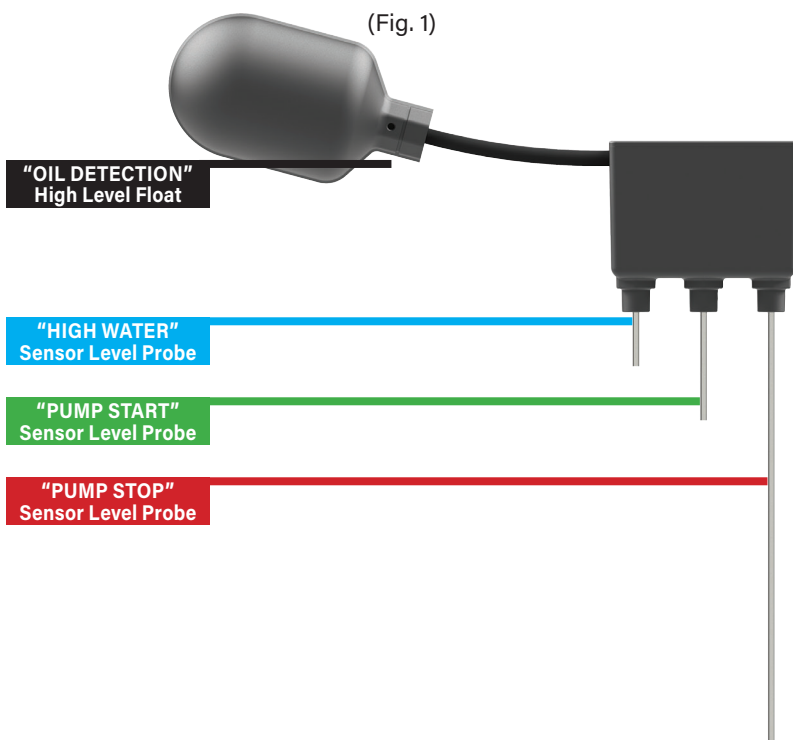
The pump stop probe senses air or oil and when the water level is no longer touching this probe, the pump stops running so the oil layer will not be pumped out of the sump. Oil will float on top of water, so if oil is present and touching this probe, the pump will also stop running. If the water level rises touching the high water probe (shortest), a high water alarm condition occurs and the pump continues to run. 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 which closes solenoid valve #1 (water) and opens solenoid valve #2 (oil). After solenoid valve #2 opens, the pump will start and continue to run for the programmed amount of time (off-delay) after the high level float switch is deactivated for the oil to be safely pumped into the oil holding tank. The included current sensors verify the status of the valves and pump for data logging.

During an alarm condition the OilTector control panel auxiliary contacts send a signal to activate the OilTector remote alarm panel. The remote alarm panel 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. 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 holding tank high level alarm deactivates and the alarm panel will auto reset for the next alarm cycle.

## Application and Installation Examples | Sensor and System

1. The application example below (Fig. 1) describes the functions of the preset level sensor module that is installed in the monitoring area. Refer to the complete installation in steps 1 - 4 on page 5 for more information.
2. The OilTector system installation example (Fig. 2) shows a typical setup for a simplex auto valve control panel system and the components included.



## Installation of the Control Panel

1. The OilTector control panel is recommended to be installed with appropriate conduit connections (Fig. 3) prior to mounting, routing, or wiring of the sensors, alarm, valves, pump, and incoming power. Make sure all conduits are sealed and waterproof.

**WARNING:** Do not mix high and low voltage wires in the same conduit or junction box, failure to do so will cause system failure. The preset level sensor module, holding tank float switch, alarm panel, and solenoid valves are low voltage class 2 wires and cannot be installed in the same conduit as high voltage incoming system or pump power wires. Refer to system wiring section on pages 6 - 9 and the included schematic for wiring connections.

- 3A = Low Voltage Preset Level Sensor Cable
- 3B = Low Voltage Float Switch, Alarm, and Valve Cables
- 3C = High Voltage Incoming Pump Power Cable
- 3D = High Voltage Incoming System Power Cable

2. You MUST separate the incoming 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.
3. Determine the mounting location for the OilTector control panel and mount at the desired location. The enclosures sizes are 14x12x8 (inches) for single phase and 16x14x8 (inches) for three phase.

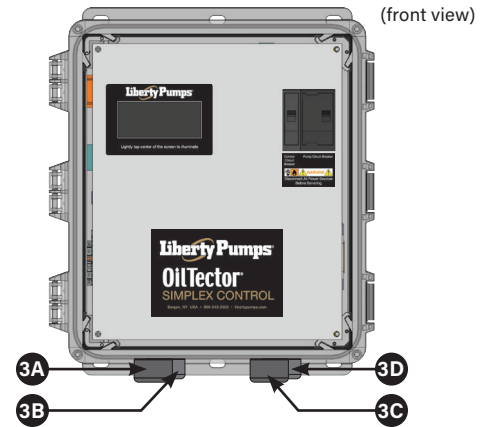
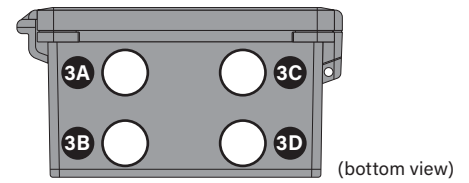
*Note: The control panel should be mounted within 25-feet of the preset level sensor module which is mounted in the sump/monitoring area. Splicing may be required for some installations.*

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.
5. Hold the control panel up to the desired mounting location and mark the drill hole locations (Fig. 4). Once marked, drill pilot holes for screws (not included) and use wall mount anchors (not included) if necessary. Recommended to use at least four mounting screws.
6. 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.

## Installation of the Holding Tank High Level Float Switch

1. Install the holding tank high level float switch with cable weight in the holding tank using a float bracket or mounted per local codes. Refer to installation instructions of the control switch for complete operating information and activation levels. See page 7 for wiring information on connecting the holding tank high level float switch to the OilTector control panel.

(Fig. 3)



(Fig. 4)





## Installation of the Pump Disconnect Junction Box

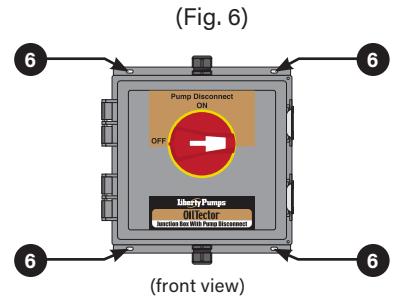
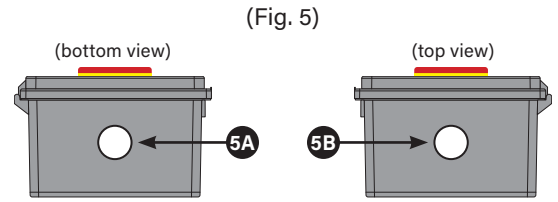
1. The OilTector pump disconnect junction box is recommended to be installed with appropriate conduit connections (Fig. 5) prior to mounting or wiring of the pump connections and incoming pump power. Make sure all conduits are sealed and waterproof.

*Note: The pump power is coming from the OilTector control panel, refer to system wiring section on pages 6 - 9 and the included schematic for wiring connections.*

- 5A = Pump Connection Wires (bottom; from pump)
- 5B = Incoming Pump Power (top; from control panel)

2. Hold the junction box up to the desired mounting location and mark the drill hole locations (Fig. 6). Once marked, drill pilot holes for screws (not included) and use wall mount anchors (not included) if necessary. Recommended to use at least four mounting screws.

3. Place the junction box in the mounting location, adjust until the pilot holes are lined up with the enclosure mounting brackets and fasten screws to secure in place.



## Installation of the Preset Level Sensor

1. Determine the mounting location and attach the preset level sensor to the discharge pipe (Fig. 7A) 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 cables and preset level sensor cable by at least 2-inches (7B) whether the cables are in the tank or when they are above ground in separate conduits or junction box. Conductive material could affect the performance of the sensor.

2. The preset level sensor "stop level" (7C) 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. Route the 5-conductor sensor cable through the OilTector control panel sealed conduit or junction box and connect the wires to the circuit board terminals. Refer to the wiring sections on page 6 and page 7 for information on the control panel sensor connections.

*Note: Do not connect power to the system until all steps of the wiring and installation are completed.*

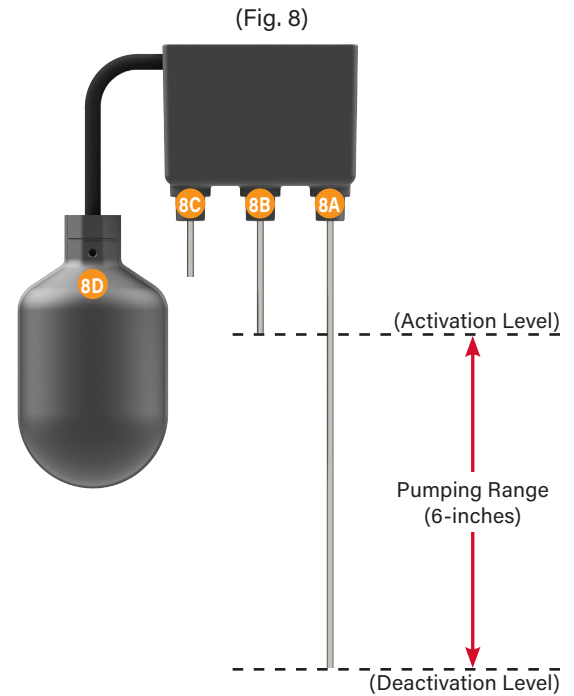
4. If sensor cable splicing is required, use liquid tight junction boxes, conduit, and connectors per NEC/local codes. It is recommended to use standard THHN wire, 600VAC, 18 AWG minimum. For applications where splicing longer than 300 feet is required, consult factory.



## Pumping Range of the Preset Level Sensor

1. When the water level is no longer touching the pump stop probe (8A; longest), the pump stops running. When the water level rises touching the pump start probe (8B; middle), solenoid valve #1 (water) opens, the pump starts and continues to run until the water level recedes below the pump stop probe to complete the pump cycle and closes solenoid valve #1. This is the pumping range (6-inches).

- 8A = PUMP STOP/Sensor Level Probe (preset)
- 8B = PUMP START/Sensor Level Probe (preset)
- 8C = HIGH WATER/Sensor Level Probe (preset)
- 8D = OIL DETECTION/High Level Float (narrow angle float switch)



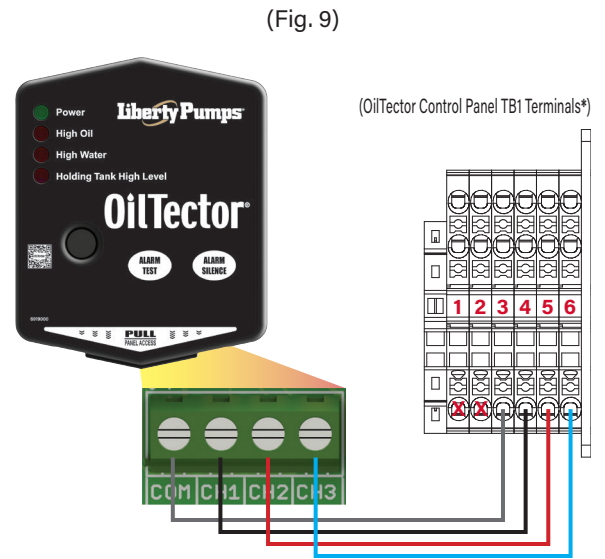
## Wiring and Installation | Remote Alarm Panel

1. Determine the mounting location of the OilTector remote alarm panel and install following the complete installation and wiring instructions of the alarm panel on pages 11 - 13. See below for wiring information on connecting the alarm panel to the OilTector control panel.

*Note: The alarm panel can be mounted up to 2,500 feet from the control panel for remote alarm notification of high oil, high water, and holding tank high level.*

2. Connect the OilTector control panel auxiliary contacts to the OilTector alarm panel signaling device INPUTS terminals listed below and shown in the diagram (Fig. 9).

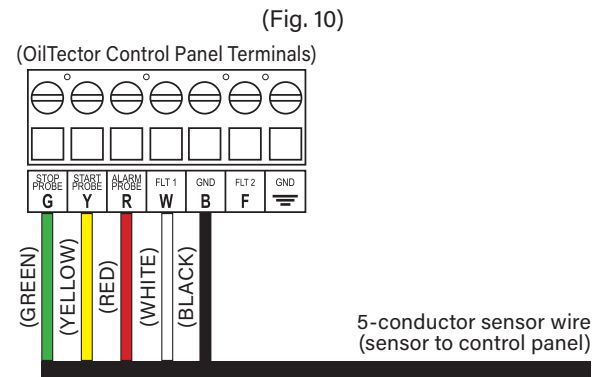
- Control Panel TB1-3 (common) = Alarm Panel TB-COM
- Control Panel TB1-4 (oil alarm) = Alarm Panel TB-CH1
- Control Panel TB1-5 (water alarm) = Alarm Panel TB-CH2
- Control Panel TB1-6 (holding tank) = Alarm Panel TB-CH3



## Wiring | Preset Level Sensor

1. The preset level sensor should first be installed in the sump, then route the 5-conductor sensor cable from the mounting location in the sump through the low voltage conduit into the OilTector control panel. Connect the wires to the terminals listed below and shown in the diagram (Fig. 10).

- 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)



**WARNING:** The sensor contacts are low voltage wires, follow the NEC requirements pertaining to separation of voltages if run in the same conduit or junction box with high voltage wires.

## Wiring | Sensors, Alarm Panel, and Control Power

### Single Phase OilTector Wiring:

1. Route the holding tank float switch, alarm panel, and solenoid valve wires through the low voltage conduit with the incoming control power routed through the high voltage conduit into the OilTector control panel. Connect the wires to the terminals listed below and shown in the diagram (Fig. 11).

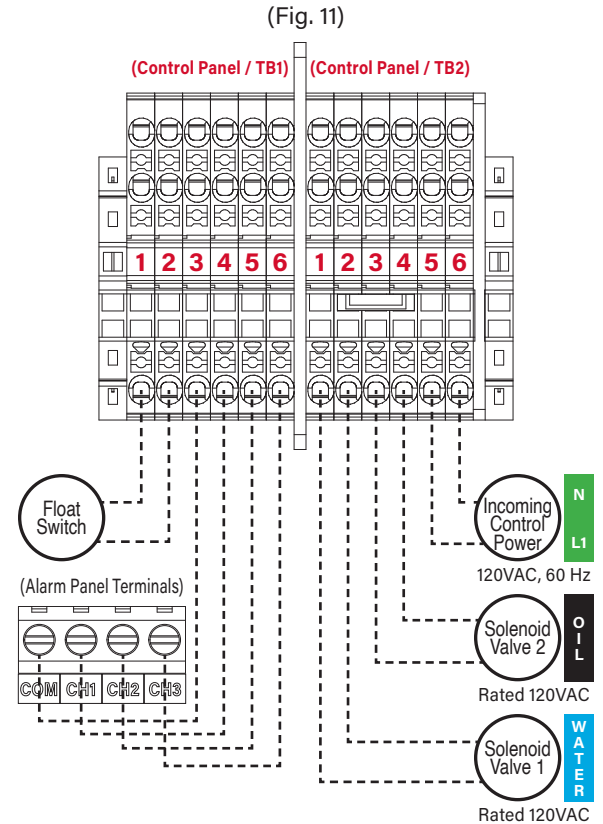
#### Terminal Block 1 Connections:

Float Switch Wire 1 = TB1-1  
 Float Switch Wire 2 = TB1-2  
 Alarm Panel TB-COM = TB1-3  
 Alarm Panel TB-CH1 = TB1-4  
 Alarm Panel TB-CH2 = TB1-5  
 Alarm Panel TB-CH3 = TB1-6

#### Terminal Block 2 Connections:

Water Valve Wire 1 = TB2-1  
 Water Valve Wire 2 = TB2-2  
 Oil Valve Wire 1 = TB2-3  
 Oil Valve Wire 2 = TB2-4  
 Control Power, L1 = TB2-5  
 Control Power, N = TB2-6

**CAUTION:** NEVER leave the ground wire(s) exposed, use provided ground terminals for wire termination. Refer to included schematic.



### Three Phase OilTector Wiring:

1. Route the holding tank float switch, alarm panel, and solenoid valve wires through the low voltage conduit into the OilTector control panel. Connect the wires to the terminals listed below and shown in the diagram (Fig. 12).

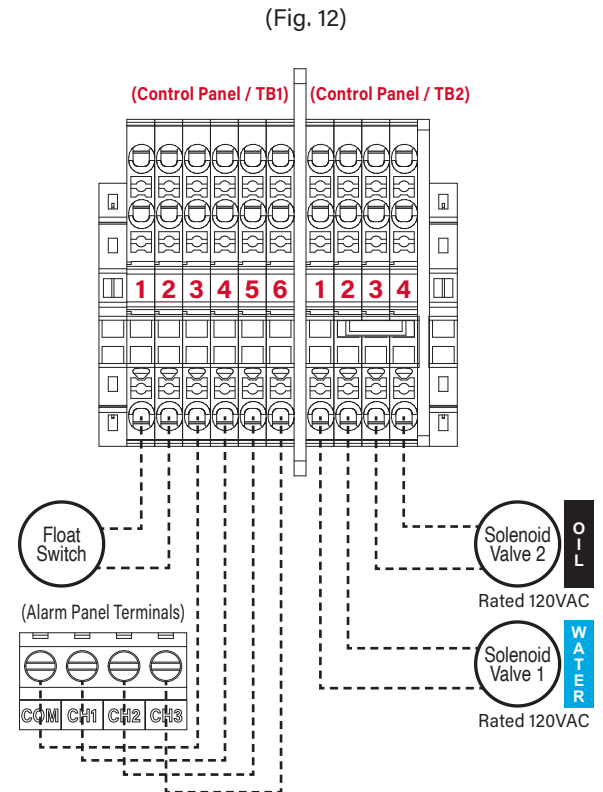
#### Terminal Block 1 Connections:

Float Switch Wire 1 = TB1-1  
 Float Switch Wire 2 = TB1-2  
 Alarm Panel TB-COM = TB1-3  
 Alarm Panel TB-CH1 = TB1-4  
 Alarm Panel TB-CH2 = TB1-5  
 Alarm Panel TB-CH3 = TB1-6

#### Terminal Block 2 Connections:

Water Valve Wire 1 = TB2-1  
 Water Valve Wire 2 = TB2-2  
 Oil Valve Wire 1 = TB2-3  
 Oil Valve Wire 2 = TB2-4

**CAUTION:** NEVER leave the ground wire(s) exposed, use provided ground terminals for wire termination. Refer to included schematic.



## Wiring | Pump Connections and Pump Power

### Single Phase OilTector Wiring:

1. Route the pump connection and incoming pump power wires through the high voltage conduit into the OilTector control panel and connect the wires to the terminals listed below and shown in the diagram (Fig. 13).

Note: The pump is wired to the bottom of the disconnect switch (DS1) inside the junction box, then the top of the disconnect switch is wired to the OilTector control panel motor contactor (M1).

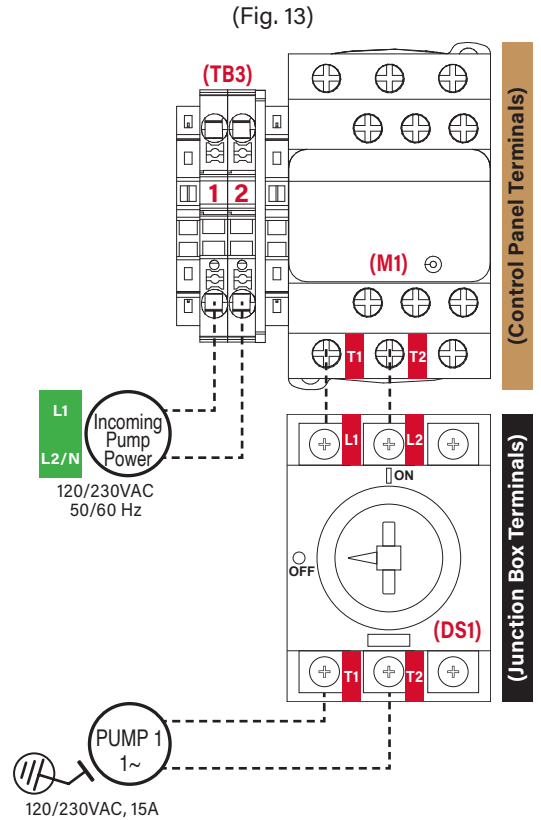
#### Pump Connections:

- Pump Wire 1 = DS1-T1 (junction box)
- Pump Wire 2 = DS1-T2 (junction box)
- Disconnect DS1-L1 = M1-T1 (control panel)
- Disconnect DS1-L2 = M1-T2 (control panel)

#### Incoming Pump Power:

- Pump Power, L1 = TB3-1 (control panel)
- Pump Power, L2/N = TB3-2 (control panel)

**CAUTION:** NEVER leave the ground wire(s) exposed, use provided ground terminals for wire termination. Refer to included schematic.



### Three Phase OilTector Wiring:

1. Route the pump connection and incoming power wires through the high voltage conduit into the OilTector control panel and connect the wires to the terminals listed below and shown in the diagram (Fig. 14).

Note: The pump is wired to the bottom of the disconnect switch (DS1) inside the junction box, then the top of the disconnect switch is wired to the OilTector control panel motor contactor (M1).

#### Pump Connections:

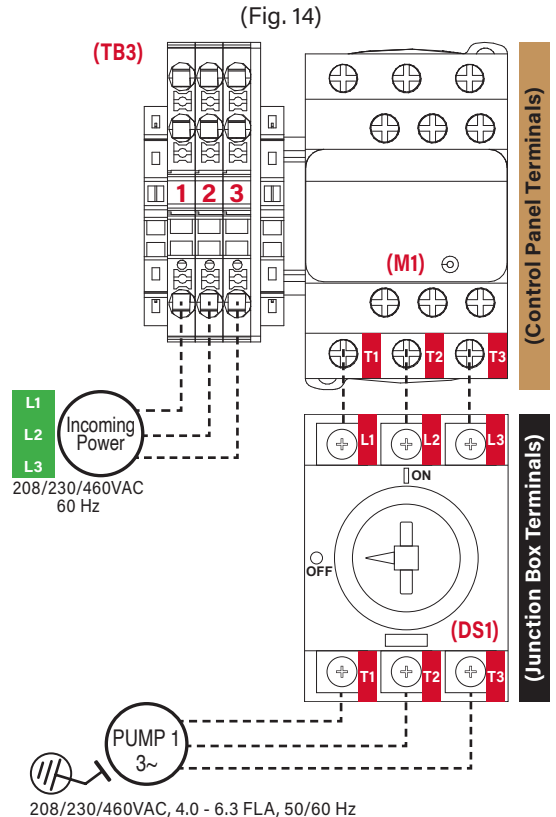
- Pump Wire 1 = DS1-T1 (junction box)
- Pump Wire 2 = DS1-T2 (junction box)
- Pump Wire 3 = DS1-T3 (junction box)
- Disconnect DS1-L1 = M1-T1 (control panel)
- Disconnect DS1-L2 = M1-T2 (control panel)
- Disconnect DS1-L3 = M1-T3 (control panel)

Note: Prior to connecting the incoming power, complete the steps on page 9 for setting the transformer and motor protective switch.

#### Incoming Power:

- Incoming Power, L1 = TB3-1 (control panel)
- Incoming Power, L2 = TB3-2 (control panel)
- Incoming Power, L3 = TB3-3 (control panel)

**CAUTION:** NEVER leave the ground wire(s) exposed, use provided ground terminals for wire termination. Refer to included schematic.





## Settings | Transformer and Motor Protective Switch

### Three Phase OilTector ONLY (single phase, skip to page 10)

1. The transformer (TRANS1) H4 terminal is pre-wired at the factory and the other wire must be field connected to the corresponding voltage terminal listed below and shown in the diagram (Fig. 15). The transformer is used to step down power to the control voltage required for the OilTector control panel.

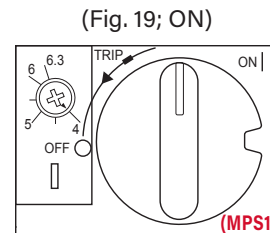
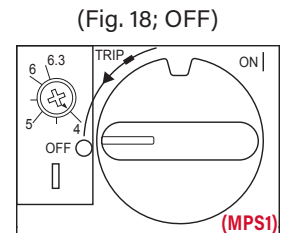
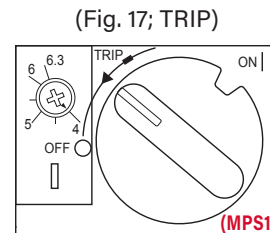
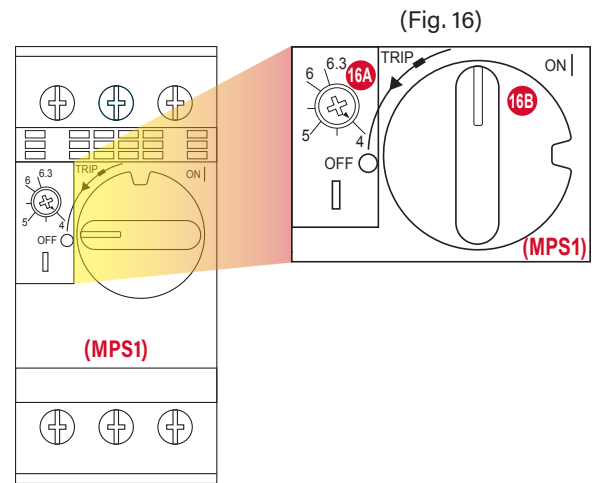
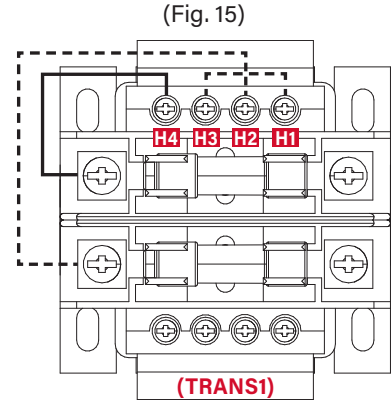
- Terminal H1 = 460VAC
- Terminal H2 = 230VAC
- Terminal H3 = 208VAC
- Terminal H4 = Pre-wired at Factory

**WARNING:** Both legs of power must be connected on the top of the transformer before power can be applied to the control panel. Refer to included schematic for complete wiring information and function.

2. Set the arrow on the dial of the motor protective switch (MPS1) to the full load amps (FLA) of the pump using a phillips head screw driver (Fig. 16A).
3. When the OilTector control panel is ready for operation, place MPS switch into the ON position (Fig. 16B).

*Note: The MPS switch is a combination of a circuit breaker and an overload.*

4. If the pump trips (TRIP) (Fig. 17), reset by turning counter clockwise to OFF (Fig. 18), then clockwise back to ON (Fig. 19).





## 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 ALARM 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 Holding Tank 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 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 holding tank high level 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 holding tank high level 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 holding tank high level alarm input is activated by multiple alarms depending on the model of the control panel and may include power loss, sensor error, and other alarms (see control panel manual for full details). The alarm condition will stay on until the sensor for high oil, high water, and/or holding tank high level 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 holding tank high level alarm deactivates and the alarm panel will auto reset for the next alarm cycle.

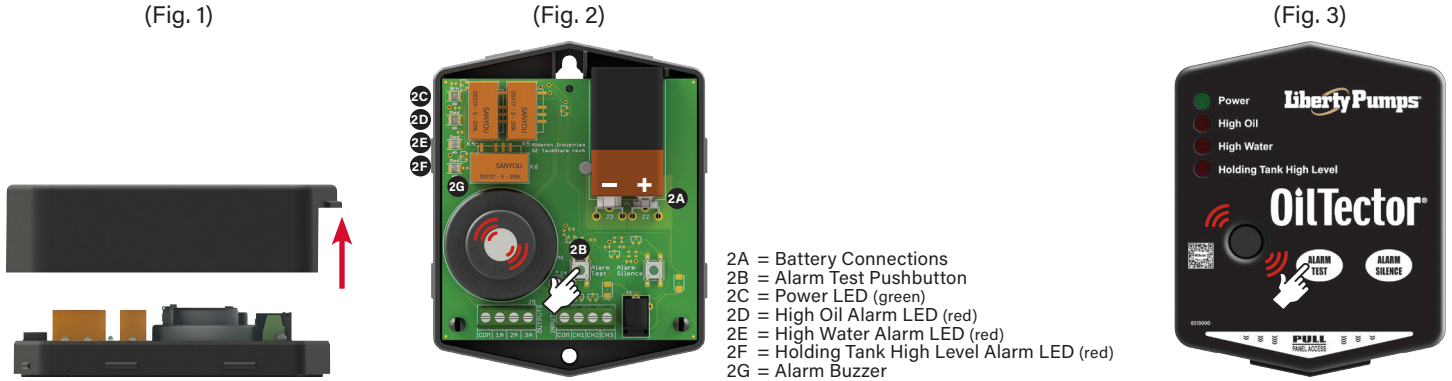
Note: If zone-1 (high oil) is in an alarm condition and the buzzer is silenced, and then zone-2 (high water) or zone-3 (holding tank high level alarm) goes into an alarm condition, the buzzer will reactivate until the alarm silence pushbutton is pressed to acknowledge that a new alarm condition has occurred.

## Installation of the Alarm Panel

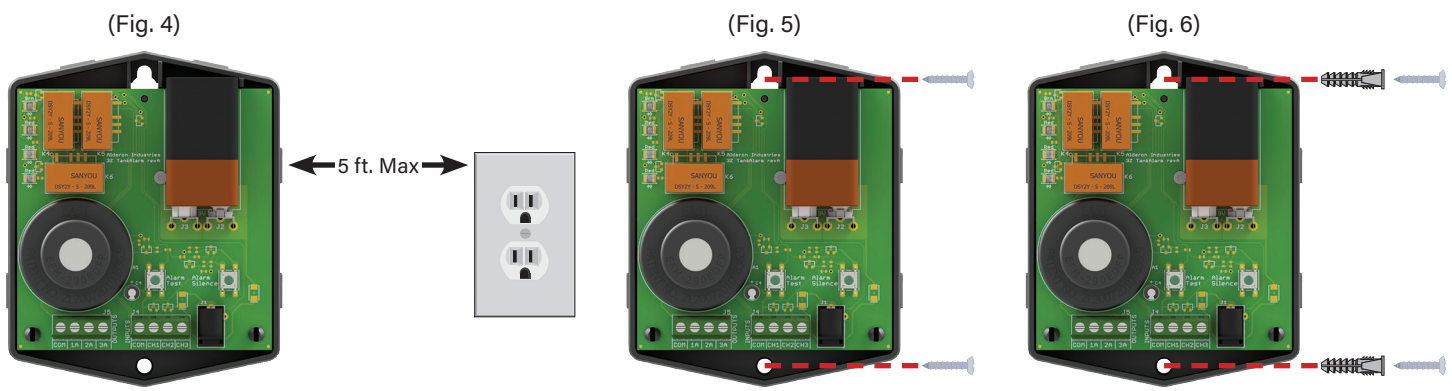
1. To install/replace the battery for the backup power feature, remove the enclosure cover (Fig. 1) and install a 9VDC battery (not included) by pressing down into the positive (+) and negative (-) terminal connections (Fig. 2). After installing battery, perform a quick test, press and hold the alarm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



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.



**Installation of the Alarm Panel (continued)**

3. 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).
4. 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 Holding Tank High Level Alarm)  
 Connects to external monitoring device

Note: Terminal 3A will monitor power loss, 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.

*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, TB1-3 (common)

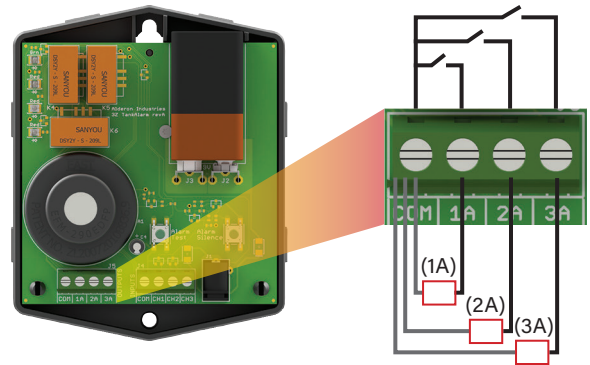
**Terminal CH1**  
 Connects to OilTector Control Panel, TB1-4 (oil alarm)

**Terminal CH2**  
 Connects to OilTector Control Panel, TB1-5 (water alarm)

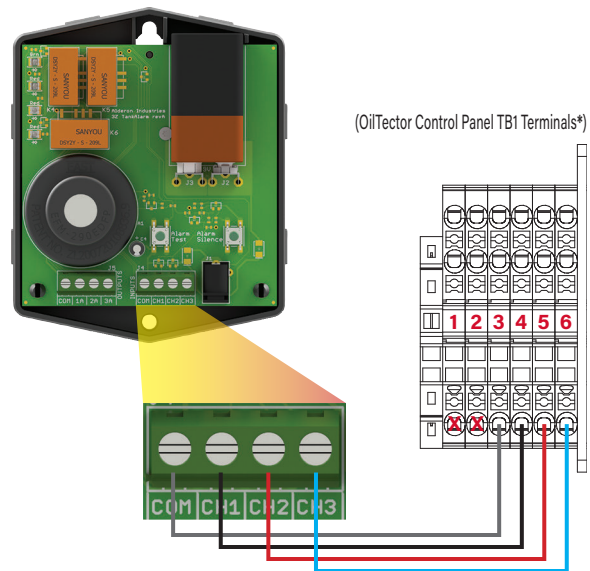
**Terminal CH3**  
 Connects to OilTector Control Panel, TB1-6 (holding tank high level alarm)

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

(Fig. 7)



(Fig. 8)



(\*) The OilTector control panel's terminal block exact terminal style may vary but 3, 4, 5, 6 is consistent for wiring connections.



### Installation of the Alarm Panel (continued)

5. 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)

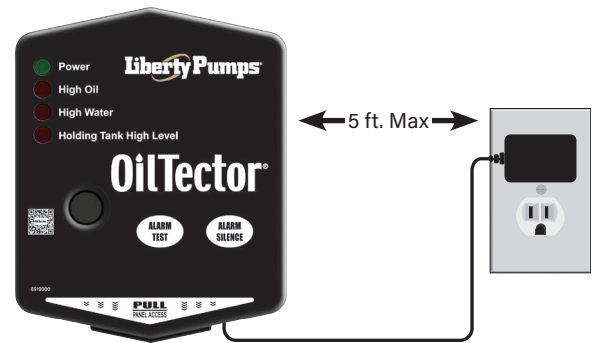


(Fig. 10)



6. 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

1. Test the alarm panel by pressing and holding the alarm test pushbutton (Fig. 12). The alarm LEDs should illuminate (solid), buzzer should announce (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)



## OilTector Control Panel | PLC and HMI Operation

The OilTector control panel is operated by the programmable logic controller (PLC) using a human machine interface (HMI) touchscreen and a preset level sensor for a simplex (one pump) application with two valve control. The current sensors on the pump and valves provide the most accurate data logging to verify the correct valve opened and pumped the correct fluid to the correct location. The valves open and close depending on the current condition of the PLC based on the preset level sensor in the monitoring area. The system includes a time based holding tank level display with approximate tank level based on the pump gallons per minute and tank dimensions entered into the system settings.

After all the steps of the installation are completed and supply voltage is verified:

1. Power OilTector control panel, navigate to the Main Menu > Configure Oil Tank screen, and configure PLC for volume.
  - i. Enter the pump gallons per minute from the pump nameplate.
  - ii. Select what type of holding tank is being used and press the dimensions button (round or square/rectangle).
  - iii. Enter the dimensions of the tank.
2. Navigate to the Maintenance Menu > Pump Valve/Control screen.
  - i. Verify the Hand/Auto switches are in the correct position for operation.

### Hand Mode:

1. When the pump Hand/Auto switch is placed into HAND mode, the pump will run.
2. When the solenoid valve #1 (water) Hand/Auto switch is placed into HAND mode, the valve will open.
3. When the solenoid valve #2 (oil) Hand/Auto switch is placed into HAND mode, the valve will open.

### Auto Mode:

1. When the pump Off/Auto switch is placed into AUTO mode, the pump will be called to run by the OilTector stop probe, start probe, high water alarm probe, and/or high level float switch (oil detection).
2. The valves will open and close depending on the condition(s) of the OilTector control panel and preset level sensor.
3. As the water levels rises touching the start probe, solenoid valve #1 (water) opens, the pump will start and continue to run until the water level recedes below the pump stop probe to complete the pump cycle and closes solenoid valve #1.
4. 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 which closes solenoid valve #1 (water) and opens solenoid valve #2 (oil). After solenoid valve #2 opens, the pump will start and continue to run for the programmed amount of time (off-delay) after the high level float switch is deactivated. If solenoid valve #2 does not open or if solenoid valve #1 is open, the pump will not run during an oil detection condition.
  - i. If the PLC does not see a pump run confirmation in 5-seconds, it will stop the pump and display a pump fail message on the HMI touchscreen.
  - ii. This fault must be reset by navigating to the Main Menu > Reset Faults screen and pressing the "Reset Pump Fail" button.
  - iii. If the PLC does not receive a valid signal from either valve within 5-seconds of being called, it will display a fault message on the HMI touchscreen.

## OilTector System Alarm Conditions

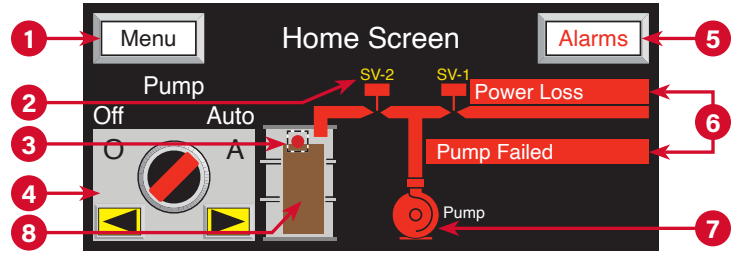
An alarm condition will occur on the OilTector control panel during a high oil, high water, holding tank high level, and/or pump failure event. During an alarm condition the OilTector control panel auxiliary contacts send a signal to activate the OilTector remote alarm panel. The remote alarm panel buzzer 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. 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 holding tank high level alarm deactivates and the alarm panel will auto reset for the next alarm cycle.

The pump fail and holding tank high level alarm condition displays can be reset on the OilTector control panel by navigating to the Main Menu > Reset Faults screen.

## OilTector Control Panel | HMI Menu, Settings, and Display Screens

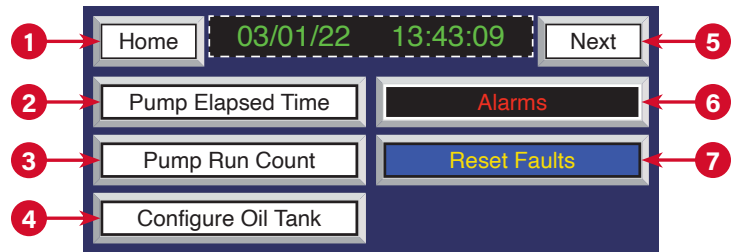
### (Home Screen)

1. Press to go to the main menu.
2. Displays status of solenoid valves.  
(green = open and red = closed)
3. Red dot blinks if high level float switch is activated.
4. Pump Off/Auto selector switch.
5. Press to go to the alarm count and history screen.
6. Displays alarm event banners for pump failure, high oil, high water, holding tank high level, power loss, etc.
7. Displays status of the pump.  
(green = on and red = off)
8. Displays estimated amount of oil in the holding tank based on pump run time.



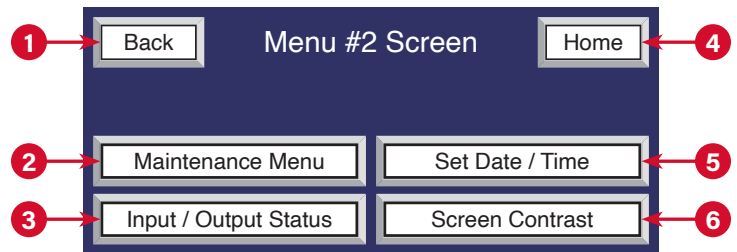
### (Main Menu Screen)

1. Press to return to the home screen.
2. Press to go to the pump elapsed time meter screen.
3. Press to go to the pump run count screen.
4. Press to choose the holding tank type, either round or square/rectangle and enter the tank dimensions.
5. Press to go to the menu #2 screen.
6. Press to go to the alarm count and history screen.
7. Press to go to the reset faults screen to reset a pump failure, solenoid failure, or full tank display fault.



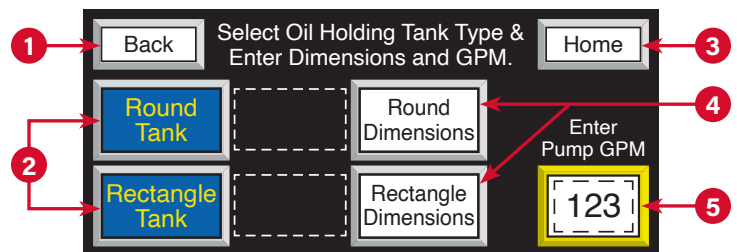
### (Menu #2 Screen)

1. Press to go back to the previous screen.
2. Press to go to the maintenance menu screen.  
(password protected, factory set to 1001)
3. Press to view status of the inputs and outputs.
4. Press to return to the home screen.
5. Press to update the current date and time.
6. Press to change the brightness of the screen.



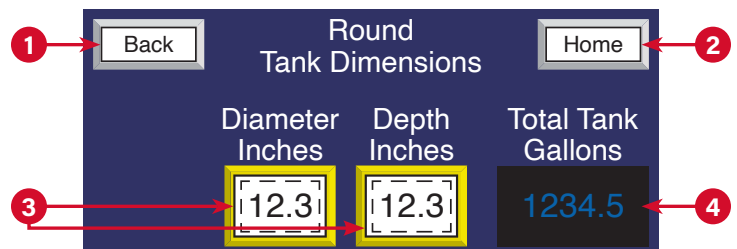
### (Holding Tank Type and Pump GPM Screen)

1. Press to go back to the previous screen.
2. Press to select what type of oil holding tank you have, round or square/rectangle.
3. Press to return to the home screen.
4. Press to enter dimension measurements.  
(can only enter dimensions of the tank that is selected)
5. Press to enter the gallons per minute of the pump from the pump nameplate.



### (Round Tank Dimensions Screen)

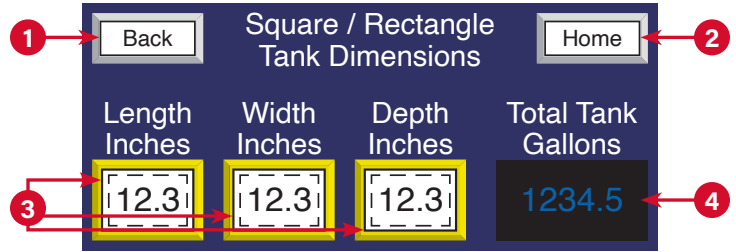
1. Press to go back to the previous screen.
2. Press to return to the home screen.
3. Press to enter the measurements of the diameter and depth of the holding tank.
4. Displays the total gallons of the tank based on the dimensions entered.



## OilTector Control Panel | HMI Menu, Settings, and Display Screens (continued)

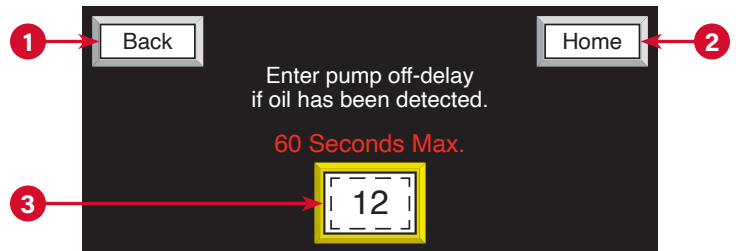
### (Square/Rectangle Tank Dimensions Screen)

1. Press to go back to the previous screen.
2. Press to return to the home screen.
3. Press to enter the measurements of the length, width, and depth of the holding tank.
4. Displays the total gallons of the tank based on the dimensions entered.



### (Pump Off-Delay Oil Detected Run Time Screen)

1. Press to go back to the previous screen.
2. Press to return to the home screen.
3. Press to enter amount of time (seconds) the pump will continue to run once oil has been detected, off-delay (60 seconds maximum, factory set to 5-seconds).



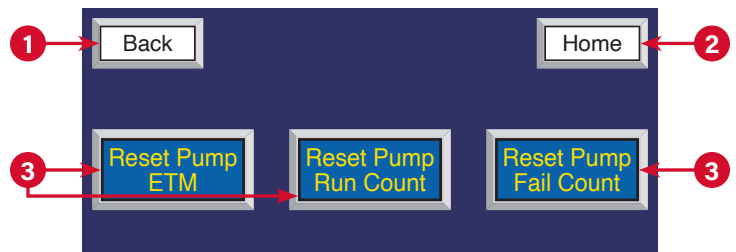
### (Pump, Solenoid, and Holding Tank Reset Screen)

1. Press to go back to the previous screen.
2. Press to return to the home screen.
3. Press to reset a pump fail or solenoid valve fault.
4. Press to reset the level display of the oil holding tank (storage tank).



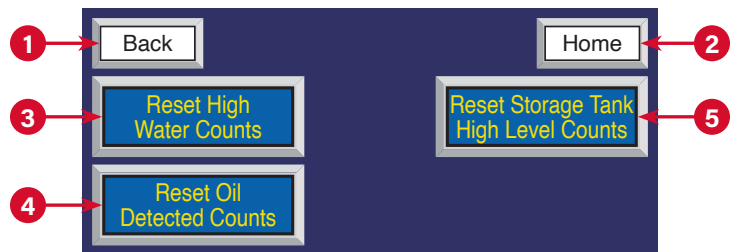
### (Pump Information Reset Screen)

1. Press to go back to the previous screen.
2. Press to return to the home screen.
3. Press to reset pump information such as elapsed time meter, run count (cycle counter), and pump fail count.



### (Fault Count Reset Screen)

1. Press to go back to the previous screen.
2. Press to return to the home screen.
3. Press to reset the high water alarm counts.
4. Press to reset the high oil alarm counts (oil detected).
5. Press to reset the oil holding tank high level counts (storage tank).

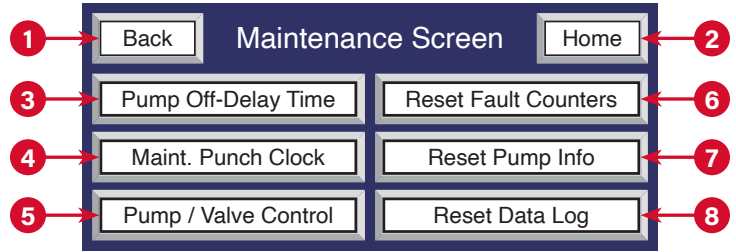




## OilTector Control Panel | HMI Menu, Settings, and Display Screens (continued)

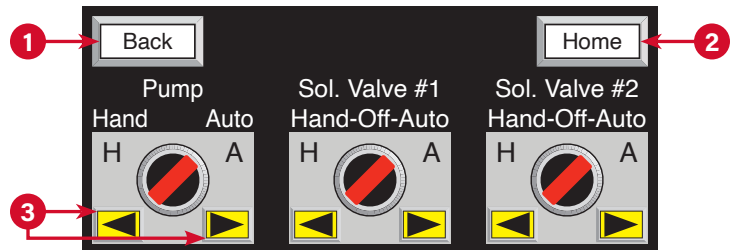
### (Maintenance Menu Screen)

1. Press to go back to the previous screen.
2. Press to return to the home screen.
3. Press to go to the pump run off-delay timer setting screen (factory set to 5-seconds). This is the amount of time the pump will continue to run after oil is detected.
4. Press to go to the maintenance punch clock screen.
5. Press to go to the pump/valve control screen.
6. Press to go to the reset fault counters screen.
7. Press to go to the reset pump information screen.
8. Press to go to the data log reset screen.  
*(password protected, factory set to 3333)*



### (Pump and Solenoid Hand/Auto Screen)

1. Press to go back to the previous screen.
2. Press to return to the home screen.
3. Press arrows (left and right) to toggle the control to HAND or AUTO mode for the pump, solenoid valve #1 (water), and solenoid valve #2 (oil).



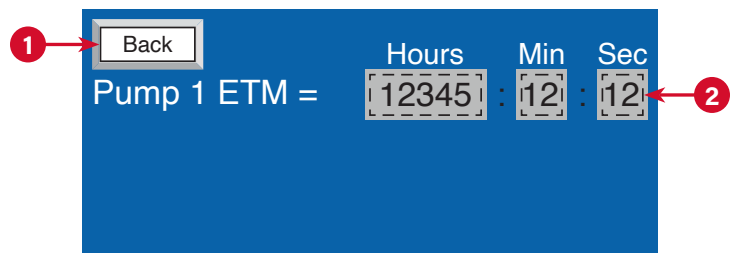
### (Maintenance Punch Clock Screen)

1. Press to go back to the previous screen.
2. Press to return to the home screen.
3. Press to start maintenance punch clock, a stopwatch image will blink while activated.
4. Press to stop maintenance punch clock, the time will then be stored to the USB flash drive if inserted.



### (Pump Elapsed Time Meter Screen)

1. Press to go back to the previous screen.
2. Displays the pump run time (elapsed time meter, ETM) in hours, minutes, and seconds.



### (Pump Run Count Screen)

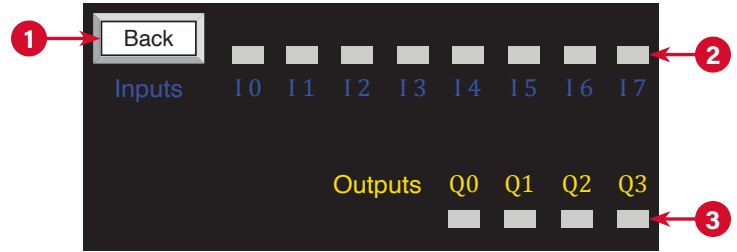
1. Press to go back to the previous screen.
2. Displays the pump run count (each cycle occurrence).



## OilTector Control Panel | HMI Menu, Settings, and Display Screens (continued)

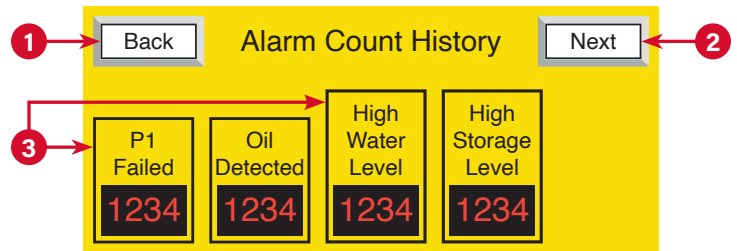
### (Inputs and Outputs Screen)

1. Press to go back to the previous screen.
2. Displays if the input is on or off.  
(green = on and grey = off)
3. Displays if the output is on or off.  
(green = on and grey = off)



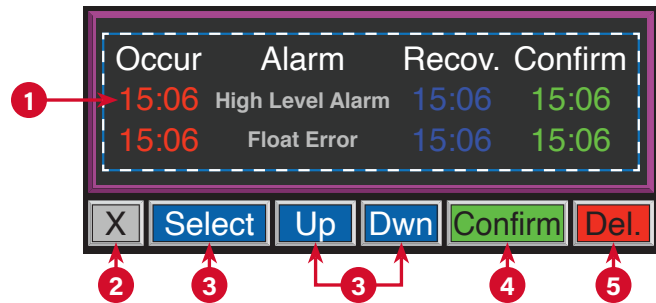
### (Alarm Count History Screen)

1. Press to go back to the previous screen.
2. Press to view current and past alarm conditions.
3. Displays the corresponding count history for the alarm conditions programmed.



### (Alarm History Screen)

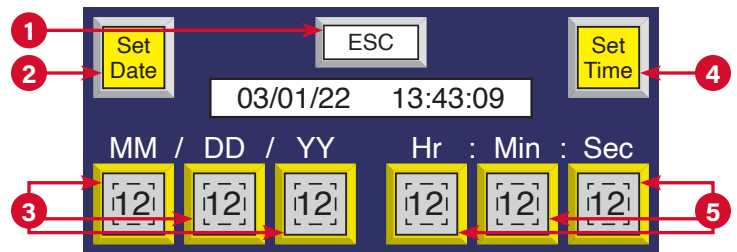
1. Displays each alarm event with: time alarm occurred, description of alarm type, time alarm was recovered, and time alarm was confirmed/acknowledged.
2. Press (X) to go back to the previous screen.
3. Press (Select) to highlight alarm history, then press (Up or Dwn) to scroll through events list.
4. Press (Confirm) to confirm alarm event(s).
5. Press (Del.) to delete the alarm event selected.



Note: Must press (Select) button to be able to scroll, confirm, or delete alarm events. Information can be stored to the USB flash drive if inserted.

### (Date and Time Screen)

1. Press to go back to the previous screen.
2. Press to set the date values.
3. Enter the month, date, and year as MM/DD/YY.
4. Press to set the time values.
5. Enter the hour, minutes, and seconds based on a 24-hour clock.



### (Data Reset Screen)

1. Press to go back to the previous screen.
2. Press to return to the home screen.
3. Press to erase all the alarm and data log values.

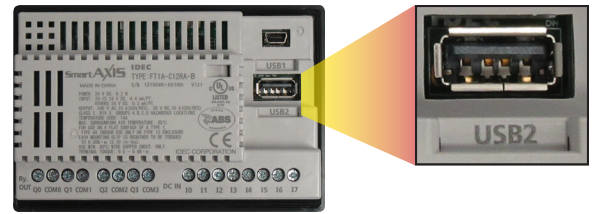


## OilTector Control Panel System | Data Logging

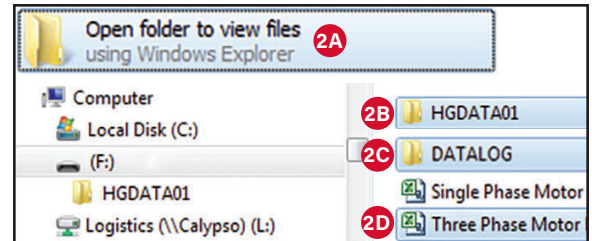
The OilTector control panel programmable logic controller (PLC) and human machine interface (HMI) touchscreen are capable of system data logging by the end user. These files are saved as CSV files.

1. Insert a flash drive into the port labeled USB2 (Fig. 1) located on the back of the HMI touchscreen to retrieve data for the pump and valves. Access the port on the inside of the inner dead front door of the control panel.
2. How to view system data after inserting the flash drive (USB) into your computer, laptop, or other electronic device.
  - i. Wait for dialog box to appear, locate the folder titled "Open folder to view files" and click to open (2A).
  - ii. Click to open on the folder titled "HGDATA01" (2B).
  - iii. Click to open on the folder titled "DATALOG" (2C).
  - iv. Click to open on the desired CSV file name to view data (2D).

(Fig. 1)



(Fig. 2)



## OilTector Control Panel System | Testing

1. Make sure all the steps of the installation and wiring for the pump, control panel, junction box, preset level sensor module, holding tank float switch, remote alarm panel, and valves have been completed prior to testing. The incoming voltage and all power receptacles used must match the OilTector system voltage.
2. Verify the incoming power is connected, turn the pump disconnect switch on the junction box to the ON position, and then turn the motor protective switch (MPS) inside the control panel to the ON position.
3. Once powered, use the human machine interface (HMI) touchscreen and navigate to the maintenance menu screen, enter the password (factory set to 1001), and then go to the pump/valve control screen.
4. Ensure the correct valves open and close when the corresponding selector is toggled from AUTO to HAND modes.
5. Check the motor voltage, amps, and rotation by toggling the pump selector from AUTO to HAND mode.
6. Make sure all selectors (pump, solenoid valve #1, and solenoid valve #2) are placed into AUTO mode.  
*Note: The pump gallons per minute and dimensions of the holding tank should already be entered into the settings.*
7. Navigate to the home screen and place the pump Off/Auto selector into AUTO mode.
8. Raise the holding tank high level float switch until the contacts activate and hold for 5-seconds to verify the holding tank high level alarm condition activates. Once the float switch contacts are deactivated by lowering the float switch, the alarm condition should reset.
9. With the probes on the preset level sensor module out of the water, raise (activate) and lower (deactivate) switch to verify:
  - i. When raised, the high oil alarm (oil detected) condition should activate.
  - ii. When raised, solenoid valve #2 (oil) should energize 1-second before the pump starts.
  - iii. When raised, the oil holding tank level display should start rising (based on information entered into settings).
  - iv. When lowered, the pump should run for approximately 5-seconds or the value entered into the off-delay setting.
  - v. When lowered, the high oil alarm (oil detected) condition should deactivate and reset for the next alarm cycle.
10. To perform a quick system test to simulate a water level rise event in the monitoring area, see the bucket test on page 20 using the preset level sensor module.

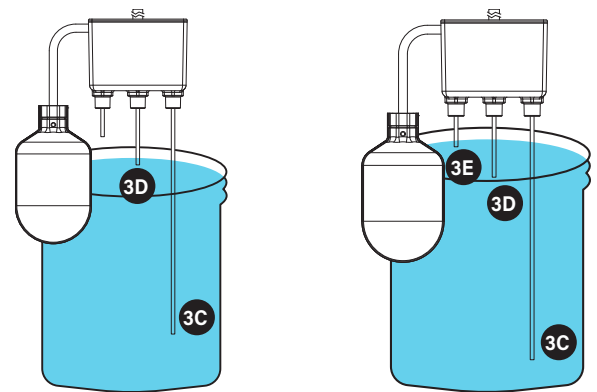
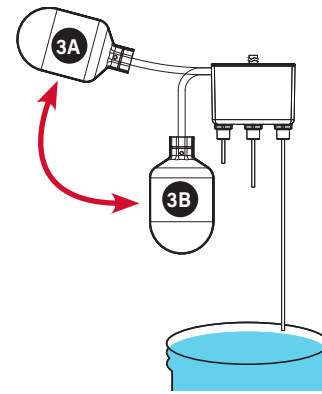
## OilTector Control Panel System | Bucket Test

When an OilTector full system installation test 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.

*Note: 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. 3), test a high oil alarm condition by raising (3A, activate) and lowering (3B, deactivate) the high level float switch to verify:
  - i. When raised, the high oil alarm (oil detected) condition and auxiliary contacts should activate, solenoid valve #2 (oil) should open, and the pump should run for the programmed amount of time (off-delay).
  - ii. When lowered, the high oil alarm (oil detected) condition and auxiliary contacts should deactivate, the pump should turn off, and solenoid valve #2 should close.
2. With the Off/Auto switch in the AUTO position, test a pump cycle by slowly immersing the preset level sensor into the water (Fig. 3) to verify:
  - i. When the pump stop probe (3C, longest) is immersed in water, the pump should not start.
  - ii. Continue lowering until the pump start probe (3D, middle) is immersed in water, solenoid valve #1 (water) should open, the pump should start and continue to run until the pump stop probe is raised out of the water. After the pump turns off, solenoid valve #1 should close.
3. 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. 3) to verify:
  - i. When the pump stop probe (3C, longest), pump start probe (3D, middle), and high water probe (3E, shortest) are immersed in water. The high water alarm condition and auxiliary contacts should activate.
  - ii. The alarm condition should clear once the high water probe (3E, shortest) is removed from the water.

(Fig. 3)



## Troubleshooting

PROBLEM	PROBABLE CAUSE	SOLUTION
Pump does not start	No incoming power source connected to panel Circuit breaker(s) in the OFF position Pump disconnect switch in the OFF position Defective motor contactor or overload module Preset level sensor loose wiring issue HMI pump Off/Auto switch in the OFF position Oil holding tank is full (storage tan) Solenoid valve(s) are not energizing Solenoid valve(s) current sensor(s) not activating Pump failure	Verify incoming power is connected to the panel Verify circuit breaker(s) are in the ON position Verify pump disconnect is in the ON position Check or replace contactor or overload module Check connections and for proper terminal wiring Verify pump Off/Auto switch is in the ON position Empty tank and reset HMI holding tank fault Verify power at solenoid or replace solenoid valve Replace the current sensor(s) Check or replace the pump
Pump running continuously or the pump runs continuously once started with the sensor	HMI pump Hand/Auto switch in HAND mode Induced voltage on sensor wires Improper installation of the preset level sensor	Toggle pump Hand/Auto switch into AUTO mode Separate sensor/power cables by 2-inch minimum Refer to pages 5 and 6 for proper installation
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 probes or replace the preset level sensor
Holding tank high level alarm (trouble alarm) is activated and the overload is tripped	Pump FLA improperly set on the overload dial Pump is clogged or defective	Set dial to the full load amps of the pump Clear debris, check, or 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	Refer to pages 5 and 6 for proper installation Clear obstruction so float can operate properly