OilTector® Control Panel System

Single Phase Simplex | Type 4X (Indoor/Outdoor)
Models: OTC Series, Opaque Door, Local and Remote Alarm

Operation, Maintenance, and Installation Manual | 7613000B

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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 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 alarm buzzer and/or auxiliary contacts will activate on power loss, high oil, high water, or the various alarm conditions. The system also includes auxiliary contacts for pump run monitoring. The alarm auxiliary contacts of the control panel 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 panel menu system with rotary encoder interface and OLED display screen provides indication of the current system status and access to 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. Refer to additional information in this manual for: multiple auxiliary contact outputs, navigating menu system, changing system settings or configurations, system setup with the setup wizard, system displayed statistics, and user input presets.

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 manual covers models: OTC-115-230W and OTC-115-230W-5. System includes: control panel with local alarm (beacon, buzzer, and test/silence switch), remote alarm panel, and preset level sensor module.

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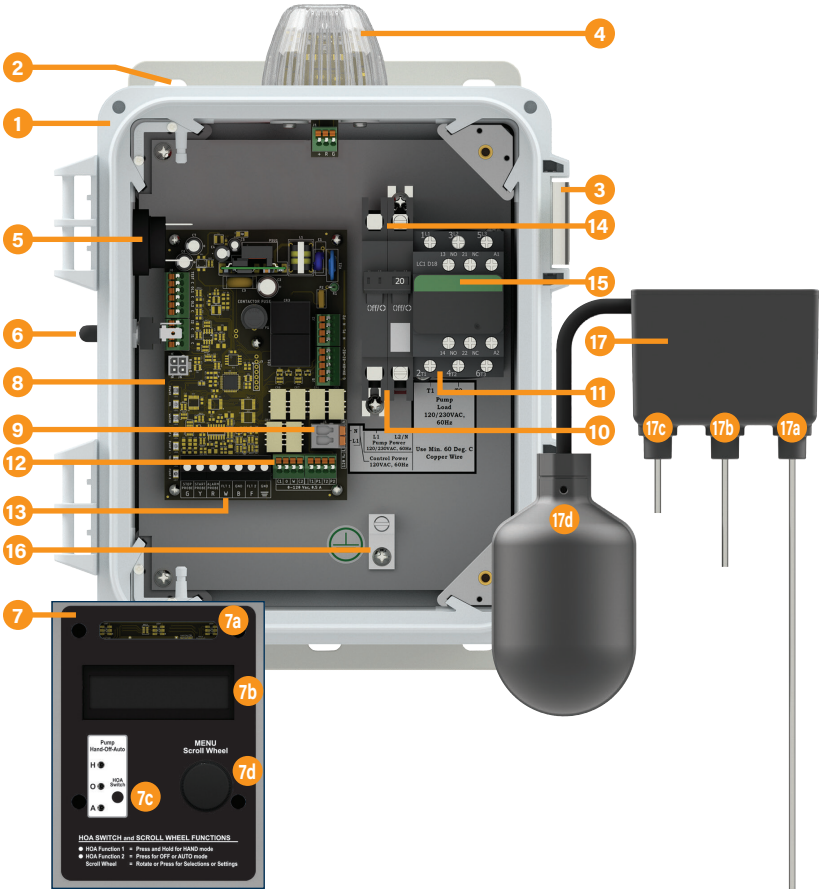
STANDARD FEATURES & SPECIFICATIONS | CONTROL PANEL



(1) Type 4X Enclosure (indoor/outdoor rated)
(2) Mounting Brackets
(3) Lockable Latches
(4) Alarm Beacon
(5) Alarm Buzzer
(6) Alarm Test/Silence Switch
(7) Inner Door (not shown) with Menu System (shown)
- 7a) Vibrant System LED Indicators
- 7b) 16x2 OLED Display Screen
- 7c) Hand-Off-Auto (HOA) Pump Selector Switch
- 7d) Menu Scroll Wheel (selections and settings)

(8) OilTector Circuit Board
(9) Incoming Control Power
(10) Incoming Pump Power
(11) Pump Connections
(12) Control Panel "Dry" Auxiliary Contacts
- Oil Alarm
- High Water Alarm
- Pump Trouble Alarms
- Pump Run

(13) Preset Level Sensor/Function Input Terminals
(14) Pump Power Circuit Breaker
(15) IEC Motor Contactor
(16) Ground Lug
(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

Pump Power
120/230VAC, 7-15A, 60 Hz (120VAC or 230VAC pump)
Models: OTC-115-230W and OTC-115-230W-5

Phase/Pump Type
Single Phase, Simplex

Incoming Control Power Terminals (circuit board)
120VAC, 60 Hz

Circuit Breaker (incoming pump power)
120/230VAC, 2P, 20A

IEC Motor Contactor (incoming pump connections)
120VAC or 230VAC, 18A, 50/60 Hz
3-Pole, Normally Open

Auxiliary Dry Alarm Contacts
24VDC, 250mA maximum (each)
Normally Open

LEDs (select colors listed)
Green (power)
Blue (pump run)
Red (alarm, activated sensor, or system setting)
Red/Yellow (system function alert, error, or alarm)

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

Control Switches (optional; 3-4 float system only)
25-foot or 50-foot cable
Narrow Angle, Normally Open, Cast Iron Cable Weight
SJOOW (UL/CSA)
18 AWG, 2-conductor, flexible, and water/oil resistant

Oil Probe (optional; 3-4 float system only)
25-foot or 50-foot cable
316 Stainless Steel, 1-inch diameter
SJOOW (UL/CSA)
18 AWG, 2-conductor, flexible, and water/oil resistant

Enclosure
Thermoplastic; 10 x 8 x 6 (inches)
Type 4X, Indoor/Outdoor; Lockable Latches

Certifications
UL 508 (US and Canada)

Three-Year Limited Warranty

Note: Refer to page 15 for the OilTector remote alarm panel specifications

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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 120/230VAC, 7.0-15.0 Amps, and a Type 4X (indoor/outdoor) enclosure. Menu system and scroll wheel are used to program settings and view data such as: pump running, pump cycle counts, pump amps, elapsed time, alarm conditions, and more. The system includes: control panel with local alarm (beacon, buzzer, and test/silence switch), remote alarm panel, and preset level sensor module. 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 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 continues to run until the water level recedes below the pump stop probe (longest) to complete the pump cycle. The control panel pump run LEDs will illuminate in addition to a pump running event on the system display screen (inner door) 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, and more.

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 (factory default) 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 alarm buzzer will annunciate, alarm LEDs will illuminate along with system display of the specific alarm condition on the inner door while the 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. To silence the control panel's buzzer during an alarm condition flip the test/silence toggle switch upward. The silence condition will reset when the sensor causing the alarm condition deactivates.

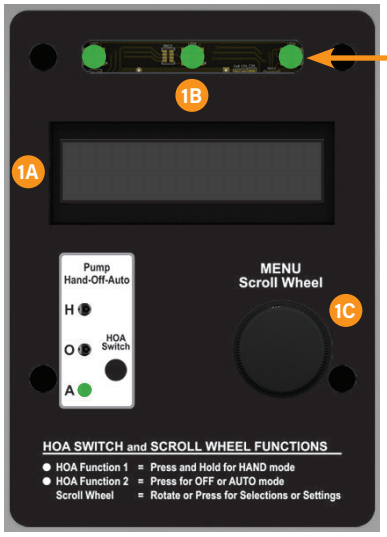
Menu System Overview | Interface

The user interface of the OilTector system includes a 16x2 OLED display screen (1A), three RGB LED indicators (1B), and a rotary scroll wheel (1C) used for navigating system statistics or changing settings. While the system is idle, the display screen will be turned off (Fig. 1) to conserve the life of the display.

1A = 16x2 OLED Display Screen
1B = (3) RGB LED Indicators (green, blue, red, red/yellow, etc.)
1C = Rotary Scroll Wheel

Note: See the setup wizard section on pages 11 and 12 to run a quick setup of system configurations and get the system running with basic functions.

(Fig. 1)



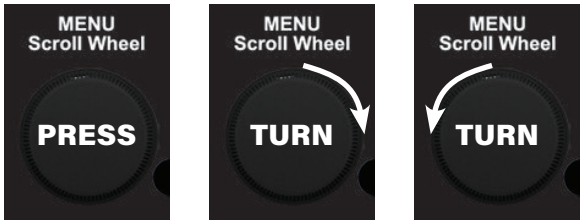
To wake up, simply make any action (press or turn) to the menu scroll wheel and System Normal (Fig. 2) should be displayed if the system is in a normal state (idle).

(Fig. 2)

Menu System Overview | Navigation

The menu scroll wheel is used for all user actions (inputs) to the menu system. This includes: navigation, configuration settings, clearing alarms, viewing system statistics, and more. See the table below and diagrams shown (Fig. 3) for the basic user functions.

(Fig. 3)



(clockwise) (counter-clockwise)

Menu Scroll Wheel - Basic Functions	
ACTION	**SYSTEM RESULT**
PRESS	Navigate Forward, Select, Commit a Change, or Clear an Alarm
TURN CLOCKWISE	Navigate to the Right or Increase a Configuration Value
TURN COUNTER-CLOCKWISE	Navigate to the Left or Decrease a Configuration Value
ACTIVATE TEST/SILENCE SWITCH	Exits Menu System and Returns to Main Screen (note: if test routine is activated, make any action to wheel to deactivate)

Menu System Overview | Conventions

The OLED display screen features a set of arrow indicators which appear on the bottom line to aid with menu navigation. See the table below for descriptions of these indicators.

Menu Screen Display - Arrow Indicators		
INDICATOR and LOCATION (IMAGE)		**MEANING (when shown)**
RIGHT ARROW	BOTTOM RIGHT (→)	Navigate Forward; PRESS to Take Action
LEFT ARROW	BOTTOM RIGHT (←)	Navigate Backwards; PRESS to Take Action
BLINKING RIGHT ARROW	BOTTOM LEFT (→)	Modify Selection; SCROLL to Change Value (canceled by timeout or activated test/silence switch)
ENTER ARROW	BOTTOM RIGHT (↵)	Confirm Modified Selection; PRESS to Confirm (canceled by timeout or activated test/silence switch)

Menu System Overview | Change a Setting

The system display screen configurations are organized into a file path similar to a computer, example shown in the diagram (Fig. 4).

To access settings, enter the password and then available selections are organized into groups, sub-groups, and individual configurations.

1. **System Normal** - Scroll down to MENU and press to view the main menu options available.
2. **Menu** - Scroll down to SETTINGS and press to enter password.
3. **Enter Password** - Enter the system password (factory set; 1919) and then scroll down to SYSTEM SET UP and press to view the configurations available.
4. **System Set Up** - Scroll down to desired selection and press to change the setting (example; AUTO ERROR RESET, ENABLED).

Note: See the settings section on page 23 for a complete list of available configurations in each of the main categories: setup wizard, system set up, pump set up, and input set up.

(Fig. 4)

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Installation of the OilTector Control Panel

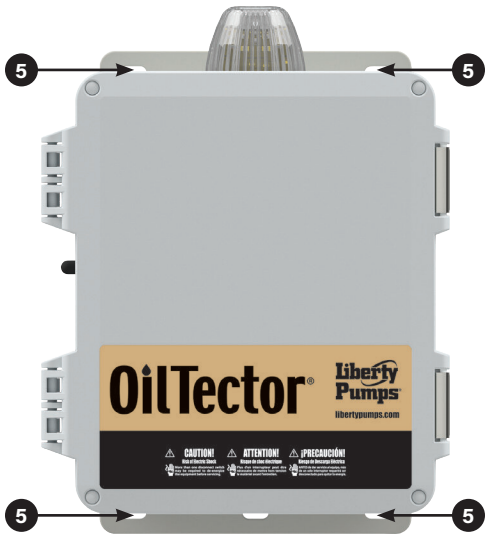
1. Determine the mounting location (Fig. 5) for the OilTector control panel and mount at the desired location. The enclosure size for all models is 10x8x6 (inches). Hold control panel in desired location, mark and drill pilot holes then mount using screws (not included) and wall mount anchors (not included) if necessary. Recommended to use four mounting screws.

Notes:
The control panel should be mounted within 25-feet (OTC-115-230W) or 50-feet (OTC-115-230W-5) of the preset level sensor module which is mounted in the sump/monitoring area. Splicing may be required for some installations.

If the control panel is to be installed with conduit, make sure to install and seal per local codes to prevent moisture or gases from entering the panel. 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 or junction box, follow the NEC requirements pertaining to separation of voltages.*

(Fig. 5)



Installation of the Preset Level Sensor

1. Determine the mounting location and attach the preset level sensor to the discharge pipe (Fig. 6A) 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 (6B) 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.

(Fig. 6)

2. The preset level sensor "stop level" (6C) 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 section on 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.

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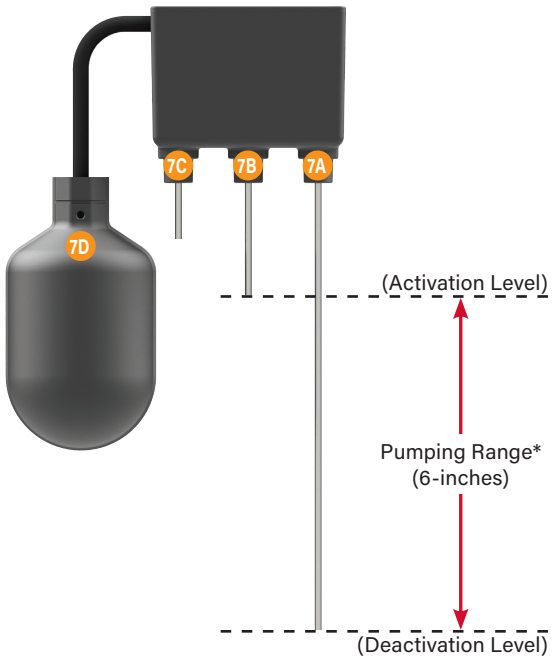
Pumping Range of the Preset Level Sensor

1. When the water level is no longer touching the pump stop probe (7A; longest), the pump stops running. When the water level rises touching the pump start probe (7B; middle), the pump turns on and remains on until the water level recedes below the pump stop probe. This is the pumping range* (6-inches).

   7A = PUMP STOP/Sensor Level Probe (preset)
   7B = PUMP START/Sensor Level Probe (preset)
   7C = HIGH WATER/Sensor Level Probe (preset)
   7D = OIL DETECTION/High Level Float (narrow angle float switch)

(*) Optional models may include a preset level sensor with an adjustable oil probe (pump stop) which can be mounted at the desired location to create an adjustable pumping range of 1.0" to 44.0" and operates as described in this section and shown in the diagram (Fig. 7) for activation and deactivation levels.

(Fig. 7)



Installation of the Float Switches and Oil Probe

1. If this system needs to be field converted to an application using three or four control float switches and an oil probe, refer to the float arrangements listed below and shown in the diagram (Fig. 8).

   8A = LOW LEVEL ALARM/REDUNDANT OFF (control switch)
   8B = OIL DETECTION (oil probe)
   8C = PUMP STOP (control switch)
   8D = PUMP START (control switch)
   8E = HIGH LEVEL ALARM (control switch)

2. Install the oil probe (8B) at the desired height where oil detection is required. As the liquid level rises oil or water touches the oil probe but no action is taken until the stop float is activated. If oil is touching the oil probe when the stop float is activated, then an oil alarm condition occurs. If water is touching the oil probe when the stop float is activated, then the system is enabled to allow the pump to run once the start float is activated.

3. Install an optional low level alarm/redundant off control switch (8A) for a low liquid level alarm indicator and redundant pump off. The alarm condition and pump stop events occur when this float switch is deactivated. Skip this step if using a three-float set up.

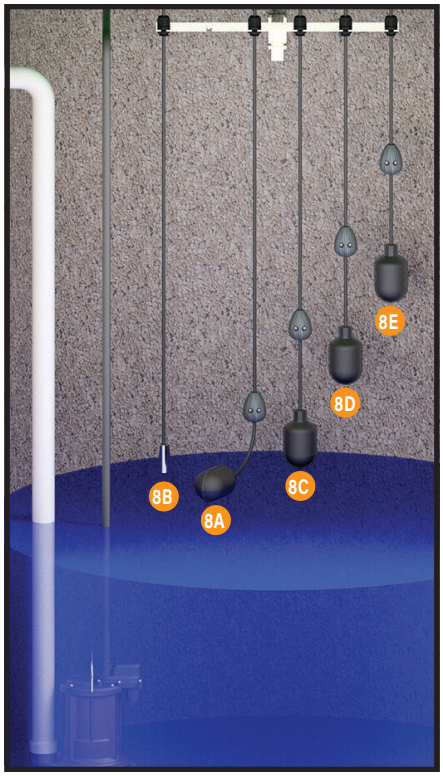
4. Install the pump stop control switch (8C) at the desired height which the pump should stop once the float switch is deactivated.

5. Install the pump start control switch (8D) at the desired height which the pump should start once the float switch is activated. The pump will continue to run until the pump stop (8C) float switch is deactivated to complete the pump cycle.

6. Install the high level alarm control switch (8E) at the desired height and an alarm condition occurs when this float switch is activated. The alarm condition will automatically reset itself when this float switch is deactivated.

Note: See the application examples and system configuration sections on pages 11, 12, and 23 for a complete list of available system configurations.

(Fig. 8)



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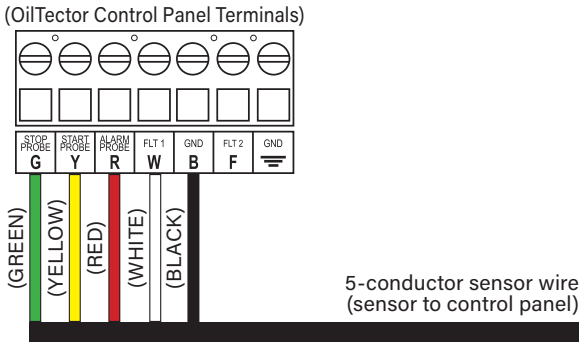
System Wiring | Preset Level Sensor

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 conduit into the OilTector control panel. Connect the wires to the terminals listed below and shown in the diagram (Fig. 9).

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)

(Fig. 9)



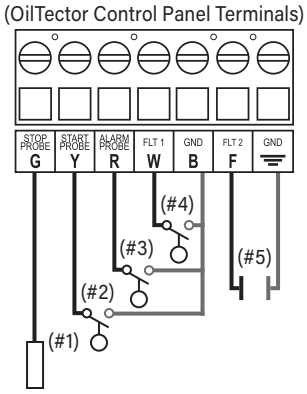
WARNING: The sensor contacts are low voltage wires, follow the NEC requirements pertaining to separation of voltages if run in the same conduit or junction box with high voltage wires.

System Wiring | 3-Floats and Oil Probe

1. The control float switches and oil probe should first be installed in the sump, then route the cables from the mounting location in the sump through the conduit into the OilTector control panel. Connect the wires to the terminals listed below and shown in the diagram (Fig. 10). Each sensor has one wire connected to the common input and the other wire connected to the corresponding terminal input. When using three control float switches, the extra digital input (FLT 2) will be configured as a fire alarm input.

OIL PROBE = TB-G (Oil Detection Probe; #1)
STOP PUMP = TB-Y (Control Switch; #2)
START PUMP = TB-R (Control Switch; #3)
HIGH ALARM = TB-W (Control Switch; #4)
COMMON 1 = TB-B (Common to Sensor Inputs)
FIRE ALARM = TB-F (Fire Alarm System Dry Contacts; #5)
COMMON 2 = TB-GND (Common to Fire Alarm Input)

(Fig. 10)

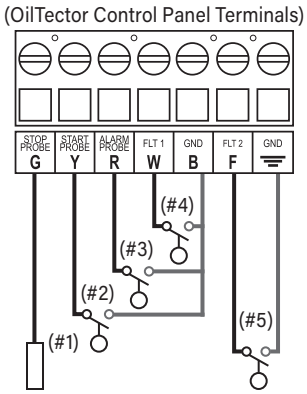


System Wiring | 4-Floats and Oil Probe

1. The control float switches and oil probe should first be installed in the sump, then route the cables from the mounting location in the sump through the conduit into the OilTector control panel. Connect the wires to the terminals listed below and shown in the diagram (Fig. 11). Each sensor has one wire connected to the common input and the other wire connected to the corresponding terminal input. When using four control float switches, the extra digital input (FLT 2) will be configured as a low level alarm/ redundant off input.

OIL PROBE = TB-G (Oil Detection Probe; #1)
STOP PUMP = TB-Y (Control Switch; #2)
START PUMP = TB-R (Control Switch; #3)
HIGH ALARM = TB-W (Control Switch; #4)
COMMON 1 = TB-B (Common to Sensor Inputs)
LOW ALARM/OFF = TB-F (Control Switch; #5)
COMMON 2 = TB-GND (Common to Low Alarm/Off Input)

(Fig. 11)



System Wiring | Function Input (FI)

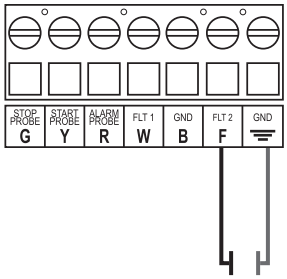
The function input (FLT 2) of the OilTector control panel can be used as a fire alarm input or with a low level alarm/redundant off float switch.

1. Fire Alarm Input
   If connecting to an existing alarm security system or building automation system (BAS), use 18 gauge 2-conductor wire to connect the existing product to the FLT 2 input and ground terminal on the OilTector control panel as listed below and shown in the diagram (Fig. 12). When connected and activated (contacts close), the system will run the pump on **ANY** liquid detection during a fire alarm condition, whether oil or water, to empty the sump.

   Fire Alarm Input Wire 1 = TB-F (function input)
   Fire Alarm Input Wire 2 = TB-GND (⏚)

(Fig. 12)

(OilTector Control Panel Terminals)



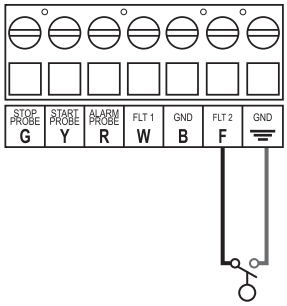
Fire Alarm Input
Normally Open, Dry Contact

2. Low Level Alarm / Redundant Off
   If installing a normally open float switch, connect one wire to the FLT 2 input and the other wire to the ground terminal on the OilTector control panel as listed below and shown in the diagram (Fig. 13). When connected, if the liquid level recedes and the float switch deactivates (contacts open), the system will stop the pump and activate a low level alarm condition.

   Float Switch Wire 1 = TB-F (function input)
   Float Switch Wire 2 = TB-GND (⏚)

(Fig. 13)

(OilTector Control Panel Terminals)



Low Level / Redundant Off
Float Switch, Normally Open

(deactivates, contacts open if the liquid level is below the float switch)

Note: When installing a sensor or device, always refer to its installation instructions for complete operating information.

System 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 16 - 18. See below for wiring information on connecting the alarm panel to the OilTector control panel.

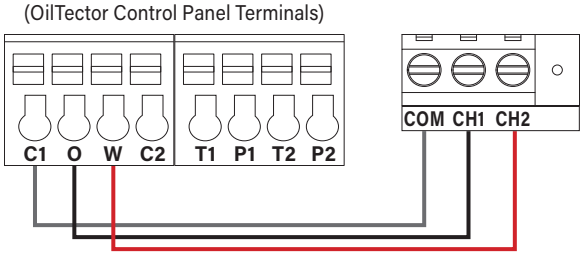
Note: The alarm panel can be mounted up to 2,500 feet from the control panel for remote alarm notification of high oil, high water, and trouble alarm.

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. 14).

   Control Panel TB-C1 (common) = Alarm Panel TB-COM
   Control Panel TB-O (oil alarm) = Alarm Panel TB-CH1
   Control Panel TB-W (water alarm) = Alarm Panel TB-CH2

(Fig. 14)

(OilTector Control Panel Terminals)



(OilTector Alarm Panel Terminals)

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System Wiring | Auxiliary Contacts

The OilTector control panel features a set of auxiliary dry contacts for pump trouble alarms and pump run monitoring. If desired, connect the auxiliary contacts to an existing alarm security system or building automation system (BAS). Use 18 gauge, 5-conductor wire. See wiring information listed below and shown in the diagram (Fig. 15). Refer to the table below for functions and events for each auxiliary contact terminal.

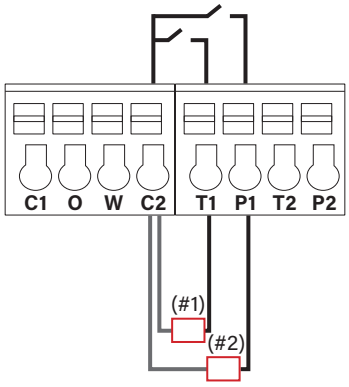
Control Panel TB-C2 = Common 2
Control Panel TB-T1 = Pump Trouble Alarm Auxiliary Output (#1)
Control Panel TB-P1 = Pump Run Auxiliary Output (#2)

1. Trouble Alarm Events:
   When the system detects a trouble alarm condition for the pump, the T1 and/or T2 terminals "close" and the trouble alarm auxiliary contacts will activate.

2. Pump Run Monitoring:
   When the OilTector preset level sensor or control switches activate the pump to start and the pump is running, the control panel's pump run LEDs will illuminate and the pump run auxiliary contacts will activate.

Note: When installing a sensor or device, always refer to its installation instructions for complete operating information.

(Fig. 15)
(OilTector Control Panel Terminals)



Control Panel - Auxiliary Contacts | Remote Alarm Panel, Trouble Alarms, and Pump Run Monitoring		
AUXILIARY CONTACT	TERMINAL BLOCK DESCRIPTION	FUNCTION or SYSTEM EVENT CONDITION(S)
C1	Common 1	This is the common terminal connection for the O and W terminals
O	Oil Alarm Contact Output	Oil Alarm event conditions will activate this terminal
W	Water Alarm Contact Output	Water Alarms, Input Errors, and Power Loss event conditions will activate this terminal
C2	Common 2	This is the common terminal connection for the T1 and P1 terminals
T1	Pump Trouble Alarm Output	Pump: Under Current, Over Current, Fail, and Contactor Latched event conditions will activate this terminal
P1	Pump Run Output	Pump Run event will activate this terminal

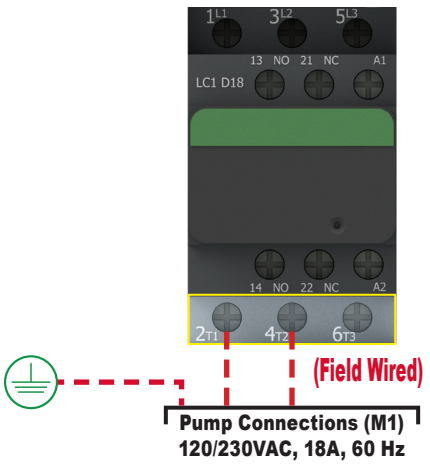
System Wiring | Pump Connections

1. The pump should first be installed in the sump, then route the pump connection cable from the mounting location in the sump through the conduit into the OilTector control panel. Connect the wires to the motor contactor terminals listed below and shown in the diagram (Fig. 16).

Pump Connection Wire 1 = M1-T1 (motor contactor)
Pump Connection Wire 2 = M1-T2 (motor contactor)

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

(Fig. 16)



System Wiring | Incoming System Power

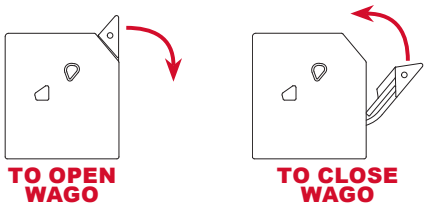
Before making wire connections and terminations for the incoming system power, carefully read this section for proper function of the WAGO connector used with this product.

WARNING: *Improper use of connectors will cause damage to components. DO NOT use mechanical tools to open or close, hand usage only for proper installation and component integrity.*

Wire Connection Type - Quick Snap Terminal WAGO (Fig. 17):

1) Press tab(s) outward. DO NOT open past a 40° angle to avoid risk of breaking the tab(s).
2) Insert wire(s) into slot.
3) Press tab(s) inward.
4) Make sure wire(s) are secured.

(Fig. 17)

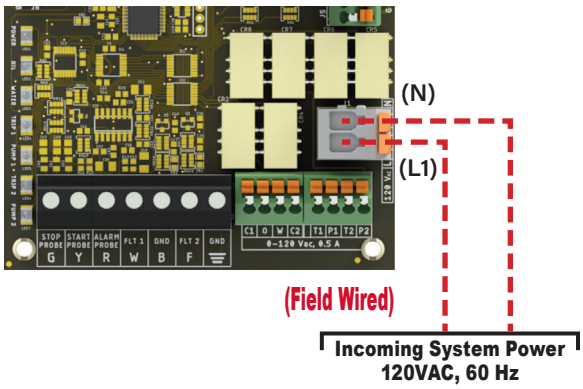


1. The incoming system power cable and wires should be routed through the conduit into the OilTector control panel. Connect the line (L1) wire into the bottom terminal of the connector as shown in the diagram (Fig. 18) and then connect the neutral (N) wire into the top terminal as shown in the diagram.

   Incoming System Power, L1 = TB-L1 (line)
   Incoming System Power, N = TB-N (neutral)

Note: Do not connect power to the system until all steps of the wiring and installation are completed. The power outlet or receptacle must match the voltage of the OilTector control panel. Refer to the included electrical schematic for complete wiring and voltage information.

(Fig. 18)



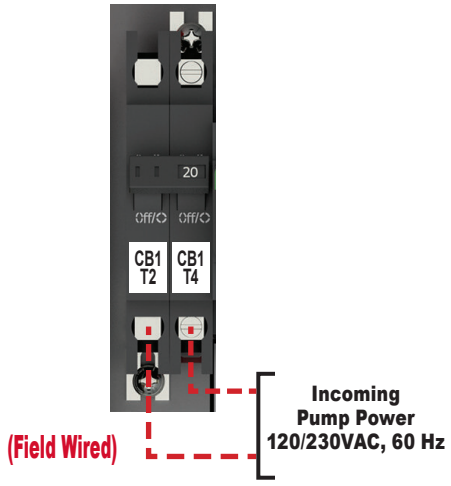
System Wiring | Incoming Pump Power

1. The incoming pump power cable and wires should be routed through the conduit into the OilTector control panel. Connect the first line (L1) wire into the bottom/left side of the pump circuit breaker as shown in the diagram (Fig. 19) and then connect the second line or neutral (L2/N) wire into the bottom/right side of the pump circuit breaker as shown in the diagram.

   Incoming Pump Power, L1 = CB1-Terminal 2 (line)
   Incoming Pump Power, L2/N = CB1-Terminal 4 (line/neutral)

Note: Do not connect power to the system until all steps of the wiring and installation are completed. The pump power must match the voltage of the OilTector control panel. Refer to the included electrical schematic for complete wiring and voltage information (120VAC pump = L1/N and 230VAC pump = L1/L2).

(Fig. 19)



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Application Examples | Determine Sensor Type

After the installation of the OilTector system is complete and prior to running the setup wizard, determine the system sensor type per application. The system has two modes of operation, one for sump applications and one for lift station applications. The control panel is programmed from the factory for either sensor type depending on the model number (sensor types can be changed in the field).

Note: See the system configuration sections on pages 12 and 23 for a complete list of available system configurations.

SYSTEM TYPE: 3-Probe and Float (Fig. 20 and Fig. 21)
This system type sensor option uses a preset level sensor with a fixed or adjustable pumping range. See complete installation and operation information for the preset level sensor on pages 5 - 7.

1. Preset Level Sensor - Fixed Pumping Range (6.0")

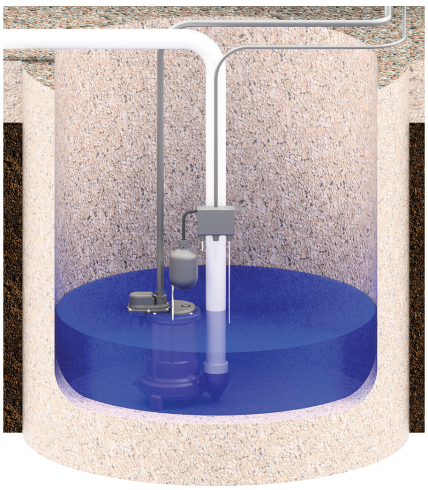
The control panel is operated by the sensor for pump stop, pump start, high water alarm, and oil detection alarm (high level float switch). As the water level rises touching the pump start probe (middle) the pump will start and continue to run until the water level recedes below the pump stop probe (longest) to complete the pump cycle. This sensor has a fixed pumping range of 6.0", the distance between the pump stop and pump start probes.

2. Preset Level Sensor - Adjustable Pumping Range (1.0" - 44.0")

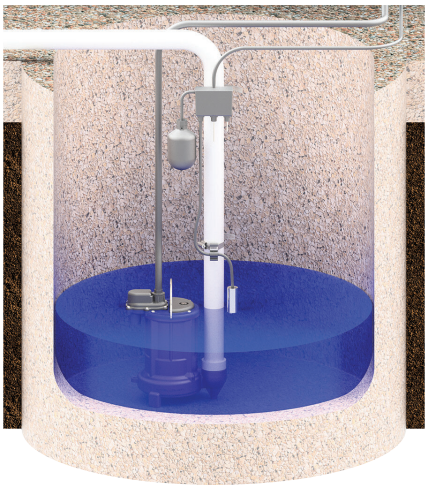
The control panel is operated by the sensor for pump stop, pump start, high water alarm, and oil detection alarm (high level float switch). As the water level rises touching the pump start probe (middle; fixed) the pump will start and continue to run until the water level recedes below the pump stop probe (longest; adjustable) to complete the pump cycle. This sensor has an adjustable pumping range of 1.0" - 44.0", the distance between the pump stop and pump start probes.

[Display Screen Configuration Example]:

(Fig. 20)



(Fig. 21)



SYSTEM TYPE: 3-4 Floats and Probe (Fig. 22)
This system type sensor option uses three or four control switches and an oil probe to create the pumping range. See complete installation and operation information for the control switches and oil probe on pages 6 - 8.

1. Floats and Probe - Pumping Range (customized per application)

The control panel is operated by the control switches and oil probe for pump stop, pump start, high water alarm, oil detection alarm, and low level/redundant off alarm. As the liquid level rises it first touches the oil probe and no action is taken until the liquid level rises and activates the stop float. At this time, if oil is touching the oil probe, an oil alarm is activated. If water is touching the oil probe, the pump will start when the water level activates the start float. The pump will turn off if either the stop float deactivates or if oil is touching the oil probe. A low level/ redundant off float can be installed below the oil probe to activate a low level alarm and also turn off the pump in case the stop float fails. If the high alarm float is activated a high level alarm condition occurs.

[Display Screen Configuration Example]:

(Fig. 22)

Setup Wizard | Quick System Configuration

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

Once power is applied to the OilTector control panel a system normal display screen should be shown with green LEDs to indicate a normal state (idle) if the system was installed properly. Follow the menu path listed below and shown in the diagrams to start the setup wizard quick system configuration process to get the system running quickly.

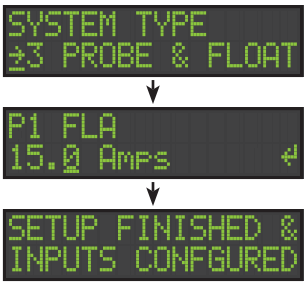
1. **System Normal** - Scroll down to MENU and press to view the main menu options available.
2. **Menu** - Scroll down to SETTINGS and press to enter password.
3. **Enter Password** - Enter the system password (factory set; 1919) and then scroll down to SETUP WIZARD and press to view the configurations available for the system sensor type.

(Fig. 23)

3-Probe and Float (Fig. 24; sump applications):

1. **Setup Wizard** - Scroll down to SYSTEM TYPE 3 PROBE & FLOAT and press to enter the pump full load amps (FLA).
2. **P1 FLA** - Use menu scroll wheel to enter the value of the pump FLA and press to confirm selection.
3. **Setup Finished & Inputs Configured** - After the pump FLA has been confirmed, SETUP FINISHED & INPUTS CONFGURED should display on the screen before returning to system normal.

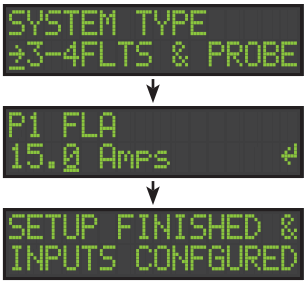
(Fig. 24)



3-4 Floats and Probe (Fig. 25; lift station applications):

1. **Setup Wizard** - Scroll down to SYSTEM TYPE 3-4 FLTS & PROBE and press to enter the pump full load amps (FLA).
2. **P1 FLA** - Use menu scroll wheel to enter the value of the pump FLA and press to confirm selection.
3. **Setup Finished & Inputs Configured** - After the pump FLA has been confirmed, SETUP FINISHED & INPUTS CONFGURED should display on the screen before returning to system normal.

(Fig. 25)



Note: Entering the pump FLA will configure the high and low amp alarm values for the pump. The system will set the trip values at 25% above and below the FLA entered here. Both high and low amps can be field modified individually in the pump set up section of the menu system.

Device Configurations:

Refer to pages 13, 20, 21, and 23 for more information on settings for optional device configurations and a complete list of the system configurations. Some of these settings include: level sensor error detection, automatic alarm reset, fire alarm, low level alarm/redundant off, pump exerciser, clearing alarms, and pump hand-off-auto selector switch.

Testing:

Refer to pages 14 and 19 for testing the OilTector system.

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System Operation | User Input/Clearing Alarms

To clear an alarm condition that is displayed on the main screen, scroll to the desired event (Fig. 26) and then press the menu scroll wheel. A confirmation screen will appear (Fig. 27), press the menu scroll wheel again to clear the alarm and the system rechecks itself (Fig. 28). When the alarm condition is cleared and no other alarms are present, then System Normal (Fig. 29) should appear on the display screen.

If the alarm condition immediately reactivates, the alarm condition is still present and the system cannot clear the alarm event. If this occurs, check the source of the alarm.

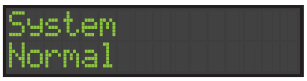
Note: Activating the test/silence switch will jump to the main screen and all active alarm events are displayed.

(Fig. 26)

(Fig. 27)

(Fig. 28)

(Fig. 29)



System Operation | Pump Hand-Off-Auto (HOA) Switch

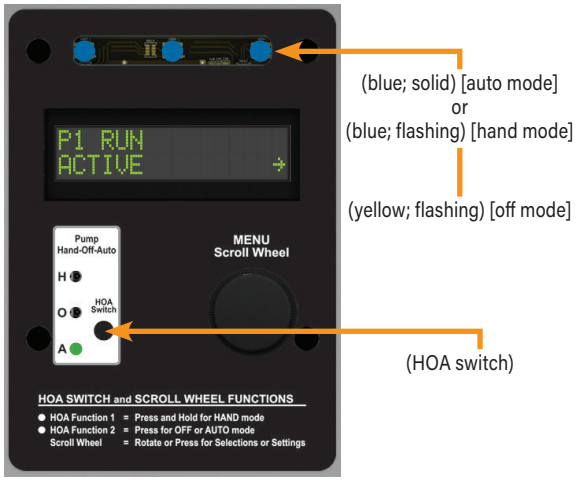
The pump hand-off-auto (HOA) selector switch (Fig. 30) is used to control the desired operation mode of the pump and a green LED will illuminate to indicate which mode is currently selected. See below for more information on the three operating positions, the "normal" operating position is Auto Mode.

1. **Hand Mode (H);** press and hold the HOA switch for more than 3-seconds, the panel will be in Hand Mode. The pump will start and continue to run until the switch is toggled to the off position regardless of sensor status. The blue pump run LEDs will illuminate (flashing) and a pump hand mode event is displayed on the screen.

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. When in Off Mode, yellow LEDs will flash and a pump disabled event will be displayed on the screen.

3. **Auto Mode (A);** the pump will operate based only on the status of the system sensors, turning the pump on and off. The blue pump run LEDs will illuminate (solid) and a pump run active event is displayed on the screen (Fig. 30).

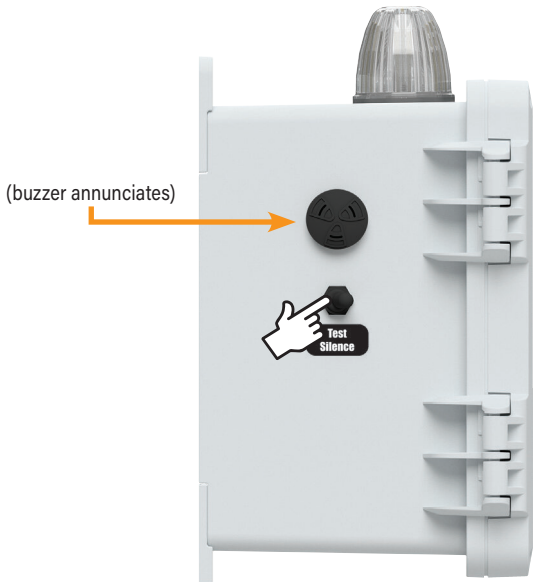
(Fig. 30)



System Operation | Alarm Test/Silence and Buzzer

The alarm test/silence switch of the OilTector control panel can be used to either test the alarm system, silence the buzzer during an alarm condition, cancel a selection during system configurations, or access to system quick stats and alarm events.

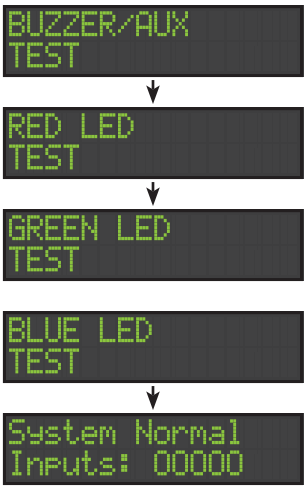
(Fig. 31)



Alarm Test:

1. Flip upward and then release (1-second +) the test/silence switch (Fig. 31) on the exterior left side of the control panel enclosure, the alarm buzzer will annunciate, auxiliary contacts activate, and LED test pattern will begin immediately. See below for more information and the display screen examples shown (Fig. 32).
    a. Alarm buzzer will annunciate (Fig. 31).
    b. Control panel alarm auxiliary contacts will activate.
    c. LEDs will illuminate (solid) and color is shown on the display screen during the testing sequence (Fig. 32):
        i. Buzzer and Alarm Auxiliary Contacts Activate (no LEDs)
        ii. Red LED Test
        iii. Green LED Test
        iv. Blue LED Test
    d. Once the alarm test sequence is complete, the system will return to system normal when in an idle condition.
2. Flip upward and then hold to view quick stats including: pump run cycle counter and pump run total elapsed time (Fig. 33). Upon release it will initiate the test sequence before returning to system normal when in an idle condition.

(Fig. 32)

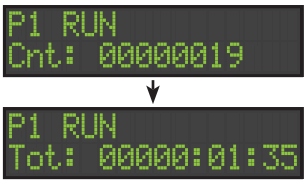


Alarm Silence:

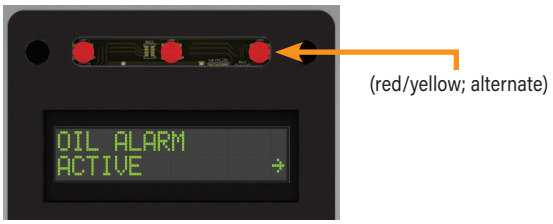
1. Activate the high level float switch on the preset level sensor. When raised, a high oil alarm (oil detected) event will be displayed on the screen of the control panel and the red/yellow alarm LEDs illuminate (alternating; Fig. 34). The alarm buzzer should annunciate (Fig. 31), the high oil alarm auxiliary contacts on the control panel should activate the OilTector remote alarm panel and BAS system contacts should activate if used with the remote alarm.
2. Flip the test/silence switch upward (Fig. 31) on the exterior left side of the control panel enclosure, the alarm buzzer should silence while the alarm LEDs remain illuminated (alternating).
3. When lowered, the high oil alarm (oil detected) alarm condition should deactivate, the high oil alarm auxiliary contacts should deactivate. The remote alarm panel and BAS system should also reset for the next alarm cycle after the alarm condition is cleared on the control panel.
4. Refer to the user input/clearing alarms section on page 13 for more information on how to clear an alarm condition.

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

(Fig. 33)



(Fig. 34)



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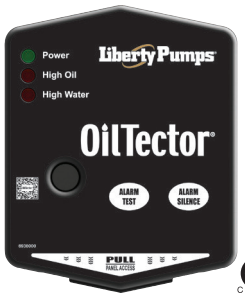

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OilTector Remote Alarm Panel Introduction

WARNING

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 2-Zone Alarm is an indoor rated alarm panel, powered by a standard 120VAC wall outlet. The green power LED will illuminate (solid) when powered. This alarm panel is used with 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 and high water events. A preset level sensor or optional control switches are 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 and/or high water 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 high water alarm input is activated not only by a high water alarm but may also activate on power loss, sensor error, and other trouble alarms (see page 17 for full details). The alarm condition will stay on until the sensor for high oil and/or high water 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 and/or high water 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) 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.

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Installation of the Alarm Panel

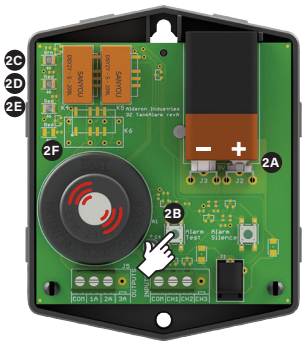
1. To install/replace the battery for the backup power feature, remove the enclosure cover (Fig. 1) and install a 9VDC battery (not included) by pressing down into the positive (+) and negative (–) terminal connections (Fig. 2). After installing battery, perform a quick test, press and hold the alarm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

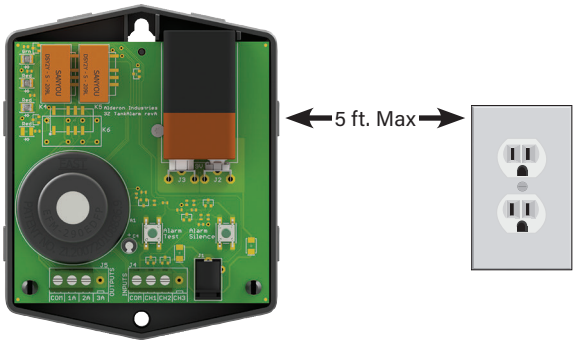


2A = Battery Connections
2B = Alarm Test Pushbutton
2C = Power LED (green)
2D = High Oil Alarm LED (red)
2E = High Water Alarm LED (red)
2F = Alarm Buzzer

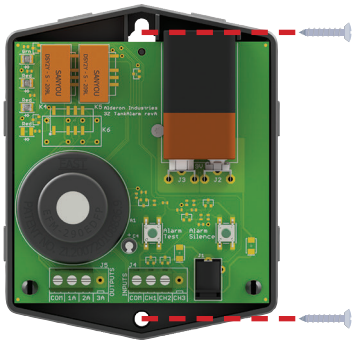
(Fig. 3)

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.

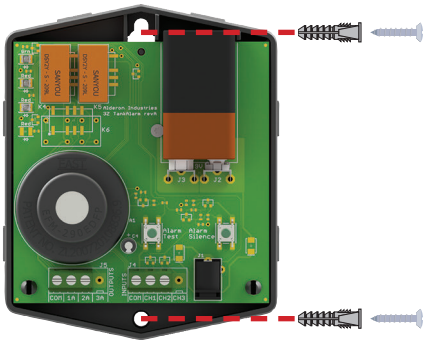
(Fig. 4)



(Fig. 5)



(Fig. 6)



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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 3-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.

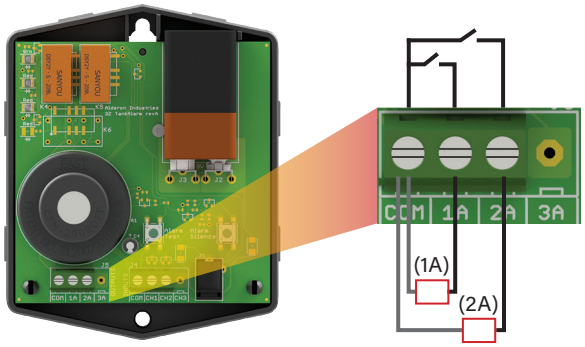
Auxiliary Contacts (OUTPUTS):

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

Note: Terminal 2A will monitor power loss, input sequence error (if enabled), fire mode indication (if enabled), and low level/redundant off alarm (if enabled) depending on the model of control panel connected to the alarm panel. For remote monitoring of pump trouble alarms and pump run status, connect an external monitoring device to the OilTector control panel terminals C2, T1, and P1 (Fig. 8; i.e., 3A and 4A).

(Fig. 7)



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.

(Fig. 8)

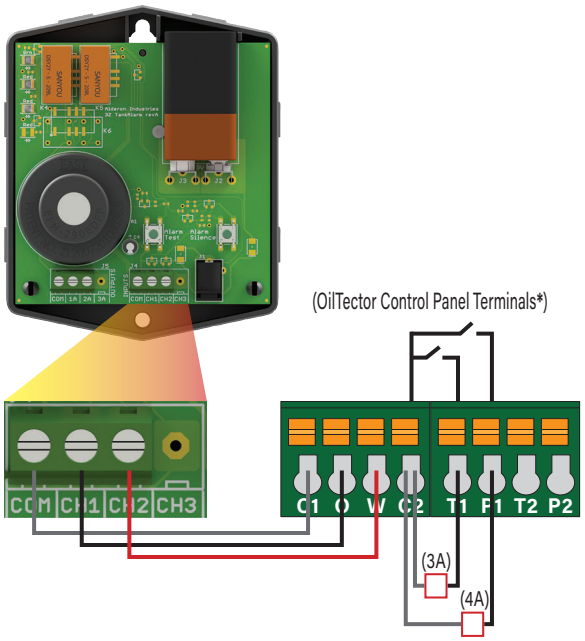
Signaling Device (INPUTS):

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)

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



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

Terminals C2 and T1 (simplex pump applications)
Connect the OilTector control panel pump trouble alarm auxiliary contacts, terminals C2 and T1, to an external monitoring device (Fig. 8; i.e., 3A).

Terminals C2 and P1 (simplex pump applications)
Connect the OilTector pump run auxiliary contacts, terminals C2 and P1, to an external monitoring device (Fig. 8; i.e., 4A).

(*) The OilTector control panel's circuit board exact terminal style may vary but C, O, W 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).

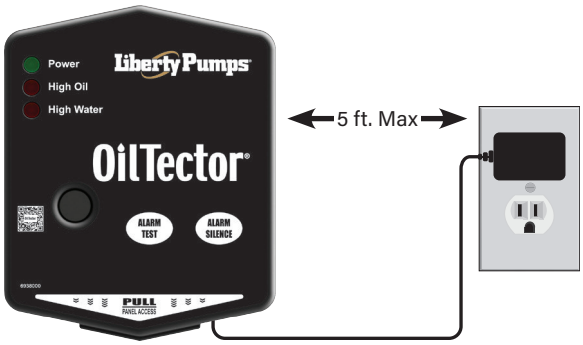
CAUTION: Route all wires away from sharp objects and internal components when installing wires.

(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 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)

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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, optional control switches with oil probe, and remote alarm panel have been completed prior to testing. 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 pages 20, 21, and 23 for system settings and configurations).

2. Verify the pump hand-off-auto (HOA) selector switch/indicator is in the OFF position and the incoming power is connected , the pump should be off (yellow LEDs will flash and pump disabled will be on the display screen). Toggle the HOA switch to the HAND position (press and hold 3-seconds), the pump should start, pump run hand mode should be on the display screen with blue LEDs illuminated (flashing), 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/indicator 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, a high oil alarm (oil detected) event should be on the display screen of the control panel and the red/yellow alarm LEDs should illuminate (alternating), alarm buzzer should annunciate, the high oil alarm auxiliary contacts on the control panel should activate, and remote alarm panel should activate. Flip the test/silence switch upward to silence the alarm buzzer and the alarm LEDs should remain illuminated (alternating).

    ii. When lowered, the high oil alarm (oil detected) alarm condition should deactivate, the high oil alarm auxiliary contacts should deactivate. The remote alarm panel (plus optional BAS system) should also reset for the next alarm cycle after the alarm condition is deactivated on the control panel.

4. With the HOA switch/indicator 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 pump should not start.

    ii. When the water level continues to rise touching the pump start probe (middle), the pump should start, a pump run event should be on the display screen, blue LEDs should illuminate (solid), 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 event should no longer be displayed on the screen, blue LEDs will turn off, and system normal should be on the display screen when in an idle condition.

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

5. With the HOA switch/indicator 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 pump should not start.

    ii. When the water level continues to rise touching the pump start probe (middle), the pump should start, a pump run event should be on the display screen, blue LEDs should illuminate (solid), 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), a high water alarm event should be on the display screen of the control panel and the red alarm LEDs should illuminate (flashing), alarm buzzer should annunciate, the high water alarm auxiliary contacts on the control panel should activate, and the remote alarm panel should activate. Flip the test/silence switch upward to silence the alarm buzzer and the alarm LEDs should remain illuminated (flashing).

    iv. The high water alarm condition will clear once the water level recedes below the high water probe. The remote alarm panel (plus optional BAS system) should also reset for the next alarm cycle after the alarm condition is deactivated on the control panel. After the pump turns off, the control panel pump run event and LEDs should turn off.

6. With the HOA switch/indicator 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. Disconnect the incoming system power cable wires from the control panel circuit board inputs and the remote alarm panel should activate a high water 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.

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Optional Configurations | Customize Application

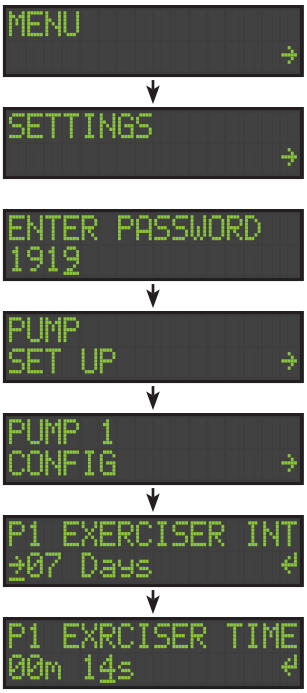
The system includes optional configurations that are not critical to each application, but can be useful to customizing the behavior of the control panel.

1. Set Pump Exercise Timer

If set, the exercise timer will run the pump for a set amount of time after it has been idle for the configured number of days. By default, the exercise timer is disabled. See file path below and display screen examples shown in the diagram (Fig. 1).

1. **System Normal** - Scroll down to MENU and press to view the main menu options available.
2. **Menu** - Scroll down to SETTINGS and press to enter password.
3. **Enter Password** - Enter the system password (factory set; 1919), then scroll down to PUMP SET UP and press to enter.
4. **Pump Set up** - Scroll down to PUMP 1 CONFIG, press to enter and then scroll down to P1 EXERCISER INT DISABLED screen. Press to enable and use the menu scroll wheel to set the desired day value (disabled or 7 - 45 days) and press to change.
5. **Pump Exerciser Time Interval** - After the day value is set, scroll down to P1 EXERCISER TIME, press to set the minutes and seconds values (0:01 - 5:00), then press to change.

(Fig. 1)

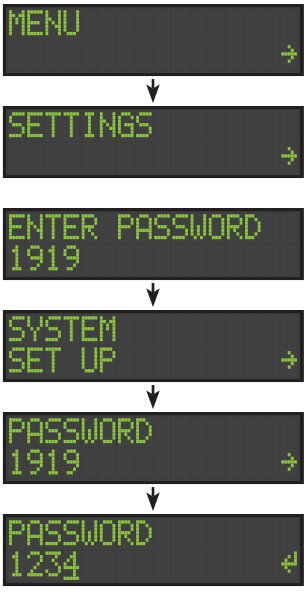


2. Set Password

The password is required to change system settings, keep password in a secure location to prevent unintended changes to the saved configurations. See file path below and display screen examples shown in the diagram (Fig. 2).

1. **System Normal** - Scroll down to MENU and press to view the main menu options available.
2. **Menu** - Scroll down to SETTINGS and press to enter password.
3. **Enter Password** - Enter the system password (factory set; 1919) and then scroll down to SYSTEM SET UP and press to enter.
4. **Password** - Scroll down to PASSWORD, then press and use the menu scroll wheel to enter the new password value (0000 - 9999), then press to change.

(Fig. 2)



3. Config Code

The configuration code (Fig. 3) can be decoded by customer support to provide a snap-shot for how the system is set up.

1. **Config Code** - From system normal scroll down to MENU, press to enter, and then scroll down to view code.

(Fig. 3)

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Optional Configurations | General Settings

The system can be configured to multiple settings and most of the basic configurations have been described. This section outlines more of the general behaviors, such as how long the buzzer stays silenced, how bright the pump run LEDs are, etc.

MENU→ SETTINGS→ PASSWORD→ SYSTEM SET UP:		
NAME	RANGE	DESCRIPTION
Automatic Error Reset	Disabled or Enabled	If enabled (factory set), system error events will clear themselves once the error conditions are resolved. Note this does not apply to pump errors; pump errors always require a user input action.
Silence Time	00:00:00 - 99:59:59	This controls how long the alarm buzzer will be silenced when the test/silence switch is toggled to silence during an alarm event. Factory set to 24:00:00 (24 hours).
Pump Run LED	High, Med, Low, and Off	This controls the brightness of the pump run LED indicators, choose from: high, medium, low, and off. Factory set to low.
System Normal LED Brightness	High, Med, Low, and Off	This controls the brightness of the system normal LED indicators, choose from: high, medium, low, and off. Factory set to low.
Password Change	0000 - 9999	This is the system password and is required to change system settings, keep this password in a secure location to prevent unintended changes to saved configurations. Factory set to 1919.

MENU→ SETTINGS→ PASSWORD→ PUMP SET UP →: (high amp alarm) PUMP 1 CONFIG→: (remaining settings)		
NAME	RANGE	DESCRIPTION
High Amp Alarm	Alarm Only or Alarm + Stop	This controls whether or not the high amp alarms shut off the pump. Note this is only visible if at least one pump has its current sensor enabled. Factory set to alarm only.
Pump 1 Enabled	Disabled or Enabled	This enables or disables pump one. If disabled, the hand-off-auto (HOA) pump selector switch inputs will be unresponsive and the pump will never turn on. Factory set to enabled.
Pump 1 Current Sensor Enabled	Disabled or Enabled	This enables or disables the current sensor for pump one. Factory set to enabled.
Pump 1 Over Current Level	Adjustable	This is the over current threshold for pump one. Note this is only visible if the current sensor is enabled. Factory set to 25.0 Amps.
Pump 1 Under Current Level	Adjustable	This is the under current threshold for pump one. Note this is only visible if the current sensor is enabled. Factory set to 1.2 Amps.
Pump 1 Exercise Interval	Disabled or 7-45 Days	This is the exercise timer for pump one. If the pump has been inactive for the indicated number of days, system will briefly run the pump to maintain pump health. Factory set to disabled.
Pump 1 Exercise Time	00:01 - 05:00	This is how long (minutes and seconds) pump one will run during an exercise event. Factory set to 3-seconds (00:03).
Pump 1 Extended Run Alarm	00:00:00 - 99:59:59	This is how long the system will run the pump before activating an extended pump run time alarm. To disable, set the time to zero (00:00:00). Factory set to disabled/zero.

MENU→ SETTINGS→ PASSWORD→ INPUT SET UP→:		
NAME	RANGE / NAME	DESCRIPTION
Input Preset	1 - 4	This selects the input preset for the system and determines how the system operates. See the input presets listed below for various system options. Factory set to Input Preset 1.
Probe Sensitivity	10.0K - 100.0K	This is the sensitivity the water sensors can be configured to activate (trip) at equivalent resistance values of 10k-Ohms (least sensitive) to 100k-Ohms (most sensitive). Factory set to 50.0 K Ohms.
Input Errors	Disabled or Enabled	If enabled (factory set), the system will alarm if the inputs are activated out of order. For example, if the start probe activates before the stop probe, an error alarm event will occur for the stop probe.
The system can be configured for a variety of sensor set ups using the input presets. Note that one of the presets listed below will have been selected when running the setup wizard depending on user input. This can be changed at any time, whether using the setup wizard or not. See below for list of presets available.		
Input Preset 1 S-OA w/FA	Preset Level Sensor w/ Fire Alarm	This input works with a preset level sensor option and configures the FLT 2 (F) input as a fire alarm auxiliary contact to interface with a building automation system (BAS).
Input Preset 2 S-OA w/RO	Preset Level Sensor w/ Low Level/Red. Off	This input works with a preset level sensor option and configures the FLT 2 (F) input as a low level/ redundant off alarm to stop the pump.
Input Preset 3 S-PS w/FA	Control Switches+Probe w/ Fire Alarm	This input works with the control switches plus oil probe sensor option and configures the FLT 2 (F) input as a fire alarm auxiliary contact to interface with a building automation system (BAS).
Input Preset 4 S-PS w/RO	Control Switches+Probe w/ Low Level/Red. Off	This input works with the control switches plus oil probe sensor option and configures the FLT 2 (F) input as a low level/redundant off alarm to stop the pump.

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Menu System | Quick Stats and Main Menu

The system display home screen includes quick stats for system normal inputs, sensor status inputs, pump lead order, and main menu. The system statistics and settings can be found in the main menu (MENU→) screen.

SYSTEM NORMAL→ HOME SCREEN/QUICK STATS and MENU→:		
DISPLAY SCREEN	**DISPLAY SCREEN**	**DESCRIPTION**
(blank screen; idle)	System Normal Inputs: OOOOO	System is in a normal state/idle, the configured inputs are shown.
	Sensor Status Inputs: OOOOO	System is in a normal state/idle, the sensor status inputs are shown.
	MENU (see below) →	System main menu includes: statistics, settings, optional wireless connection, firmware, and config code.
MENU →	RESETTABLE HISTORY →	includes: Pump One Stats, Liquid Stats, and Back.
	SETTINGS →	includes: Enter Password, Setup Wizard, System Set Up, Pump Set up, Input Set Up, and Back.
	LIFETIME HISTORY →	includes: Pump One Stats, Liquid Stats, and Back.
	FIRMWARE VERSION XXX-01 1.0.0 (example)	Displays the firmware version of the control panel menu system.
	CONFIG CODE ABCDEFGH (example)	Displays the current system configurations which can be decoded for a system snap-shot by customer support.
	BACK ←	(back to main home screen/quick stats menu)

System Statistics | Resettable and Lifetime

The system has both resettable and lifetime statistics for trackable system event information. The resettable statistics appear in *UPPERCASE* font type and the data can be reset to zero at any time. The lifetime statistics appear in *Title Case* font type and are non-resettable. All settings and statistics are retained during power outages. These statistics can be found in the main menu (MENU→) screen.

SYSTEM NORMAL→ MENU→ RESETTABLE HISTORY→:		
DISPLAY SCREEN	**DISPLAY SCREEN**	**DESCRIPTION**
PUMP ONE STATS →	P1 RUN STATS →	includes: last, total, average, minimum, maximum, last amp, average amp, minimum amp, maximum amp, cycle counter, and reset stats?
	P1 FAIL STATS →	includes: counter and reset stats?
	P1 LATCHED STATS →	includes: counter and reset stats?
	P1 HIGH AMPS STATS→	includes: last amp, average amp, minimum amp, maximum amp, counter, and reset stats?
	P1 LOW AMPS STATS →	includes: last amp, average amp, minimum amp, maximum amp, counter, and reset stats?
	BACK ←	(back to main resettable history menu)
LIQUID STATS →	HIGH WATER STATS →	includes: counter and reset stats?
	OIL ALARM STATS →	includes: counter and reset stats?
	BACK ←	(back to main resettable history menu)

SYSTEM NORMAL→ MENU→ LIFETIME HISTORY→:		
DISPLAY SCREEN	**DISPLAY SCREEN**	**DESCRIPTION**
Pump One Stats →	P1 Run Stats →	includes: last, total, average, minimum, maximum, last amp, average amp, minimum amp, maximum amp, and cycle counter
	P1 Fail Stats →	includes: counter
	P1 Latched Stats →	includes: counter
	P1 High Amps Stats →	includes: last amp, average amp, minimum amp, maximum amp, and counter
	P1 Low Amps Stats →	includes: last amp, average amp, minimum amp, maximum amp, and counter
	Back ←	(back to main lifetime history menu)
Liquid Stats →	High Water Stats →	includes: counter
	Oil Alarm Stats →	includes: counter
	Back ←	(back to main lifetime history menu)

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System Configurations | Settings

The system can be configured to specific settings per application and are password protected to prevent unintended changes to program settings. These can be found within the main menu (MENU→ SETTINGS→) screen.

SYSTEM NORMAL→ MENU→ SETTINGS→:			
DISPLAY SCREEN	**DISPLAY SCREEN**	**DISPLAY SCREEN**	**DESCRIPTION, SELECTIONS, or DISPLAY SCREEN EXAMPLES**
SETTINGS →	ENTER PASSWORD 1919		Required to enter the settings menu, factory set to 1919.
	SETUP WIZARD →	SYSTEM TYPE →3 PROBE & FLOAT	Enter: P1 FLA --.- Amps (enter full load amps of the pump) Shown: SET UP FINISHED, INPUTS CONFGURED
		SYSTEM TYPE →3-4FLTS & PROBE	Enter: P1 FLA --.- Amps (enter full load amps of the pump) Shown: SET UP FINISHED, INPUTS CONFGURED
	SYSTEM SET UP →	AUTO ERROR RESET ENABLED →	Select: ENABLED or DISABLED Shown: AUTO ERROR RESET, ENABLED → (example if enabled selected)
		SILENCE TIME 00:00:00 →	Enter: 00h 00m 00s Shown: 00h 05m 00s → (example of 5 minute silence time)
		PUMP RUN LED LOW →	Select: HIGH, MEDIUM, LOW, or OFF Shown: PUMP RUN LED, LOW → (example if low selected)
		NORMAL LED LOW →	Select: HIGH, MEDIUM, LOW, or OFF Shown: NORMAL LED, LOW → (example if low selected)
		PASSWORD 1919 →	Enter: New 4-digit value to change password Shown: PASSWORD, 1234 → (example if changed to 1234 from 1919)
		BACK ←	(back to settings menu)
	PUMP SET UP →	HIGH AMP ALARM ALARM ONLY →	Select: ALARM ONLY or ALARM + STOP Shown: HIGH AMP ALARM, ALARM ONLY → (example if alarm only selected)
		PUMP 1 CONFIG →	(settings):P1 Enabled/Disabled, P1 Current Sensor Enabled/Disabled, P1 Exerciser Interval Disabled/7-45 Days, P1 Exerciser Time (mm/ss), and P1 Extended Run Alarm Disabled/(hh, mm, ss)
		BACK ←	(back to settings menu)
	INPUT SET UP →	INPUT PRESET 1) S-OA w/FA →	Select: 1) S-OA w/FA 2) S-OA w/RO 3) S-PS w/FA 4) S-PS w/RO Shown: INPUT PRESET, 1) S-OA w/FA → (example if #1 selected)
		PROBE SNSITIVITY 50.0 K Ohms →	Enter: value between 10.0 K to 100.0 K Ohms Shown: PROBE SNSITIVITY, 50.0 K Ohms → (if 50.0 K entered)
		INPUT ERRORS ENABLED →	Select: ENABLED or DISABLED Shown: INPUT ERRORS, ENABLED → (example if enabled selected)
		BACK ←	(back to settings menu)
	BACK ←		(back to enter password screen; then BACK← to main menu)

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.

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Basic Troubleshooting

PROBLEM	PROBABLE CAUSE	SOLUTION
Pump does not run	Incoming power is lossed	Check incoming power and restore
	Pump hand-off-auto (HOA) in the OFF position	Toggle HOA selector switch to HAND or AUTO
	Improper wiring of the preset level sensor	Re-seat and check wire connections
	Defective motor contactor	Replace motor contactor
	Pump failure	Replace pump
Pump turns off before the water level recedes below the pump stop probe (longest)	Poor pump or system ground	Check grounding system and wire terminations
	Preset level sensor has dirty or damaged probes	Clean or replace the preset level sensor
Pump runs continuously	Pump hand-off-auto (HOA) in the HAND position	Toggle HOA selector switch to OFF or AUTO
	Improper installation of the preset level sensor	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	Refer to installation and wiring information
	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)	Clear obstruction so the high level float switch can operate properly; the alarm condition should clear when the float switch is deactivated

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